THE 11TH EAST AFRICAN PETROLEUM CONFERENCE & EXHIBITION 2025

CONFERENCE PROCEEDINGS REPORT

5TH - 7TH MARCH 2025

DAR ES SALAAM, TANZANIA

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
AGS	Africa Geophysical Services
BOPD	Barrels of Oil Per Day
CCS	Carbon Capture and Sequestration
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
CRB	Contractors Registration Board
DIT	Dar es Salaam Institute of Technology
DMI	Dar es Salaam Maritime Institute
EAC	East African Community
EAPCE'25	11th East African Petroleum Conference and Exhibition 2025
EAPP	Eastern Africa Power Pool
ECA	Likely Engineering Critical Assessment; not explained
EPSA	Exploration and Production Sharing Agreement
EWURA	Energy and Water Utilities Regulatory Authority
GASCO	Gas Company (Tanzania) Limited
GDP	Gross Domestic Product
GPSA	Government Procurement Services Agency
JNICC	Julius Nyerere International Convention Centre
KSCA	Kasuruban Contract Area
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LWI	Light Well Interventions
MFNP	Murchison Falls National Park
Min-LNG	Mini-Liquefied Natural Gas; abbreviation not defined
NDC	National Data Center
NOC	National Oil Corporation
PAU	Petroleum Authority of Uganda
PBPA	Petroleum Bulk Procurement Agency
PKs	Possibly Polyketones; not defined in the document
PRMS	Permanent Real-time Reservoir Monitoring Systems
PSC	Production Sharing Contract
PURA	Petroleum Upstream Regulatory Authority
REA	Rural Energy Agency

LIST OF ABBREVIATIONS

RE	Renewable Energy
SAPP	Southern Africa Power Pool
SMEs	Small and Medium Enterprises
STOIIP	Stock Tank Oil Initially In Place
Tanesco	Tanzania Electric Supply Company Limited
TBS	Tanzania Bureau of Standards
TCF	Trillion Cubic Feet
TODA	Tanzania Online Drivers Association
TPDC	Tanzania Petroleum Development Corporation
UNCDF	UN Capital Development Fund
UNOC	Uganda National Oil Company
MEMD	Ministry of Energy and Mineral Development
Min-LNG	Small Scale Liquefied Natural Gas
mmscf/d	Million Standard Cubic Feet per Day
MoE	Ministry of Energy
NOC	National Oil Company / National Organising Commitee

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FOREWORD

H. E Veronica M. Nduva,
CBS Secretary General, East African Community

On behalf of the East African Community (EAC), I am honored to have been part of the successful 11th East African Petroleum Conference and Exhibition 2025 (EAPCE'25) held at Julius Nyerere International Convention Centre (JNICC) Dar es Salaam Tanzania, from 5th to 7th March 2025. The conference was preceded by the Pre-Conference Workshop held on 4th March 2025. The East African Petroleum Conference and Exhibition (EAPCE) is a biennial event held since 2003 on a rotational basis among the EAC Partner States. EAPCE'25 particularly provided a unique forum for dialogue for all players in the petroleum industry, regionally and internationally.

The Main Conference theme was **"Unlocking Investment in Future Energy: The Role of Petroleum Resources in the Energy Mix for Sustainable Development in East Africa"**, while the Pre-conference Workshop theme was **"Energy Transition: The Role of East African Partner States in Enabling a Just Energy Transition in East Africa".**

"Unlocking Investment in Future Energy: The Role of Petroleum Resources in the Energy Mix for Sustainable Development in East Africa"

These themes align with the broad goal of the EAC to achieve economic, social, and political integration to create wealth in the region and enhance competitiveness through increased production, trade, and investment. As the world transitions to clean energy, targeted policy approaches to promote energy mix and integration are necessary.

The technical papers, posters, and exhibitions aligned to the Conference theme were presented to stimulate interactions among Conference delegates. The conference provided the platform for the Partner States to showcase the potential for oil and gas that exists in the region and reported on the ongoing activities in exploration, development, and production of oil and gas in the region. Further, the EAC Partner States shared their policy, legal and regulatory frameworks, and other initiatives aimed at continually improving the enabling and facilitative environment for the industry. In addition, field excursions were conducted to the selected geological sites, ongoing projects, and tourist destinations to provide delegates with knowledge and experience of the East Africa region.

The EAPCE'25 would not have been possible without the presence of honored delegates and the generous support of our sponsors, media, partners and other collaborative partners. On behalf of the EAC, I thank them all.

I therefore take this opportunity to invite you to read the proceedings of the 11th edition of the EAPCE. The proceedings provide more information on the prevailing investment opportunities in the oil and gas sector in the region. We look forward to registering increased investment in the sector.

1.0 INTRODUCTION

The 11th East African Petroleum Conference and Exhibition 2025 (EAPCE'25) was held at Julius Nyerere International Convention Centre (JNICC) in Dar es Salaam, Tanzania, from 5th to 7th March 2025, preceded by the Pre-Conference Workshop on 4th March 2025.

The Main Conference theme was "Unlocking Investment in Future Energy: The Role of Petroleum Resources in the Energy Mix for Sustainable Development in East Africa", while the Pre-conference Workshop theme was "Energy Transition: The Role of East African Partner States in Enabling a Just Energy Transition in East Africa".
The EAPCE'25 attracted more than

1,534 delegates from EAC Partners States and beyond and 52 exhibiting companies. The delegates included Government Institutions, International Oil Companies, academic institutions, non-oil and gas companies, development partners, and media. Furthermore, on the sidelines of the conference, there was a participation of university students from EAC Partner States in order to encourage involvement of youth in the planning and implementation of strategies in the oil and gas sector in East Africa.

A total of 72 oral technical papers and 5 posters on different energy related topics were presented during the conference. These presentations covered a wide range of topics including exploration, development and production, mid and downstream opportunities, energy mix and just energy transition, revenue management, cross cutting issues and other investment opportunities. The conference also comprised other major events such as the promotion of the Tanzania 5th licensing round, Kenya's first licensing round, and Uganda's production license areas.

The EAPCE'25 was colored with social events that included an icebreaker reception, conference cocktail, and a gala dinner where various stakeholders had an opportunity to network. Furthermore, cultural groups such as Kibati, Maasai, Mganda, and live band Taarab were part of the entertainment for the conference.

THE 11TH EAST AFRICAN PETROLEUM CONFERENCE & EXHIBITION 2025(EAPCE'25)

PRE-CONFERENCE WORKSHOP

TOPIC

Energy Transition: The Role of East Africa Partner States in Enabling a Just Energy Transition in East Africa

JNICC - DAR ES SALAAM | 4TH MARCH 2025

2.0 PRE-CONFERENCE WORKSHOP

2.1. INTRODUCTION

The Pre-Conference Workshop was held on 4th March 2025. The theme of this workshop was "Energy Transition: The Role of East Africa Partner States in Enabling a Just Energy Transition in East Africa". The topics discussed during this session included:

- **Energy Transition**: General Overview of Global Energy Transition,
- **CNG as Transition Energy**: Case Study of Tanzania; (3) Plans, Strategies, Opportunities, and Challenges Toward Carbon Net Zero, 2050; and
- **Clean Cooking**: Plans and Strategies. The workshop deliberations provided clear strategies for balancing sustainability, economic growth, and social equity, ensuring that the region's energy transition remains just, inclusive, and aligned with global climate goals.

The Ministry of Energy in Tanzania, Petroleum Upstream Regulatory Authority (PURA), Tanzania Development Petroleum Corporation (TPDC) and the Energy and Water Utilities Regulatory Authority (EWURA), in collaboration with oil and gas sector partners, sponsored and hosted the Pre-Conference Workshop.

The Guest of Honor for the Pre-Conference Workshop was Hon. Dr. Doto Mashaka Biteko, the Deputy Prime Minister and Minister for Energy, Tanzania. Alongside him were other distinguished leaders from the host country, Tanzania, EAC Partner States, and beyond. Among them were Hon. Andrea Ariik Aguer Malueth (Deputy Secretary General, Infrastructure, Productive, Social, and Political Sectors), Hon. Judith Kapinga (Deputy Minister of Energy), Eng. Felchesmi J. Mramba (Permanent Secretary – Ministry of Energy), Edward Mpogolo (Ilala District Commissioner), Dr. James Mataragio (Deputy Permanent Secretary – Petroleum and Gas), as well as the Commissioner of Petroleum, Board Chairpersons and Heads of Institutions.

2.2. OBJECTIVES OF THE WORKSHOP

The overall objective of the Pre-Conference Workshop was to bring together the EAC Partner States and stakeholders to discuss plans and strategies for a Just Energy Transition.

Specifically, the workshop aimed to provide a platform for open dialogue and facilitate collaboration on key issues, including the Global Energy Transition, Natural Gas as a Transition Energy, Carbon Net Zero by 2050, and Clean Cooking. It sought to foster an environment for joint problem-solving and innovation in shaping East Africa's energy future by aligning its energy policies with global climate goals while addressing local needs for energy access and sustainable development.

2.3. OPENING SESSION

2.3.1. REMARKS FROM EAC SECRETARIAT

Hon. Malueth welcomed all participants to the Pre-Conference Workshop, which set the stage for the EAPCE'25 with a warm greeting and expressed his gratitude to the Government of the United Republic of Tanzania for their hospitality in hosting the event. He highlighted that EAC comprising of eight Partner States (Republic of Burundi, Democratic Republic of the Congo, Republic of Kenya, Republic of Rwanda, Federal Republic of Somalia, Republic of South Sudan, the United Republic of Tanzania and Republic of Uganda) is a region with immense opportunities for growth in the petroleum industry.

With a combined population of 302.2 million and a GDP of USD 312.9 billion, the EAC offers tremendous opportunities in the petroleum industry. The region's strategic location and growing energy demand position it as a key player in the global energy landscape. He further pointed out that the energy sector in the region is guided by the EAC Treaty, signed in 1999 and effective from 2000. The Treaty's primary

Hon. Andrea Ariik Aguer Malueth, Deputy Secretary General, Infrastructure, Productive, Social and Political Sectors, EAC.

goal is to ensure the availability of reliable, cost-effective, and environmentally friendly energy sources, supporting regional integration, attracting investments, and enhancing trade competitiveness. He informed that the EAPCE has been held biennially since 2003, serving as a crucial platform for dialogue among stakeholders in the petroleum industry.

This year's Pre-Conference Workshop, among other things, provided young professionals with an opportunity to engage with industry experts on emerging technologies and the critical issue of energy transition for climate action. Looking ahead, he reminded the participants that the 11th EAPCE was officially going to be opened the following day, 5th March 2025, in Dar es Salaam. Over the course of the three-day conference, technical papers were going to be presented, offering valuable insights into the future of East Africa's energy sector. He encouraged everyone to actively engage in the conference, take advantage of learning and networking opportunities, and contribute to the ongoing discussions about the region's energy future

2.3.2. REMARKS BYREMARKS BY DEPUTY MINISTER FOR ENERGY-TANZANIA

Hon. Kapinga expressed her deep honor in delivering the welcoming remarks at the Pre-Conference workshop, which served as the precursor to the EAPCE'25. In her address, she conveyed confidence that the carefully selected topics for the Pre-Conference would engage and inspire participants. She emphasized that the topics were designed not only to address key concerns in the energy sector but also to lay a solid foundation for the discussions that were to take place during the main conference.

She highlighted the theme of the Pre-Conference, **"Energy Transition: The Role of East African Partner States in Enabling a Just Energy Transition in East Africa,"** as a crucial topic for the event. She added that the deliberations under this theme would offer actionable strategies for navigating the challenges of transitioning to sustainable energy while ensuring no one is left behind. She was confident that the insights that were going to be shared during the sessions would help in developing informed policies, strategies,

Hon. Judith S. Kapinga, Deputy Minister for Energy, Ministry of Energy, Tanzania

and partnerships, ultimately advancing East Africa towards a cleaner, more resilient, and inclusive energy future.

Further, she described the workshop as a vital platform for EAC Partner States, policymakers, industry leaders, and key stakeholders to engage in meaningful dialogue, exchange best practices, and explore innovative solutions that would drive the region toward a just energy transition. She underscored that, from discussions on Compressed Natural Gas (CNG) as a transition energy source to strategies for achieving net zero carbon emission by 2050 and advancements in clean cooking technologies, the sessions would address essential aspects that shape our energy landscape.

She also took a moment to thank the organizers of the Pre-Conference, particularly the EAC Secretariat, Steering Committee, National Organizing Committee, esteemed speakers, panelists, and sponsors, for their unwavering support in making the event a success. She extended her gratitude to all participants for attending, acknowledging that the event would not have been possible

The deliberations under this theme would offer actionable strategies for navigating the challenges of transitioning to sustainable energy while ensuring no one is left behind.

without their commitment to register and participate.

In her concluding remarks, she encouraged delegates to actively engage in the discussions and participate in the lively, fruitful sessions. She also invited participants to visit the CNG clinic at the exhibition pavilion for further insights into this key energy topic. With great honor, she invited the Chief Guest, the Deputy Prime Minister and Minister for Energy of the United Republic of Tanzania, Hon. Dr. Doto M. Biteko, to deliver the opening remarks

2.3.3. SPEECH FROM THE CHIEF GUEST

Hon. Biteko began by giving a brief on the importance of the workshop and imploring participants to actively engage in discussions around just energy transition and strategize on how the EAC Partner States can smoothly realize the transition.

He touched on the climate change crisis facing the world, mainly because of human activities. In this area, Hon. Dr. Biteko talked

Hon. Dr. Doto M. Biteko, Deputy Prime Minister and Minister for Energy, Tanzania

about the increase of carbon emission levels witnessed today compared to that of the pre-industrial era and associated consequences such as severe drought, floods, biodiversity loss, the rise of sea level, and the dwindling of freshwater resources, to mention a few.

In a similar vein, he briefly mentioned collaborative efforts undertaken to address climate change, citing international treaties and agreements such as the Kyoto Protocol, Montreal Protocol, and the Paris Agreement.

Still on climate change, he explained that despite being the least contributor to climate change, African countries have been proactive in driving the climate change agenda, incorporating it into their legal and regulatory frameworks to ensure adherence to the global commitment to climate action.

Most of these legislations, he said, put emphasis on green economy, low carbon emission, and sustainable development as adaptation and mitigation measures. At this juncture, he commended actions taken by the East African Community to put in place the EAC Climate Change Policy and the EAC Climate Change Master Plan to address the observed climate change crisis in the region.

81%

Africa still relies on firewood and charcoal for cooking with about 81% of households depending on wood and charcoal as their primary cooking energy sources.

On energy transition plans, Dr. Biteko explained that the East African Partner States and African countries as a whole, have adopted practical strategies to ensure the region shifts from using polluting energies to clean energies.

Referring to strategies, he cited the National Energy Compact for the United Republic of Tanzania, the Kenya Energy Transition and Investment Plan 2023 – 2050; the Uganda Energy Transition Plan, and the National Energy Compact for the Democratic Republic of Congo.

Apart from energy transition, Hon. Biteko talked about critical electricity access challenges facing African countries. He also appreciated and commended efforts put forth to address the electricity challenge, specifically mentioning the Africa Heads of State Energy Summit held in Tanzania in January 2025, through which African countries committed to expanding access to electricity to 300 million Africans by 2030.

He also touched on clean cooking as an indispensable part of the energy transition since a great population in Africa still relies on firewood and charcoal for cooking with about 81% of households depending on wood and charcoal as their primary cooking energy sources.

This massive dependence on biomass, Dr. Biteko stated, resulted in an alarming loss of forest and biodiversity, a situation that necessitated an urgent and coordinated response to advance the clean cooking agenda across the continent.

Citing Tanzania as a case, Hon. Biteko applauded the clean cooking initiatives by the President of the United Republic of Tanzania, Her Excellency Dr. Samia Suluhu Hassan, initiatives that are driving the clean cooking agenda not only in Tanzania but also in Africa. As a clean cooking champion in Africa, he said, Hon. Dr. Samia Suluhu Hassan led 26 African Governments to endorse the high-level Clean Cooking Declaration for Africa.

Alongside electrification and clean cooking, Dr. Biteko expressed that the use of natural gas as fuel in vehicles is also imperative in realizing energy transition. In this context, he explained that the Government of the

Her Excellency Dr. Samia Suluh Hassan
President of the United Republic of Tanzania

United Republic of Tanzania continues to encourage and improve the environment for private investors to participate in the construction of Compressed Natural Gas (CNG) infrastructure refueling stations and workshops for installing gas systems. By using natural gas, which is cleaner than petrol and diesel, he insisted, the country will not only walk the talk of energy transition but promote saving since a CNG user can save approximately 40-60% of costs compared to fuel for the same distance.

Speaking of Tanzania, Dr. Biteko said that the use of CNG began in 2009 as a pilot project through the construction of the main station (Mother Station) and a CNG refueling station in Dar es Salaam. As of January 2025, he said, six (6) CNG refueling stations had been constructed, eight (8) were under construction and 50 investors expressed interest in building more stations.

He also hinted that there were over twelve (12) workshops involved in installing CNG systems in vehicles and that it is on the Government's plan to build six (6) refueling stations in Dar es Salaam, Pwani, Morogoro, and Dodoma through the Government Procurement Services Agency (GPSA).

He urged participants to use the platform to thoroughly discuss and set actionable strategies around energy transition, clean cooking, and CNG and called on investors and the general public to take advantage of this event to get more information about CNG and its benefits.

He concluded by reiterating that energy transition is a shared responsibility of EAC member states, aimed at creating an equitable energy sector. With that, he declared the Pre-Conference workshop for EAPCE'25 officially opened.

CNG FILLING PUMP

CNG MOTHER STATION INFRASTRUCTURE

2.4. KEYNOTE PRESENTATION: ENERGY TRANSITION - GENERAL OVERVIEW OF GLOBAL ENERGY TRANSITION

Eng. Anita Otto Ringia - Clean Cooking Expert, Tanzania

The global energy transition is necessary to address climate change, reduce carbon emissions, and ensure equitable access to energy. Clean cooking is a critical aspect of this transition as it directly impacts health, environmental sustainability, and gender equality by replacing polluting biomass-based cooking with modern alternatives like LPG, electricity, and biofuels.

Currently, 2.1 billion people worldwide lack access to clean cooking, with 990 million in Sub-Saharan Africa. Traditional biomass-based cooking methods pose significant health risks due to indoor air pollution, particularly affecting women and children. The reliance on firewood and charcoal also contributes to gender inequalities and severe environmental degradation, accelerating deforestation and climate change.

Eng. Ringia showcased a documentary that highlighted the effects of traditional cooking practices in Africa, including health hazards, gender disparities, and environmental impacts due to the heavy reliance on firewood and charcoal. The documentary showed that in the year 2021, only 6.9% of the population in Tanzania had access to clean cooking energy sources. Recognizing these challenges and in alignment with international commitments to providing access to clean

energy for all, it was highlighted that under the leadership of Her Excellency Dr. Samia Suluhu Hassan, President of the United Republic of Tanzania, as a global champion, Tanzania has committed to advancing the Clean Cooking agenda. The documentary also showed initiatives that aim to promote cleaner and more sustainable energy solutions, ensuring improved health, gender equality, and environmental conservation.

Eng. Ringia also presented how clean cooking is a pivotal component of the global energy transition agenda, highlighting initiatives from Tanzania as a case study.

2.1
Billion people
Currently, 2.1 billion people worldwide lack access to clean cooking, with 990 million in Sub-Saharan Africa.

2.5. PANEL DISCUSSION

2.5.1. CNG AS TRANSITION ENERGY: CASE STUDY TANZANIA

This session was moderated by **Dr. Esebi A. Nyari**, who serves as the CNG Manager at the vehicle conversion workshop at the Dar es Salaam Institute of Technology (DIT), Tanzania. The participants in this panel discussion were Eng. Emmanuel Gilbert Simon - Ag. Director of Gas Business from Tanzania Petroleum Development Corporation (TPDC); Eng. Poline Msuya - Director of Natural Gas, Energy and Water Utilities Regulatory Authority (EWURA), Tanzania; Eng. John Bura, Director, BQ Contractors, Tanzania; Mr. Amr Aboushad - Country Manager, TAQA, Tanzania; Mr. Eric Kironde - Chief Financial Officer, Dangote Cement Limited, Tanzania; and Ms. Florah Mwankali - Chairperson, Tanzania Online Driver Association (TODA)

The session highlighted Tanzania's progress in CNG adoption and the role of public and private partnerships in scaling its use. The Government's incentives, infrastructure expansion, and regulatory support create a favorable environment for investment. Addressing challenges such as land acquisition bureaucracy and infrastructure costs will accelerate CNG adoption, positioning Tanzania as a regional leader in the clean energy transition. The key highlights of the session were;

i. Gas discovery was made at Songo Songo Island in 1974, Mnazi Bay in 1982, Mkuranga in 2008, Ruvu in 2017, and Ruvuma in 2018. These are onshore discoveries that bring an estimated reserve of 10.41 TCF. Both the Songo Songo and Mnazi Bay gas fields have been developed and have been producing gas since 2004 and 2006, respectively, for power generation, industries, households, and vehicles. Significant gas discovery was made between 2010 and 2014 in deep offshore Tanzania to an estimated reserve of 47.13 TCF. This makes a total reserve of around 57.54 TCF(GIIP).

ii. An additional 140 million standard cubic feet per day (mmscf/d) is expected to be produced from the Ntorya Gas Field in 2026. The Government has expanded natural gas distribution to 2,000 households and increased CNG stations from one to six. Efforts are also underway to construct a CNG Mother Station at the University of Dar es Salaam, expected to be launched by the end of March 2025. To enhance supply beyond pipeline coverage, the Government has acquired five mobile CNG trucks and is engaging investors in Mini LNG facilities. Additionally, discussions are ongoing with Uganda, Zambia, and Malawi for cross-border natural gas pipeline projects.

iii. The Government recognizes the private sector's role in CNG infrastructure development, with five out of six operational stations owned by private investors. To attract investment, incentives include a Value Added Tax (VAT) exemption on CNG conversion kits and technical equipment. Regulatory bodies such as EWURA, TBS, and CRB ensure compliance with safety standards. The Government's supportive regulatory framework encourages further private sector participation in CNG distribution and utilization.

iv. Since 2019, the private sector has shown strong interest in CNG, with over 50 applications for filling stations. Key investment opportunities include vehicle conversion services, CNG distribution, mobile refueling units, and manufacturing of CNG equipment such as storage cylinders and dispensers. Expansion in these areas presents job creation opportunities, particularly in vehicle conversions, maintenance, and station operations.

v. Public-Private Partnerships (PPPs) are essential for accelerating CNG adoption in Tanzania. The Government can support investors by providing land incentives, streamlining permit acquisition, and securing financial backing with lower loan interest rates. Incentives for public transport operators using CNG and policy reforms to integrate fuel and gas stations

Panelists for the session on CNG as Transition Energy

under a unified licensing framework can also drive adoption. Establishing a fair tax structure for CNG investment will further promote growth.

vi. Large companies, such as Dangote Cement, have invested in private CNG stations to reduce fuel costs and emissions. Currently, dual-fuel systems (CNG and diesel) are used due to limited refueling stations, but further infrastructure expansion would enable full CNG adoption. Despite benefits such as reduced CO_2 emissions and cost savings, challenges faced include bureaucratic delays in land acquisition and high initial investment costs.

vii. CNG offers significant cost savings for online taxi businesses. Drivers benefit from lower fuel expenses, extended driving ranges per refill, and increased profitability. Improved access to CNG refueling stations from just one in 2018 to six as of March 2025 has further facilitated adoption.

viii. The Government's collaboration with private investors continues to enhance CNG infrastructure, making it a more viable fuel alternative.

2.5.2. PLANS, STRATEGIES, OPPORTUNITIES, AND CHALLENGES TOWARD CARBON NET ZERO, 2050

Eng. Peter Kichogo, who serves as a Managing Director at SolutionsTag, Tanzania moderated this session. The panelists for the session were Emilian Nyanda - Head of Environmental Management Unit, Ministry of Energy, Tanzania; Eng. Mungai Kihara - Deputy Director Renewable Energy, Ministry of Energy & Petroleum, Kenya; and Ms Proscovia Nabbanja- CEO, UNOC, Uganda.

The discussion focused on the role of EAC Partner States in achieving Carbon Net Zero by 2050 while balancing economic growth and energy security. The moderator highlighted international climate commitments, including the Paris Agreement, and questioned whether the 2050 goal is realistic given existing challenges and opportunities in decarbonization strategies and technologies. The panelists discussed various issues as follows;

i. Tanzania is implementing its decarbonization strategy while ensuring economic stability and energy security.

Despite underutilizing its natural resources, the country aims to maximize energy options, including oil and gas, while transitioning to greener energy. The National Energy Policy (2015) promotes clean energy, including clean cooking and natural gas adoption, contributing to emission reductions.

ii. Tanzania's carbon emissions remain low at 0.22 tonnes of CO_2 equivalent, yet the country has established a Greenhouse Gas Inventory under the National Carbon Monitoring Centre to track emissions from various energy sources. Other initiatives include the National Renewable Energy Strategy, which targets a 30% renewable energy share, and the Tanzania National 300 Mission, which promotes carbon reduction through clean energy. Tanzania has 48 million hectares of intact forests for carbon sequestration and has implemented the Blue Economy Policy to ensure sustainable marine resource use with minimal ecological impact.

iii. Despite Sub-Saharan Africa contributing the least to global emissions, it faces severe climate change impacts. Kenya's Long-Term Emission Strategy (2050) integrates all sectors to reduce carbon emissions, with a focus on decarbonizing transport and industrial sectors, which are major CO_2 contributors. Kenya is also exploring Green Hydrogen for steel and cement industries, importing CNG from Tanzania to promote cleaner fuel use, and expanding renewable energy adoption to support sustainability goals.

iv. Achieving a green energy transition is challenging for low-energy-producing countries as they struggle to meet national energy demands. The transition must address both environmental concerns and economic development. Key obstacles include energy accessibility, security, and afford-ability disparities within the EAC region, the need for reliable energy sources for industrial parks and production stability, and financing restrictions on energy projects with stringent environmental and social requirements affecting loan accessibility.

v. Integrating existing energy infrastructure with new low-carbon technologies, such as carbon capture and storage (CCS), will be essential. Knowledge and technology sharing among EAC Partner States should be prioritized, including Kenya's geothermal expertise, Tanzania's natural gas experience, and Uganda's oil industry lessons. Creating favorable fiscal, legal, and regulatory frameworks will encourage private sector participation in green projects through tax incentives, subsidies, and investment opportunities. Leveraging financial institutions will help secure funding for clean energy initiatives.

By implementing these measures, EAC Partner States can accelerate the journey toward Carbon Net Zero while ensuring sustainable economic development and energy security.

2.5.3. CLEAN COOKING: PLANS AND STRATEGY

Imanuel WillyGod Muro, Senior Finance Specialist / CookFund Programme Manager, UN Capital Development Fund (UNCDF), moderated this session.

The panelists for the session were

Farhiya Hersi Warsame, Managing Director, Rashal Energies Ltd, Tanzania;

Eng. Anita Otto Ringia – Clean Cooking Expert, Ministry of Energy, Tanzania;

Mr. Francis Wawiye – Senior Geophysicist, State Department of Petroleum, Kenya; and ;

Shabani Fundi – Marketing Manager ORYX, Tanzania.

The discussion highlighted Tanzania's National Clean Cooking Strategy, a 10-year initiative aimed at increasing access to clean cooking solutions, particularly LPG, across urban and rural areas. The strategy

Panelists for the session on Plans, Strategies, Opportunities, and Challenges Toward Carbon Net Zero, 2050

focuses on reducing environmental impact, empowering women, and improving public health by minimizing exposure to smoke and soot. Moreover, the discussion highlighted the comparison between LPG and natural gas businesses, and Kenya's and Uganda's approaches to clean cooking.

i. Tanzania has increased LPG adoption from 5% in 2019 to 9% of the population currently, with a goal of reaching 80% by 2034. The strategy includes subsidizing LPG cylinders, expanding infrastructure, and running awareness campaigns. However, challenges remain in distribution, afford-ability, and accessibility, particularly for rural communities.

ii. Charcoal use is more expensive and environmentally damaging, making the shift to LPG crucial. The Government of Tanzania, through the Rural Energy Agency (REA), provides a 50% subsidy on LPG cylinders for rural households. However, requiring a National ID for subsidy eligibility has excluded some individuals, highlighting the need for policy adjustments.

iii. Kenya has achieved 24% LPG penetration and is working on a legal and regulatory framework to ensure market stability, prevent illegal filling stations, and encourage competition. The Bulk Supply Terminal in Mombasa can store 30,000 metric tonnes of LPG, but more suppliers are needed nationwide. The Government also provides tax incentives for LPG infrastructure development.

iv. Kenya has piloted LPG adoption in 20 public schools, leading to 11,000 more schools applying for the program. The National Oil Corporation (NOC) is set to distribute 300,000 LPG cylinders. Also, the affordable housing project of about 1080 units have been built with plan to use LPG cylinders right away after completion. Given LPG's low profit margins, large-scale importation is necessary, requiring Government-private sector partnerships to ensure broad accessibility and afford-ability.

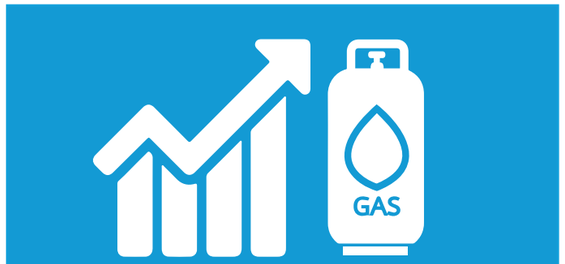
v. Uganda's oil refinery, in partnership with the UAE (60% ownership), will produce LPG for East African markets, with plans to double its capacity by 2035. However, logistics and transport costs remain a major barrier to reaching regional consumers. Refinery operations are projected to emit 1 million tonnes of CO_2 annually, prompting Uganda to launch reforestation projects for carbon sequestration. Uganda also aims to replicate Kenya's LPG adoption in public schools to support clean cooking initiatives.

vi. LPG is a cleaner alternative to

Panelists for the session on Clean Cooking: Plans and Strategy

biomass but remains price-volatile due to global market fluctuations. Some investors hesitate to fund LPG projects due to its CO_2 emissions. However, it remains a practical solution for remote areas, as it can be transported by trucks. Natural gas is a cheaper and more stable alternative, shielded from FOREX fluctuations, with lower emissions than LPG. The challenge lies in pipeline infrastructure, which limits access to remote areas. Despite high initial investment costs, maintenance costs are low, making it a viable long-term solution.

To accelerate adoption, large LPG distribution centers should be built in strategic rural locations for easier access. The refill cost challenge must be addressed through incentives, such as bonuses, cost relief, or Buy Now Pay Later options. Additionally, stakeholders should fast-track natural gas distribution to expand clean cooking access nationwide. By tackling these challenges, East Africa can achieve a sustainable and inclusive clean cooking transition, improving energy access while reducing environmental impact.



Tanzania has increased LPG adoption from 5% in 2019 to 9% of the population currently, with a goal of reaching 80% by 2034.

Shabani Fundi
Sales Manager, Oryx Energy Tanzania

2.6. RECOMMENDATIONS

The discussions during the Pre-Conference Workshop highlighted the urgency of implementing energy transition plans, increasing access to clean cooking solutions, and expanding the use of Compressed Natural Gas (CNG). Additionally, participants emphasized the need for policy frameworks that attract investment in clean energy infrastructure and promote regional collaboration.
In light of these discussions, the following key recommendations are proposed for EAC Partner States to accelerate the energy transition and enhance energy security in the region:

i. Harmonize energy policies across EAC Partner States to facilitate cross-border energy trade and investment in energy projects.
ii. Encourage Public-Private Partnerships to expand energy access particularly in rural areas.
iii. Develop and implement national clean cooking strategies to reduce dependence on biomass and promote the adoption of clean cooking technologies.

iv. Enhance the infrastructure for Compressed Natural Gas (CNG) to support its use in transportation and industrial applications.

v. Support research institutions and universities in developing innovative solutions for clean energy adoption and efficiency improvements.

vi. Establish regional training programs and knowledge-sharing platforms in the Region to build expertise in energy efficiency, and carbon markets.

vii. Streamline licensing and regulatory processes to attract foreign and domestic investments in the energy sector.

viii. Align national energy policies with global climate commitments, including the Paris Agreement, to ensure sustainable development and emissions reduction.

ix. Invest in expanding natural gas pipelines, and integrating other energy sources to ensure reliable, efficient, and affordable energy supply across the region.

x. Facilitate access to green financing to support clean energy technology investments by leveraging international climate funds and securing concessional loans.
By implementing these recommendations, EAC Partner States can accelerate their energy transition, improve energy access, and contribute to regional economic growth while addressing climate change challenges.

2.7. CLOSING REMARKS

Eng. Felchesmi J. Mramba
Permanent Secretary, Ministry of Energy,
United Republic of Tanzania

Eng. Felchesmi J. Mramba, the Permanent Secretary, Ministry of Energy, United Republic of Tanzania, delivered the closing remarks for the insightful and productive Pre-Conference Workshop of the EAPCE'25. He explained that the discussions had been both enlightening and thought-provoking, reflecting the collective commitment to addressing the challenges and opportunities that lay ahead in the journey toward a just energy transition in East Africa.

He highlighted that, over the course of the day, critical topics shaping the future of energy in the region were explored. The workshop began with a comprehensive discussion on the global energy transition, where the role of natural gas in the energy mix, the urgency of clean cooking solutions, and the delicate balance between energy security and climate goals were examined. He pointed out that the session on CNG as a transition fuel, with Tanzania serving as a case study, underscored the immense potential of CNG in the region, highlighting ongoing infrastructure developments, regulatory frameworks, and investment opportunities. It became evident that Public-Private Partnerships (PPPs) will play a vital role in expanding the use of CNG across various sectors, ensuring affordability, accessibility, and sustainability.

He further noted that a particularly significant discussion followed on the pathway to achieving net zero carbon by 2050. Representatives of various EAC Partner States shared strategies, challenges, and opportunities in their decarbonization efforts. It was clear that, while each country has its unique roadmap, there is a strong regional consensus on the need for investment in green technologies, regulatory reforms, and access to carbon financing to drive low-carbon energy solutions.

Finally, he noted that the workshop also engaged in a crucial conversation on clean cooking solutions, exploring national strategies, regulatory frameworks, and investment opportunities. He acknowledged that it was heartening to witness the shared commitment to making clean cooking fuels and technologies more accessible and affordable across East Africa.

He concluded that it was clear that the path to a just energy transition requires not only political will and strategic planning but also the collective efforts of all stakeholders, including Governments, private sector players, development partners, and civil society. He affirmed that the Ministry of Energy of the United Republic of Tanzania remains steadfast in its commitment to fostering regional cooperation, attracting investments in sustainable energy solutions, and creating an enabling environment for both public and private sector participation.

3.0 MAIN CONFERENCE

3.1. INTRODUCTION

The Guest of Honor for the main conference was Hon. Dr. Phillip Isdor Mpango, the Vice President of the United Republic of Tanzania. Along with distinguished leaders from the host country, Tanzania, and other distinguished guests from EAC Partner States and beyond. Among them were H.E. Veronica Nduva, Secretary General of the East African Community (EAC), Hon. Dr. Doto Biteko, the Deputy Prime Minister and Minister for Energy, United Republic of Tanzania, Hon. James Opiyo Wandayi, Cabinet Secretary for Energy and Petroleum, Kenya, Hon. Can. Dr. Ruth Nankabirwa Ssentamu, Minister for Energy and Mineral Development of Uganda, Hon. Dahir Shire, Minister for Petroleum and Mineral Resources of the Federal Republic of Somalia, Hon. Mahmoud Thabit Kombo, Minister for Foreign Affairs and East African Cooperation, Hon. Shaaban Ali Othman, the Zanzibar Minister for Blue Economy and Fisheries, Hon. Judith Kapinga, Deputy Minister of Energy, United Republic of Tanzania, Hon. Jennifer Namuyangu, Minister of State for Bunyoro Affairs. In attendance were also Members of Parliament, Permanent Secretaries, Ambassadors, Regional Commissioners, Heads of Institutions, District Commissioners, delegates, Board Chairpersons, development partners, sponsors, speakers, panelists, and members of the press from Partner States.

3.2. OPENING SESSION

The sessions started with opening prayers from religious leaders, namely Samuel Rolinga from Omega Ministries Church of All Nations (OCOAN) and Akhmed Kagauma from Baraza Kuu la Waislamu Tanzania (BAKWATA), followed by the introduction of delegates who attended the conference that was done by the Master of Ceremony (MC). After the introduction, the MC briefed the audience about the conference before welcoming the EAPCE'25 Steering Committee Chairperson, Dr. James Mataragio to make his remarks.

3.2.1. REMARKS FROM THE SC CHAIRPERSON

Dr. James P. Mataragio, Deputy Permanent Secretary and Chairperson of the Steering Committee

Dr. Mataragio narrated the history of the EAPCE from its inception. He said that EAPCE was first held in Mombasa, Kenya, in 2003, with the prime objective of promoting the exploration, development, and production of oil and gas in the region. From then on, he said the conference had been held biennially on a rotational basis amongst Partner States.

Dr. Mataragio informed the audience that the conference at first attracted few participants because it commenced at a time when none of the founding Partner States (namely the Republic of Kenya, the Republic of Uganda, and the United Republic of Tanzania) had started production of hydrocarbons. With increasing hydrocarbon prospects in the region, the commercialization of natural gas in Tanzania in 2004, and the first commercial oil discovery in Uganda in 2006, EAPCE started to gain ground and attracted more participants.

As a result, the EAPCE became a vital platform for Partner States to deliberate and draw actionable strategies to develop the discovered resource sustainably and enhance the exploration of petroleum in the region.

Dr. Mataragio concluded his remarks by expressing his gratitude to the Government of Tanzania, EAC Partner States, EAC Secretariat, sponsors and everyone who participated in one way or another in making the event a reality. Thereafter, Dr. Mataragio invited Eng. Felchesmi J. Mramba, the Permanent Secretary of the Tanzania Ministry of Energy, to make his welcoming remarks.

3.2.2. WELCOME REMARKS AND INTRODUCTION

Eng. Felchesmi J. Mramba, Permanent Secretary, Ministry of Energy Tanzania

Eng. Mramba started off by welcoming delegates on behalf of the Ministry of Energy, Tanzania. He then stated that the conference is a cornerstone in promoting the exploration, development, production, and sustainable utilization of oil and gas resources in the EAC.

As Tanzania navigates the global energy landscape, he said, the country remains steadfast in its commitment to leveraging natural gas as a transitional fuel, supporting industrialization and transportation through CNG, and ensuring access to clean cooking energy for its people.

He added that in line with national strategies, Tanzania is accelerating efforts to transition from traditional biomass cooking methods to modern and clean alternatives such as natural gas, liquefied petroleum gas, and electricity. This transition, he insisted, is crucial for enhancing public mitigation of environmental impact to address environmental degradation and foster energy efficiency.

Speaking about the event, Eng. Mramba emphasized that EAPCE is not just a regional gathering but an international forum for collaboration, knowledge exchange, and innovation. It provides a unique opportunity for stakeholders to engage in meaningful dialogue, adopt cutting-edge technologies, and address sectoral challenges while working towards a diversified and sustainable energy future.

For Tanzania, Eng. Mramba said that hosting the conference is a privilege as it allows the country to exchange experiences, build stronger partnerships, and deepen regional cooperation in the oil and gas sector while advancing the broader energy transition agenda. Of particular interest, he said with emphasis, is the promotion of clean cooking solutions that improve livelihood and protect the environment.

He then thanked the organizing committees and sponsors for making the event a success. In conclusion, he introduced the Regional Commissioners, delegates from countries outside EAC, and higher learning institutions, as well as the media team.

3.2.3. KEYNOTE ADDRESS

Dr. Donald Kaberuka, An economist and former president of the African Development Bank

Dr. Donald Kaberuka emphasized a need for the East African Community and Africa at large to develop its oil and gas resources, cognizant of the pivotal role they can play in accelerating economic growth. Citing the article “Oil and Gas in Africa” by the African Development Bank and the African Union, he emphasized that the key challenge in harnessing oil and gas resources lies in making the right strategic choices and ensuring their implementation aligns with a framework that promotes fiscal prudence and minimizes macroeconomic distortions.

Furthermore, he emphasized the need for strategic resource management to ensure intergenerational equity. He also highlighted the importance of regional cooperation in infrastructure development and the potential creation of an African Petroleum Fund to mitigate the impact of oil price volatility on African economies. He noted that with improved management

and allocation of revenues from oil and gas resources, the EAC could foster economic diversification and achieve sustainable economic growth.

He concluded that many oil-rich African countries have not fully capitalized on their natural resource wealth, particularly between 1980 and 2000, resulting in underwhelming economic performance. He, however, noted that under appropriate conditions, a natural resource boom can serve as a catalyst for growth and development. He emphasized that the so-called “natural resource curse” is not inevitable and can be avoided through the implementation of proper knowledge, robust institutions, and sound policies. Several African nations have demonstrated this potential, offering cautious optimism that more countries have learned from past experiences and are now better positioned to harness their natural resources effectively.

3.2.4. OPENING REMARKS

H.E. Veronica M. Nduva CBS, EAC Secretary General

H.E. Veronica M. Nduva emphasized the fact that East Africa is now among the world’s promising frontiers for oil and gas exploration and that despite the challenges faced by the African continent in utilizing petroleum resources for social-economic transformation, EAC has the responsibility to learn, improve, and do better.

She also noted that EAC should be supported by harmonized, stable, clear legal and regulatory frameworks to demonstrate the regions’ ability to offer long-term prospects and returns on investment. By doing so, the investors will be assured that EAC is a stable and attractive region for investment.

Speaking of innovation, H.E. Nduva stated that it is important for the region to center Artificial Intelligence (AI) in all initiatives and ensure there is a nexus between petroleum resources and AI. This will transform how energy companies explore, extract, refine, and distribute petroleum. She stressed the need to invest heavily in digital infrastructure and pathways to drive efficiency, reduce costs, and improve sustainability. Automation optimization, she added, will enable EAC Partner States in predictive maintenance, smart refineries, logistics spill detection and prevention, price forecasting, and risk management, among others.

She concluded that the conference was going to be both informative and rewarding and that it would serve as an ideal forum for building professional relationships, exchanging ideas, and gaining insights into the rapidly evolving energy landscape of East Africa. She further encouraged delegates to participate in field excursions planned after the conference.

3.2.5. OPENING REMARKS AND PROMOTION OF TANZANIA’S 5TH LICENSING ROUND

Hon. Dr. Doto M. Biteko, Deputy Prime Minister and Minister for Energy, Tanzania

The remarks of Hon. Dr. Doto M. Biteko, Deputy Prime Minister and Minister for Energy, Tanzania, began with a presentation of an eight-minute documentary that provided an in-depth overview of the oil and gas exploration and production history in Tanzania. The history featured types and amounts of petroleum data acquired to date, the number of wells that have been drilled so far, and the total discovery made from onshore and offshore. It also included quantities of gas produced since production started in the country in 2004 and the proportion of production from each producing field, namely Songo Songo, Mnazi Bay, and Kiliwani North. The history also shed light on the capacity of gas processing and transportation infrastructure available in the country, the history of previous licensing rounds, and preparations towards the 5th Tanzania Licensing Round.

In his speech, Hon. Dr. Biteko focused on how petroleum resources can be utilized to realize the mission of providing electricity access to 300 million people in sub-Saharan Africa by 2030 (Mission 300). He emphasized the implementation of cross-border projects under the Eastern Africa Power Pool (EAPP) and Southern Africa Power Pool (SAPP). While renewable energy sources like hydro, wind, and solar are essential for electricity generation, he said, EAC Partner States must leverage petroleum resources -particularly natural gas for power generation and advancing the clean cooking agenda.

Mission of providing electricity access to 300 million people in sub-Saharan Africa by 2030 (Mission 300).

Citing an example of investment in petroleum upstream for the year 2023, he paused a question about how much of such investment flowed to the EAC Partner States and what EAC Partner States are doing to promote investment in petroleum upstream.

He winded up by calling on the EAC Partner States to utilize petroleum resources sustainably to ensure that every citizen has access to clean, reliable, and affordable energy. Thereafter, he welcomed the Chief Guest for the official opening of the EAPCE’25.

3.2.6. CHIEF GUEST ADDRESS, OFFICIAL OPENING

H.E. Dr. Phillip Isdor Mpango, Vice President, United Republic of Tanzania

The Chief Guest, H.E. Dr. Phillip Isdor Mpango, Vice President of the United Republic of Tanzania, started his speech by encouraging the leveraging of technological innovation for efficient development of the petroleum sector in the region and the realization of the energy transition. With the unprecedented advancement of technology, he stated, the world had witnessed breakthroughs ranging from sophisticated techniques for extracting petroleum from tight reservoirs to cutting-edge technologies, transforming our approach to decarbonizing industries.

He also touched on the region's growing energy demand and the need to effectively utilize petroleum resources to provide energy needed for economic activities. Additionally, the speech hinted at the importance of utilizing revenue accrued from petroleum resources to reinvest in infrastructure and social services to support the broader development agenda.

He further noted that African countries are undergoing a just transition to renewable energy, with natural gas and other alternative sources serving as bridges toward realizing the goal of net-zero carbon emissions. He urged EAC Partner States to strike a balance between growth and sustainability by solving today`s problems while preparing solutions for tomorrow.

On the energy mix, H.E. Dr. Mpango asserted that petroleum resources will continue to play a crucial role in the energy mix. By using these resources responsibly, the region can drive development while leveraging the revenue generated to transition toward a greener future. Given that petroleum resources are locally available, he suggested that African countries could utilize them as a tool for energy transition. To accelerate this process and attain sustainable development goals, he suggested a Public-Private Partnership model. He recommended the use of the private sector, especially on financial and technical support, while the public sector creates a favourable investment environment.He concluded by declaring the 11th East African Petroleum Conference officially open.

3.3. ANNOUNCEMENT OF PETROLEUM OPPOTUNTIES IN EAST AFRICA

The presentations on the available oil and gas investment opportunities in the EAC Partner States were made by Ministers/ Deputy Ministers from the United Republic of Tanzania, the Republic of Uganda, the Federal Republic of Somalia, and the Republic of Kenya as follows;

3.3.1. UNITED REPUBLIC OF TANZANIA

Hon. Judith Kapinga,
Deputy Minister for Energy

Presenter: Hon. Judith Kapinga, Deputy Minister for Energy

Hon. Kapinga, used the platform to promote the Fifth Tanzania Licensing Round. She explained that this new phase in the country's oil and gas exploration is a strategic move aimed at attracting both local and international investors. With four previous licensing rounds conducted since 2000, Tanzania has already laid a strong foundation. These earlier rounds brought significant investments and led to major natural gas discoveries, positioning the country as a growing player in the global energy market.

Hon. Kapinga presented that the Fifth Licensing Round expects to open twenty-six exploration blocks to investors. Of these, twenty-three are offshore in the Indian Ocean, and three are located in Lake Tanganyika. These blocks were selected based on comprehensive geological and geophysical data, and they offer promising opportunities for hydrocarbon exploration. Each block is supported by a detailed data package that allows for initial evaluations of hydrocarbon potential, enabling investors to make informed decisions.

Further, she explained that Tanzania's geological setting offers exceptional potential for oil and gas exploration. Out of the country's 945 thousand square kilometers, around 534 thousand square kilometers (56%) are covered by sedimentary basins. These areas are considered highly favorable for hydrocarbon activity. Over the past 60 years, Hon. Kapinga elaborated that multinational petroleum companies have conducted extensive exploration in the region. She noted that over 139 thousand kilometers of 2D seismic data and more than 32 thousand square kilometers of 3D seismic data have been acquired. Additionally, over 90 wells have been drilled, providing critical subsurface geological information and further confirming the country's hydrocarbon prospects.

In terms of infrastructure, Hon. Kapinga explained that Tanzania had made substantial progress in its midstream and downstream oil and gas sub sector. The country operates four natural gas processing plants with a total capacity of 470 million standard cubic feet of gas per day. It also has 810 kilometers of transportation pipelines capable of transporting up to 1,177 million standard cubic feet of gas per day.

Hon. Kapinga expounded that natural gas distribution currently serves areas along the main transmission pipeline in the Mtwara, Lindi, Coast Region, and Dar es Salaam. This presents an untapped opportunity for investors to develop distribution infrastructure in other regions of the country. She reiterated that there is a significant potential for investment in expanding the gas network, building additional processing and storage facilities, and partnering with local service

providers for construction, operations, and maintenance. These opportunities are further enhanced by Tanzania's enabling investment environment.

Several factors make Tanzania an attractive destination for oil and gas investment. The country offers a stable and supportive legal framework that encourages private sector participation. Transportation networks such as the National Natural Gas Infrastructure and the East Africa Crude Oil Pipeline support current and future exploration activities. Political stability, strategic geographic positioning, and access to East and Central African markets all contribute to Tanzania's appeal. Moreover, the availability of skilled and semi-skilled human resources, technical manpower, and experienced service providers gives investors confidence in the country's capacity to support large-scale energy projects.

In conclusion, the Fifth Licensing Round will be a major milestone in Tanzania's

Around
534,000 square kilometers are covered by sedimentary basins.

journey to harness its natural resources and grow its energy sector. With the geological potentiality, improved infrastructure, and a favorable investment climate, Tanzania offers a compelling case for oil and gas exploration and development. Hon. Kapinga invited oil and gas stakeholders to explore these opportunities. She further signaled Tanzania's readiness to become a regional hub for energy and economic transformation.

3.3.2. REPUBLIC OF KENYA

Hon. J. Opiyo Wandayi,
Kenya's Cabinet Secretary for Energy and Petroleum

Presenter: Hon. J. Opiyo Wandayi, Kenya's Cabinet Secretary for Energy and Petroleum

Hon. Wandayi expressed his honor in participating in the EAPCE'25 in Tanzania. He emphasized the significance of the forum as a platform for regional collaboration, knowledge exchange, and investment in the petroleum sector. He also noted that Kenya had previously hosted the EAPCE'19 and expressed satisfaction with the conference's continued growth and impact.

To align with global best practices and legal frameworks, Hon. Wandayi explained that Kenya had restructured its petroleum exploration blocks. Through this process, the country had identified ten (10) highly prospective blocks that will be available in its First Licensing Round, set to be launched in September 2025. This new approach ensures a transparent and merit-based system that will attract investors to explore Kenya's hydrocarbon potential.

He added that the newly identified exploration blocks were located in the Lamu and Anza basins, regions that have already demonstrated significant petroleum discoveries. These basins present vast untapped potential, making them attractive for investment in oil and gas exploration. Kenya's focus was to maximize these resources while ensuring a fair and competitive process for interested investors.

To support informed investment decisions, Hon. Wandayi informed that Kenya had compiled comprehensive geoscientific data, including seismic, geological, and well data, all available at the National Data Centre. He encouraged investors to take advantage of this valuable information to assess Kenya's oil and gas potential effectively.

Recognizing the need for robust infrastructure to support oil and gas exploration, Hon. Wandayi informed the audience that Kenya is making significant investments in key projects. These included the expansion of Lamu Port, improvements in road networks for better logistics, and the construction of the Lamu-Lokichar pipeline to facilitate seamless petroleum transportation. These infrastructure developments aim to enhance Kenya's competitiveness as a regional energy hub.

He further added that Kenya's investment attractiveness is further strengthened by its skilled workforce in the petroleum sector. The country's universities and technical institutions provide specialized training in petroleum engineering, geology, and geophysics. Additionally, the Government remains committed to capacity-building initiatives to develop local expertise and innovation in the industry.

Hon. Wandayi assured a stable legal framework, flexible Production Sharing Contract (PSC) terms, and a Government fully committed to transparency and investor confidence. These factors create a favorable investment environment, ensuring that stakeholders can operate with certainty and efficiency.

Hon. Wandayi concluded by urging investors to grab the available investment opportunity and participate in Kenya's growing oil and gas sector. He invited them to visit Kenya's data room and exhibition booth set in the conference venue for further engagement and discussions on oil and gas investment opportunities

3.3.3. REPUBLIC OF UGANDA

Hon. Can. Dr. Ruth Nankabirwa Ssentamu,
Uganda's Minister of Energy and Mineral Development

Presenter: Hon. Can. Dr. Ruth Nankabirwa Ssentamu, Uganda's Minister of Energy and Mineral Development.

Hon. Can. Dr. Ssentamu expressed her privilege in attending the EAPCE'25. She emphasized the importance of collaboration and sustainable development in the energy sector, drawing from the insights shared by Dr. Donald Kaberuka. She pointed out that Uganda remains

committed to advancing its petroleum and mineral sectors while maintaining a balance between economic growth and environmental protection.

Hon. Can. Dr. Ssentamu added that Uganda, along with other EAC Partner States, adheres to comprehensive legal frameworks that govern energy exploration and natural resource management. These regulations ensure that energy activities are conducted responsibly, protecting the environment while fostering economic growth. She explained that Uganda had pledged to uphold these laws, safeguarding natural resources for future generations. A key financial strategy in Uganda's energy sector is the Petroleum Fund, which supports infrastructure projects aimed at improving energy accessibility and efficiency through reinvestment of petroleum revenues.

Further, she emphasized that the Ugandan government has also prioritized the mineral sector by banning the export of unprocessed minerals to encourage local value addition. This policy ensures that refining, processing, and manufacturing contribute more significantly to Uganda's economic development. Simultaneously, Uganda is dedicated to the energy transition, focusing on clean energy alternatives while recognizing the continued importance of petroleum revenues. The country sees natural gas as a key resource to support this transition while maintaining energy security.

Hon. Can. Dr. Ssentamu highlighted the importance of clean cooking solutions, commending Tanzania for its leadership in this area. She added that cleaner cooking technologies were crucial for reducing indoor air pollution, improving public health, and mitigating deforestation caused by biomass fuel use. Additionally, Uganda advocates for joint energy exploration efforts within the EAC to enhance regional energy security, promote knowledge sharing, and optimize resource utilization.

Hon. Can. Dr. Ssentamu explained that Uganda strongly supports the development of regional energy infrastructure, including oil and gas projects, pipelines (such as the EACOP project), and power grids, to improve energy access and connectivity across East Africa. These initiatives will boost petroleum transportation, industrial growth, and regional economic integration. In conclusion, she affirmed Uganda's dedication to sustainable energy development, environmental conservation, and regional cooperation, ensuring a prosperous future for Uganda and the East African region.

3.3.4. FEDERAL REPUBLIC OF SOMALIA

Presenter: Hon. Dahir Shire Mohammed, Somalia's Minister of Petroleum and Mineral Resources

Hon. Mohammed expressed his deep gratitude to the Vice President of the United Republic of Tanzania, H. E. Dr. Philip Isdor Mpango, and the EAC Partner State Ministers for their participation in the EAPCE'25. He further said that the event marked a historic milestone as it was Somalia's first time participating in the conference. The Minister emphasized Somalia's commitment to leveraging its petroleum sector for economic growth and regional integration.

Hon. Dahir Shire Mohammed,
Somalia's Minister of Petroleum and Mineral Resources

Hon. Mohammed explained that the Somali Government sees the petroleum industry as a key driver of economic transformation. A significant step in this direction was the passing of the Petroleum Law in 2020, which established the Somali Petroleum Authority (SPA). He elaborated that this regulatory body provides a transparent and structured framework for investors. He added that Somalia has also introduced competitive fiscal policies, including attractive royalty rates and tax incentives, to encourage foreign investment. These efforts aim to ensure that international investments contribute to both economic growth and social development.

He said that despite past challenges, including disruptions in petroleum exploration due to civil unrest, recent seismic surveys have renewed optimism about Somalia's hydrocarbon potential. Surveys conducted between 2014 and 2016 identified substantial offshore potential. To capitalize on this potential, the Somali Government has signed production-sharing agreements for both offshore and onshore blocks, with more than 30 offshore blocks now open for investment. Somalia is positioning itself as a significant player in the East African oil and gas industry.

Ongoing exploration efforts, he said, including a 3D seismic survey conducted by Turkish-owned Company (TPAO) and Liberty Petroleum, will further enhance the understanding of Somalia's subsurface structures. These studies were expected to attract additional investments and accelerate petroleum development. He added that the revenue generated from the petroleum sector will not only support Government programs but also fund essential infrastructure projects, job creation, and economic diversification, leading to long-term stability and growth.
Beyond economic benefits, Hon. Mohammed said that Somalia's petroleum sector has the potential to drive social progress. Increased Government revenues will improve public services such as education, healthcare, and infrastructure, while expanded employment opportunities will help develop a skilled workforce.

He concluded by saying that Somalia remains committed to fostering a transparent and investor-friendly petroleum sector. With continued efforts in exploration and investment attraction, Somalia is poised to benefit from its vast hydrocarbon resources, contributing to both national prosperity and regional cooperation in East Africa.

A significant step in this direction was the passing of the Petroleum Law in 2020, which established the Somali Petroleum Authority (SPA).

3.4. COUNTRY PRESENTATIONS

This session provided an update on the current status of petroleum activities across the EAC Partner States. The session was moderated by Hon. Andrea Ariik Aguer Malueth, Deputy Secretary General, Infrastructure, Productive, Social, and Political Sectors, EAC, who set the stage by emphasizing the importance of regional collaboration in the petroleum sector. The presentations featured key representatives from EAC Partner States as follows;

3.4.1. UNITED REPUBLIC OF TANZANIA

Eng. Felchesmi J. Mramba, Permanent Secretary, Ministry of Energy, Tanzania, provided an update on the country's oil and gas sector. He highlighted active production-sharing agreements, recent discoveries totaling 57.54 TCF, and current production of 230mmscfd from Mnazi Bay and Songosongo. He also discussed regulatory developments and investment opportunities, including the upcoming 5th Licensing Round open for 26 blocks, farm-in opportunities with the National Oil Company in Mnazibay North, West Songosongo, Eyasi Wembere, and Lindi-Mtwara Blocks. He updated the audience that the negotiations for the development of offshore resources through LNG are ongoing. He added that Tanzania is engaged in cross-border infrastructure projects such as the East African Crude Oil Pipeline (EACOP) and the proposed gas pipelines to neighboring countries, including Kenya, Uganda, Malawi, and Zambia.

Captain Harnad B. Hamad, Principal Secretary, Ministry of Blue Economy and Fisheries, Zanzibar, provided an overview of Zanzibar's petroleum sector and investment landscape. He began with a general introduction of Zanzibar, then detailed the 10 available petroleum blocks-2 onshore and 8 offshore-for which investors are being invited through direct award. He presented the exploration landscape, showcasing existing data and discoveries. Additionally, he outlined key fiscal terms, including royalty structures and cost recovery mechanisms. Beyond petroleum, he highlighted broader energy and blue economy investment opportunities in Zanzibar.

3.4.2. REPUBLIC OF UGANDA

Eng. Irene P. Bateebe, Permanent Secretary, Ministry of Energy and Mineral Development, Uganda, provided an update on the country's petroleum sector, highlighting its strategy to diversify the energy mix. She outlined Uganda's legal and regulatory framework and reported current reserves at 6.5 BBL of STOIIP and 500 BCF of gas, with an 88% drilling success rate. She gave a status update on exploration activities in the Moroto-Kadam and Lake Kyoga basins and announced plans for additional licensing later in the year. She also expounded the progress of key upstream projects, including Tilenga and Kingfisher. On commercialization, she highlighted major infrastructure projects such as the East African Crude Oil Pipeline (EACOP), Uganda's refinery, Kabalega Industrial Park, and LPG recovery plants. She emphasized the Government's commitment to ensuring local content participation in the industry.

3.4.3. REPUBLIC OF KENYA

Dr. Mohamed Liban, Principal Secretary, State Department for Petroleum, Kenya, provided an overview of the country's petroleum sector, covering upstream, midstream, and downstream activities. He outlined Kenya's legal and regulatory framework and traced the history of oil and gas exploration in the country. He highlighted Kenya's exploration success, particularly in the South Lokichar Basin, which holds an estimated 2.85 billion barrels of STOIIP. He provided a status update on the South Lokichar Integrated Project, expected to produce 120,000 BOPD. Additionally, he discussed Kenya's first licensing round for 10 petroleum blocks and outlined investment opportunities in midstream and downstream sectors. He emphasized Kenya's role in facilitating regional energy trade. He also underscored Kenya's commitment to regulatory improvements and attracting investment in the oil and gas sector.

3.4.4. REPUBLIC OF RWANDA

Ms. Epiphanie Buzizi, the Second Counsellor at the High Commission of Rwanda in Tanzania, representing the Government of Rwanda, provided an update on Rwanda's petroleum exploration efforts and energy diversification strategy. She highlighted ongoing activities in the Lake Kivu Basin, part of the Albertine Graben, and presented a snapshot of the available exploration data. She also provided an update on Rwanda's Exploration and Production Sharing Agreement (EPSA), emphasizing its attractive investment terms. Additionally, she discussed the progress on the Lake Kivu Methane Project, outlining associated business opportunities. Lastly, she informed the session about Rwanda's ongoing review of its petroleum law, aimed at creating a more favorable regulatory environment for investors.

3.4.5. REPUBLIC OF BURUNDI

Mr. Gerard Bigirimana, Geologist at the Ministry of Hydraulics, Energy, and Mines, Republic of Burundi, representing the Republic of Burundi, provided an overview of the country's petroleum sector. He outlined Burundi's policy, legal, and institutional framework and traced the history of oil and gas exploration from 1946 to the present. He gave an update on the Lake Tanganyika Basin, focusing on the Ruzizi and Kigoma Basins, and described the South-North play sections in detail. Additionally, he provided insights into Burundi's four petroleum blocks—A, B, C, and D highlighting their geological characteristics and potential for petroleum exploration.

3.4.6. FEDERAL REPUBLIC OF SOMALIA

Mr. Arabey Hashi Abdi, Director General of the Ministry of Petroleum and Mineral Resources, Somalia, provided an overview of the country's oil and gas potential. He detailed Somalia's exploration history from 1948 to the present, highlighting key developments over the years. He outlined offshore block opportunities, including those awarded to the Turkish Petroleum Company, and provided updates on project completion and the planned 3D seismic survey. He emphasized Somalia's strong legal and regulatory framework, positioning the country as an attractive destination for investment in the petroleum sector.

3.5. PANEL DISCUSSIONS

3.5.1. UPDATES ON LEGAL, FISCAL, AND REGULATORY REGIMES GOVERNING THE PETROLEUM SECTOR IN EAST AFRICAN PARTNER STATES

Moderator: Mr. Godluck Shirima, Commissioner for Petroleum, Ministry of Energy, Tanzania.

Panelists:

a. **Eng. Edward Kinyua,** Director, Petroleum & Gas, Energy & Petroleum Regulatory Authority, Kenya;

b. **Ms. Lynda Biribonwa**, Chairperson, Board of Directors, Petroleum Authority of Uganda (PAU), Uganda; and

c. **Mr. Dahir Osman**, Technical Adviser, Somalia Petroleum Authority, Somalia

The session focused on the evolving legal, fiscal, and regulatory landscape shaping the petroleum sector in East Africa. Key discussions covered regulatory harmonization, fiscal policies, investment climate, and sustainability challenges as follows;

i. Emphasized the importance of standardizing petroleum laws in the region to attract investment and facilitate cross-border trade. The discussion stressed the need to harmonize standards and procedures, while highlighting the value of global benchmarking and peer reviews. Further, the discussion underscored the necessity of community awareness programs and capacity building to ensure project success.

ii. Regulatory certainty is a key factor for long-term investments, especially in the context of the global energy transition and climate commitments.

iii. Some of the strategies to reduce the environmental impact of petroleum operations include sustainable exploration by including measures to prohibit gas flaring, except in emergencies, and adopting carbon-neutral strategies. Additionally, restoration plans, safety measures, decarbonization technologies, and strict decommissioning policies can be applied to minimize environmental harm.

iv. The discussion also emphasized the need to establish environmental committees and develop the necessary infrastructure to address sustainability concerns, ensuring that resource management aligns with both economic and environmental goals.

It was concluded that Governments must strike a balance between maximizing revenue and creating investment-friendly conditions to foster sustainable growth in the sector. Legal and fiscal frameworks should be aligned with global energy transition trends to ensure the long-term viability of the industry. Furthermore, policy predictability remains essential to encourage long-term investments, providing a stable environment for both Governments and investors to thrive in a rapidly changing energy landscape.

3.5.2. FINANCING OF PETROLEUM PROJECTS

Moderator: Derick Moshi, Director of Planning & Investment, Tanzania Petroleum Development Corporation (TPDC).

Panelists:

a. **Daniel Muwooya,** Head of Commercial and Business Development, Uganda National Oil Company (UNOC);

b. **Joseph Otieno,** Commissioner for Petroleum, State Department for Petroleum, Ministry of Energy and Petroleum, Kenya;

c. **Leparan Ole Morintat**, CEO, National Oil Corporation of Kenya (NOCK);

d. **Festo Barthome**, Tax Partner, Deloitte Consulting Limited, Tanzania;

e. **Manzi Rwegasira**, CEO, Stanbic Bank, Tanzania;

f. **Mussa Kitambi**, Director, Corporate Banking, CRDB Bank Plc, Tanzania; and

g. **Alex Mgeni**, Head of Business Banking, NMB Bank Plc, Tanzania.

The session explored how Governments and the private sector can collaborate to

finance petroleum projects, the incentives Governments can offer to attract investment, the current investment status by the private sector, and the challenges in financing large and complex petroleum projects. The Moderator posed specific questions to each panelist to address these key topics, and the discussion was as follows;

i. Financing mega petroleum projects comes with challenges, including high capital requirements, long payback periods, and market volatility.

ii. The shift in the perception of petroleum projects has led to a lower appetite for investment, prompting Governments to find innovative financing frameworks. Governments must ensure projects are bankable by addressing proper risk allocation, sound development practices, and the creation of necessary agreements.

iii. Governments can attract investment by creating an enabling environment through robust policies and regulatory frameworks. They can also offer incentives such as tax exemptions on certain goods and services and ensure transparency through bidding rounds for petroleum blocks.

iv. The role of Governments is critical in derisking petroleum projects by providing support, particularly for greenfield projects. National oil companies (NOCs) are essential in helping to raise capital, participating

in projects, and fostering Public-Private Partnerships. Governments can look for examples from other countries to create attractive conditions for investment.

v. Financial institutions can help derisk petroleum projects by focusing on sustainability and offering fiscal incentives like lowering interest rates.

vi. Banks are increasingly supporting oil and gas projects, including infrastructure development. They use innovative methods such as Reserve-Based Lending to provide capital for projects and emphasize the importance of Government support in mitigating risks. Banks also play a crucial role in supporting SMEs in the energy sector, particularly in areas like compressed natural gas (CNG), and seek to partner with other institutions to develop derisking models for financing.

vii. A collaborative approach between Governments and private sector is crucial to fast-track the development of oil and gas resources. One suggestion is to establish a consolidated fund for financing petroleum projects, modeled after the African Development Bank. There is also potential to leverage diaspora remittances to finance petroleum projects, offering a new avenue of funding for the sector.

To overcome financing challenges, closer collaboration between Governments and the private sector is essential. Governments should focus on derisking projects by creating a favorable environment through stable policies and incentives. Financial institutions will be ready to finance bankable projects.

PARTICIPANT CONTRIBUTING

PARTICIPANT CONTRIBUTING

3.5.3. MANAGING STAKEHOLDERS' EXPECTATIONS

Prof. Fortunata Songora Makene
Executive Director at Economic and Social Research Foundation (ESRF), Tanzania

Moderator: Prof. Fortunata Songora Makene, Executive Director at Economic and Social Research Foundation (ESRF), Tanzania.

Panelists:

a. **Joe Sang**, Managing Director, Kenya Pipeline Company;

b. **Ali Ssekatawa**, Director, Legal and Corporate Affairs, Petroleum Authority of Uganda (PAU);

c. **Kenneth Kaganga**, Senior Economist, EWURA, Tanzania; and

d. **John Bosco Habumugisha**, Deputy Managing Director, EACOP.

The panel discussion focused on managing stakeholder expectations in East Africa's petroleum sector, with insights into strategies for balancing diverse interests, the role of legal frameworks, and the importance of regional collaboration to create a stable investment climate. The highlights were as follows;

i. Effective management of stakeholder expectations is crucial for the sustainability of petroleum projects. Key strategies for managing stakeholders' expectations include clear communication, collaboration, regular feedback, compliance with regulations, and social investments to foster inclusivity and build strategic relationships.

ii. Legal frameworks and contracts play a vital role in managing stakeholder relationships by ensuring public consultation, grievance mechanisms, and accountability. Cultural sensitivity and inclusivity are also important, particularly for marginalized groups, to promote equity and prevent conflicts.

iii. Harmonizing policies across East Africa as another strategy for managing stakeholder expectations reduces trade

barriers, therefore enhancing operational efficiency and investment opportunities.

iv. Cross-border projects like shared pipelines should ensure balanced regional employment and development to reduce conflicts.

v. Past stakeholder conflicts, such as those in land acquisition and compensation for the EACOP project, emphasize the importance of inclusive engagement, continuous dialogue, and livelihood restoration programs. Proactive corporate social responsibility initiatives can also help address community grievances and promote mutual benefits.

vi. Governments and industry leaders must balance the interests of stakeholders while advancing national energy goals. Strong legal frameworks, fair benefit-sharing and strategically reinvested petroleum revenue can help align interests and contribute to long-term energy transitions.

Emphasis was made on the need for comprehensive stakeholder mapping, clear communication, and transparent legal frameworks to manage expectations and resolve disputes. Collaboration, favorable tax regimes, and social investments are essential for successful project implementation and economic growth. Transparency, trust, and shared vision are critical to sustainable development in the region.

3.6. ORAL PRESENTATIONS

The oral presentations offered a platform for discussions on scientific advancements and innovative approaches in petroleum operations, both within the region and globally. The discussions were organized into several thematic areas, including exploration and development, mid and downstream opportunities, Resource Revenue Management, Energy Mix and Just Energy transition, Crosscutting issues, and Other investment opportunities.

Experienced professionals moderated the interactive sessions within their specific areas of expertise. Below are summaries (abstracts) of the presentations delivered during these discussions. The presentations are included in Annex 2.

3.6.1. EXPLORATION AND DEVELOPMENT

3.6.1.1. LEGAL, FISCAL, AND REGULATORY REGIME

Moderator: Dr. Elias , Director of Legal Services, TPDC.

This session covered two key topics in Africa's energy sector:

The dynamics of global licensing rounds and decommissioning legislation amidst the energy transition. The discussions highlighted the challenges and opportunities in Africa's licensing processes, emphasizing the need for transparent and efficient frameworks to attract investment. It also explored the rising importance of decommissioning strategies as the shift to renewable energy accelerates, emphasizing the need for proper planning, financing, and legislative alignment to mitigate risks and manage stranded assets effectively.

GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TO MAXIMISE THE OPPORTUNITIES

Gayle Meikle, CEO, Frontier Energy Network

In an evolving energy landscape, licensing rounds remain critical for Governments seeking to attract investment and optimise hydrocarbon resource development. This paper will provide a Comprehensive overview of global licensing rounds scheduled for 2025/26, with a particular focus on Africa's ongoing and planned bid rounds. The session will explore the key factors influencing successful licensing rounds, including regulatory best practices, market dynamics, and strategic execution. A central theme of the discussion will be the "closing window"- a concept that underscores the urgency for Governments and industry players to act swiftly in securing and capitalising on available opportunities before they expire. Understanding this time-sensitive nature is crucial for stakeholders aiming to maximise value from their licensing strategies.

The over view will covered Market Dynamics & Licensing Rounds Globally - Analysing current trends, competitive landscapes, and emerging opportunities worldwide; Regulatory, Legal & Fiscal Best Practices - Examining successful frameworks that enhance investor confidence and ensure long-term sustainability; Global Marketing & Promotion Best Practices - Effective strategies for attracting international bidders and ensuring competitive participation; Upstream Stakeholder Engagement - The role of industry collaboration in optimising bid rounds; Importance of Efficient Execution & Strategic Alignment - Why well-structured, transparent, and timely licensing processes are crucial for success? and Case Studies: Lessons from Global & African Licensing Rounds – Reviewing real-world examples to identify key takeaways for future bid rounds.

With a rapidly closing window, African regulators must focus on efficient execution, strategic alignment, and proactive industry engagement to remain competitive. By adopting global best practices and tailoring approaches to regional realities, licensing authorities can enhance the attractiveness of their offerings and ensure sustainable energy sector growth.

NEED TO REVIEW DECOMMISSIONING LEGISLATION AMIDST THE ENERGY TRANSITION

Moses Ekunu, Legal Expert , Petroleum Authority of Uganda

Uganda is in advanced stages to produce its oil and gas resources currently estimated at an estimated 6.5 billion barrels of oil, with 1.4 billion estimated to be recoverable. In preparation for first oil, which is expected in 2025, several installations have been put in place to facilitate the production of these oil resources. These installations, which includes oil drilling and transportation infrastructure, will need to be decommissioned when they are disused in line with the country's national oil and gas policy of ensuring that oil and gas activities do not bring adverse impacts to the environment. This paper investigates the decommissioning

framework in Uganda and compares it with the decommissioning framework used in the UK's oil and gas sector. The paper concludes that Uganda's decommissioning framework, though not yet tested, is commendable but lacking in some respects compared to the robust UK framework. A review and amendment of Uganda's decommissioning legislation is therefore recommended as well as subscription to more international decommissioning legislation. This need is urgent especially arising from the ongoing energy transition debate where oil companies are making effort to transform into energy companies and expediting production of their oil and gas resources, with a view to deplete them at the earliest opportunity in a bid to comply with the net zero obligations.

Recommendations

i. Develop global marketing strategies to attract international bidders and optimize participation in bidding rounds.
ii. Review and amend Decommissioning Laws to align national regulations with international best practices to ensure environmental and financial responsibilities.
iii. Harmonize decommissioning policies across EAC Partner States to create a standardized and effective framework.

3.6.1.2. EAST AFRICAN RIFT AND COASTAL BASINS

Moderators:

Dr. Shaidu Nuru, Senior geologist, TPDC, Tanzania; Prof. Evelyne Mbede, UDSM, Tanzania; and

Dr. Wellington Hudson, Oil and Gas Expert, Tanzania.

The sessions had a number of presentations highlighting the geological and geophysical complexities of the East African Rift System, with a particular focus on its hydrocarbon potential. The presentations covered structural variations across rift basins, the application of advanced methods such as Euler Deconvolution for subsurface analysis, and the importance of petrophysical assessments in identifying prospective exploration targets. Additionally, the integration of geophysical techniques, source rock evaluation, and basin modeling were explored to provide deeper insights into the region's resource potential.

STRUCTURAL DIFFERENCES AND EXPLORATION POTENTIAL OF BASINS IN THE TWO BRANCHES OF THE EAST AFRICAN RIFT SYSTEM

Edward Misana, Geologist - Petroleum Upstream Regulatory Authority (PURA).

The East African Rift System (EARS) is the youngest rift system, consisting of eastern and western branches with numerous secondary rifts. It remains largely underexplored but holds significant hydrocarbon potential. Understanding variations in hydrocarbon accumulation across different rifts is crucial for guiding exploration and selecting promising targets. Using first-hand seismic-geological data, commercial databases, and open-access literature, this study analyzes the structural characteristics of key rifts in both branches. Based on discovered hydrocarbon reservoirs, the rifts are classified into four structural types: double-fault, simple single-fault, single-fault transfer, and single-fault terrace. The influence of structural styles on hydrocarbon accumulation is also examined. In the Western Branch, large rifts like the Albertine and Tanganyika Rifts are mainly double-fault and single-fault transfer types, while smaller rifts exhibit simple single-fault structures. The Eastern Branch primarily consists of small rifts, with the northern Western Branch dominated by simple single-fault rifts and the southern section by single-fault terrace types. Double-fault rifts have the highest hydrocarbon potential, followed by simple single-fault and single-fault transfer rifts, while single-fault terrace rifts have limited potential. Comparative analysis of structural styles, sediment fills, and reservoir elements suggests that the west side of the Albertine Rift, the southeast of the Tanganyika Rift, the Kerio Rift, and northwestern Turkana Rift present significant exploration opportunities.

APPLICATION OF EULER DECONVOLUTION IN ESTIMATING DEPTH, LINEATION, AND GEOMETRY OF SUBSURFACE STRUCTURES USING GRAVITY AND MAGNETIC DATA

Andrew Meitamei Geophysicist - National Oil Corporation (NOC), Kenya

The Magadi Basin, located in the East African Rift System, showcases notable tectonic complexity due to extensive faulting and magmatic intrusions. This study combines magnetic and gravity data to generate Euler Deconvolution to estimate the depth, geometry, and alignment of subsurface geological features. Euler Deconvolution is a powerful geophysical tool that uses field gradients from potential-field data to pinpoint the spatial position, depth, and characteristics of subsurface structures like faults, dykes, and intrusive bodies. By analysing magnetic and gravity anomalies together, the accuracy of structural interpretation is improved, as it captures variations in rock density and magnetic susceptibility. The study aims to identify lineation's that indicate the alignment of faults and fractures, offering valuable insights into regional stress patterns and the tectonic development of the basin. Euler solutions provide essential depth estimates, facilitating the identification of fault zones and lithological boundaries that are crucial for exploration activities. The initial findings suggest that there is a system of fault networks together with high-density intrusive bodies that run normal with respect to regional rift trends. The depths achieved through this study demonstrate a gradual increase from shallow to deep lithosphere discontinuities, which is indicative of the stretching regimes in use during the evolution of the basin. This research is an example where integration of magnetic and gravity data in Euler Deconvolution is useful for geological

mapping and enlightens the subsurface structure of the Magadi Basin.

THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH- MANDERA BASIN (SOMALIAN SECTOR)

Warsame Mohamed Atteyeh- Petroleum Geologist at the Ministry of Petroleum and Mineral Resources, Somalia.

This study attempts to evaluate the petroleum potential of the Somalian sector of the broad Lugh-Mandera basin based on the available geological and geophysical (Seismic) data sets. The basin is classified as a frontier exploration area with only 3 wells drilled in an area of approximately 70,000Km2. The main aim of this research was to undertake an integrated structural and stratigraphic study of all geological data, in particular, interpretation of fifteen (14) 2D seismic profiles, well tied to the Hol-1 well and also evaluate the source rock potential of several levels of interest through Time-Temperature Index Modeling. In Addition, the investigations also undertook a regional correlation to the formations of neighboring Ogaden basin in Ethiopia.

The objectives that guided the study are; to determine the succession of rock types and structural geology of the subsurface through interpretation of the seismic sections and well log data; to understand the aspects of structural style and evolution of the basin and delineate the subsurface (Isochore and Isopatch) maps within the study area; so as to evaluate the hydrocarbon prospect of the area. The investigations relied on the analysis of the Time-Temperature Index (TTI) modelling to gauge the maturity of the Jurassic source rocks, and estimate the timing of hydrocarbon expulsion. The result of the analysis of the seismic data shows that the deformed Garbaharey belt comprise wrench tectonics anticlines with a wavelength of about 10 Km, associated with a transpressional right strike slip movement. The presence of the positive flower structure that serves as viable hydrocarbon traps can be observed from the interpreted seismic profiles.

A TTI analysis done on the Lower Jurassic source rock found in Hol-1 well yielded a value of 1,319. This value corresponds to vitrinite reflectance of more than 2. This shows that the source rocks are over mature and located within the dry gas window, which began in the Sinemurian approximately 196 Ma. Maturation and expulsion began Aalenian (172 M.a). The Middle Jurassic source rock gives a TTI value of 20 which suggesting maturation within the peak oil window.

The Upper Jurassic source rock is positioned inside the early oil window, as indicated by a TTI value of 5.1, maturation and outflow began Oxfordian (159 M.a). Faulted anticlines formed after the initial hydrocarbon expulsion and migration occurred and entrapment relies on re-distribution of hydrocarbons.

LOW-VELOCITY LAYER CHARACTERIZATION IN THE EYASI WEMBERE BLOCK: IMPLICATIONS FOR SEISMIC REFLECTION DATA QUALITY

Petro Theonest- Exploration Geophysicist at Tanzania's national oil company (TPDC).

The weathered layer is generally characterized by low seismic velocity and consists of loose, unconsolidated materials, which cause a delay in the travel time of the reflected seismic wave. This delay results in the imaging of false structures, making it essential to mitigate its effect through the application of static correction. Therefore, an uphole seismic refraction survey was conducted in the Eyasi Wembere Block to determine the characteristics of the low-velocity layer for static correction. A total of 20 uphole surveys were conducted at different locations using a small, lightweight Marooka drilling rig. Additional equipment included a calibrated hydrophone tied with a rope, a hammer mounted with a trigger as the energy source, and recording equipment consisting of the Seismic Source DAQ Link III, which was connected to a field laptop and powered by a battery. The refraction travel times were processed using VibraScope software, and the interpretation of the picked first-break signals was performed using an Excel spreadsheet. The interpretation results indicate a three-layer velocity model. The thickness of the weathered layer ranged from 3 to 14 meters, with an average of 5.4 meters, while its velocity varied from 300 to 746 m/s, with an average velocity of 475 m/s. The velocity of the unconsolidated layer ranged from 151 m/s to 1,220 m/s, with an average of 1,017 m/s, and its thickness ranged from 9 to 24 meters, averaging 11 meters. The velocity of the consolidated layer ranged from 1,136 m/s to 1,835 m/s, with an average velocity of 1,569.62 m/s, and its thickness varied from 7 to 40 meters, with an average of 22.43 meters. Based on these findings, this study recommends applying a depth of 38 meters as the appropriate datum to correct the effects of the weathered layer, ensuring the acquisition of high-quality seismic data in the area.

PETROPHYSICAL ASSESSMENT OF THE MIOCENE SANDSTONE RESERVOIRS IN THE TANGA BASIN NORTHERN COASTAL OF TANZANIA

Mark Malinzi-BSc Petroleum Geology Student at the School of Mines and Geosciences, University of Dar es salaam, Tanzania.

The Miocene sandstones in the Tanga Basin of northern coastal Tanzania have been poorly studied. Reports on their porosity, shaliness, water saturation, and permeability are unavailable in the public domain.

This study conducts a petrophysical analysis of geophysical wireline logs, including density, spontaneous potential, gamma ray, and resistivity logs from an exploration well X to characterize the Miocene sandstones of the study area and assess their petroleum prospectivity for the first time. Results show that the Miocene sediment of the Tanga Basin may be subdivided into three parts characterized by reservoir zones with varying porosity, water saturation, and shaliness. The identified reservoir zones show water saturation below 70% and shaliness under 25%, while total porosity ranges between 15 and 30%. Despite the reported low shaliness, these reservoirs record different clay distributions: diagenetic, laminated, and structural clays. Overall, diagenetic clay distribution is dominant over laminated and structural clays.

The revealed clay distributions are interpreted to have resulted from an interplay of depositional processes, environment, and tectonic activities. The lowermost section of the Miocene stratigraphy appears to be more prospective due to thicker sand layers with low water saturation. The low porosity in this section is linked to diagenetic clays; laminated and diagenetic clays have decreased permeability of the studied sedimentary fill. The dominance of clay-filled pores suggests limited Miocene reservoir potential in the Tanga Basin. This research sets a benchmark for further studies in the area, including special core analysis to accurately determine the clay distribution modes and their effects on the pore-perm properties. Our method may be applied in other basins with limited core data for preliminary reservoir characterization.

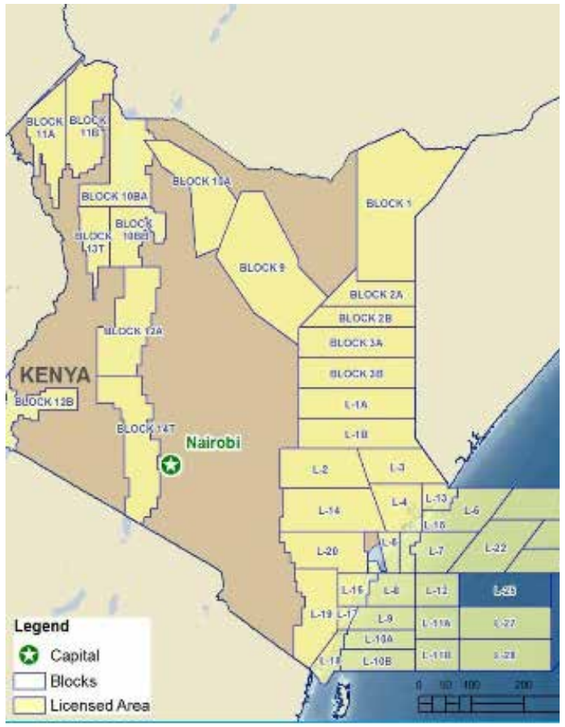
UNRAVELLING HYDROCARBON MICROSEEPAGE: EVIDENCE OF PETROLEUM SYSTEMS IN A SEMI-ARID RIFT SETTING

Mussa Nalogwa- Geophysicist at the Tanzania Petroleum Development Corporation (TPDC)

The persistence of hydrocarbon microseepage on the surface creates a reducing environment that causes mineralogical alterations. These mineralogical alterations involve bleaching of red beds, enrichment of Ferrous, increased concentration of Clay, and precipitation of Carbonate minerals. The present study aims to delineate these areas of hydrocarbon microseepage-induced mineral alteration to provide evidence for the existence of a working petroleum system in a semi-arid location which forms part of the East African Rift System.

The study applies an integrated approach consisting of Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) image processing, Amplified Geochemical Imaging (AGI) analysis, and Gravity data to accomplish this objective. ASTER image processing involved specialised band ratios (BRs), false colour composite (FCC) and principal component analysis (PCA). The integration of ASTER, AGI and Gravity Gradiometry (GG) data provided evidence of the existence of hydrocarbon microseepage in the Area of Interest (AOI). It indicated that the mapped prospects are located near the major faults and a basin depth of around 4 km sufficient for hydrocarbon generation. Therefore, confirmation of the existence of hydrocarbon microseepages in a basin implies that the area potentially has a working petroleum system.

INTEGRATION OF GEOPHYSICAL METHODS IN THE HYDROCARBON EXPLORATION OF BLOCK 14T.



Innocent Kimoita - Geophysicist at National Oil Corporation (NOC), Kenya.

The Magadi Trough, located in the Kenyan Tertiary Rift Basin, is a promising area for hydrocarbon exploration. To evaluate its potential, a comprehensive geophysical study was conducted, employing Full Tensor Gravity (FTG), magnetotelluric (MT), and seismic surveys. The FTG survey covered 21,915 line kilometers and utilized over 2,600 gravity stations, identifying sedimentary deposits interbedded with volcanic flows at depths of less than 1 kilometre. This provided evidence of shallow volcanic embedment in sediments. The MT survey complemented these findings by discriminating between sedimentary units and volcanic layers, revealing both shallow and deep volcanic embedment within the sedimentary framework.

A focused seismic survey, spanning 310 line kilometers, was subsequently carried out in areas prioritized from FTG and gravity data. The interpretation of seismic and gravity data uncovered a fault system, which is likely the primary hydrocarbon trapping mechanism. Additionally, the faults traversing the sub-basin were identified as probable migration pathways for hydrocarbons. This integrated geophysical approach has offered critical insights into the subsurface geology of Block 14T, enhancing the understanding of its hydrocarbon potential and providing a foundation for future exploration initiatives

THE ARCHITECTURE OF THE EYASI WEMBERE RIFT BASIN REVEALED FROM SEISMIC AND POTENTIAL FIELD DATA

Sindi Maduhu - Geophysicist at Tanzania Petroleum Development Corporation (TPDC)

Juvenile rifts have drawn strong attention to the geoscientist community due to their prototype of the oceanic crust formation and oil and gas resource potential. The East African Rifting, with its inception in the Neogone, raptured the crust, forming two major branches: the volcano-rich Eastern Branch and the magma-poor Western Branch. These branches contain a series of half-grabens with proven hydrocarbon potential. The architecture of these basins and the basin fill are strongly controlled by the bounding normal fault systems. Eyasi-Wembere is among the rift basins within the Eastern Branch of the East African Rift System, and little is known about its tectonic evolution. For the first time, this study integrates the basin-scale 2D seismic with potential field data to decipher the tectonic evolution of the Eyasi-Wembere rift basin. The analysis suggests that the basin developed during the Miocene and is situated between the Tanzania Craton in the West and the Proterozoic Mozambican Belt in the East. It is bounded by normal border faults, forming grabens with localized half and pseudo-full grabens. The seismic data reveals that the basin contains a sedimentary fill of more than 3 km thick, which has the potential for source rock maturation. Further, the mapped structures and the sedimentary

packages in the basin favor hydrocarbon accumulation.

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT.

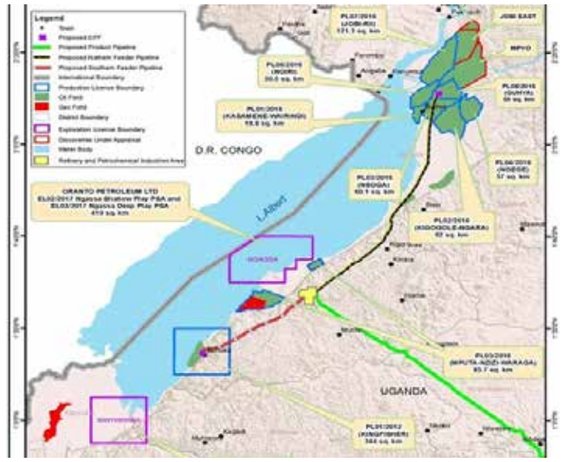
Joshua Atuta - Geologist currently at National Oil Corporation (NOC), Kenya.

Introduction of Seismic Tape drives took place in the early 1950s, during the birth of data processing in the petroleum industry. Through the years, seismic tapes and magnetic tapes have gone through many replications to improve storage capacity and speed of access to stored data and as a result, old seismic tapes and drives are being phased out or obsolete. Since old seismic data still represents the subsurface information, using current seismic imaging technology, geophysicists can re-analyze target areas. Furthermore, old seismic tapes may become unreadable when they stay for long as a result of binder degradation (sticky tapes) or substrate deformation (vinegar syndrome). Seismic magnetic tapes no longer guarantee seismic data preservation. The Kenyan Government, through The National Oil Corporation, has dedicated both financial resources and personnel to ensure the proper management of seismic datasets, including storage, access, and security measures. As the custodian of all seismic datasets, National Oil Corporation of Kenya, through its National Data Center (NDC) has the responsibility of making sure that the seismic information in the old seismic tapes are not lost. The old seismic data are encrypted in different paper printouts and seismic tapes (3592, 3590, 3590E and LTOs'). The data on seismic tapes are in different formats (SEG-D, SEG-Y, PDF and TAR). Each of these tapes can only be read by respective drives at our facility. Seismic data quality control plays a crucial role in ensuring the reliability and accuracy of seismic data used in various geophysical studies and exploration activities. MAGMA GUI (Graphical User Interface) software by TROIKA is a powerful tool specifically designed to facilitate seismic data quality control. Within the National Data Center (NDC), the software is employed for the transcription, duplication, reorganization, and manipulation of seismic data. Kenya's seismic datasets have been digitized, transcribed/duplicated or migrated to the SERVER for easier retrieval and reliable storage. Seismic datasets at NDC are stored in an organized and efficient manner. On the Microsoft Access seismic database interface developed by the NDC in-house team, by a simple press, an individual (Compliance to: Petroleum Act, 2015, NOCK data access policy 2018 and Data Server Security Control) can swiftly and easily retrieve all seismic information stored on specific tapes.

INTEGRATED PETROPHYSICAL ANALYSIS AND RESERVOIR CHARACTERIZATION, KASURUBAN CONTRACT AREA (KSCA)

Ronald Kaggwa,- Petroleum Geoscientist -Uganda Oil Company (UNOC)

Early petroleum exploration campaigns in the Kasuruban Contract Area (KSCA), Albertine Graben Uganda, encountered hydrocarbons in reservoir sands and oil shows in the basement rocks indicting the presence of all petroleum system elements in the Contract Area. Despite being located in a frontier basin with significant hydrocarbon discoveries in adjacent fields, Kingfisher to the south and Tilenga to the north, the presence of all petroleum system elements encountered from the wells and seismic data, and oil seeps observed during surface geological mapping, confirmation of a working petroleum system in the area remained a challenge. 3D basin modelling was undertaken to understand the generation, migration and accumulation of hydrocarbons in the area. In this study, 2D seismic and well data; including bore hole temperature (BHT), pressure, geochemical, and biostratigraphic data were interpreted to establish the basin geometry and determine the burial history, source rock type and maturity (VRo, Tmax), and stratigraphic ages of the formations. The data was then integrated to build a 3D petroleum systems model. The study revealed that the area is controlled by two main normal faults that trend in NESW direction. The source rocks are mostly

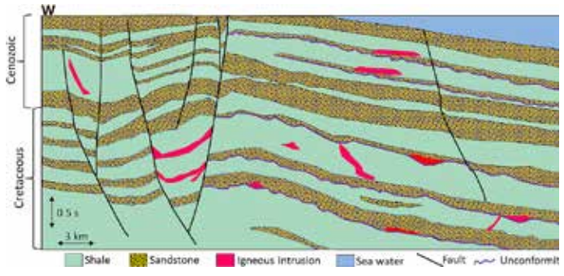


of type II from an organofacies with API range of 29-37°, of Middle to Late Miocene in age. Reconstruction of burial and thermal maturation history revealed that the source rocks are mature in the basin depocenter, located in the southwestern part of the Contract Area. The study further revealed that the petroleum generation and expulsion in the basin began in the Late Pliocene and migrated both laterally and vertically to structural highs and faulted zones that developed earlier during the Late Miocene (6.2 Ma). The hydrocarbons migrated mainly through the porous reservoirs and highly faulted zones. Therefore, this study has established a better understanding of the processes responsible for hydrocarbon generation, migration and accumulation, hence providing useful insights into hydrocarbon potential of the Contract Area, thus reducing its exploration risks.

SOURCE ROCK EVALUATION AND 1D BASIN MODELLING IN RUVUMA BASIN, SOUTHERN EAST TANZANIA

Antipas Tarimo - BSc Petroleum Engineering Student at the School of Mines and Geosciences, University of Dar es salaam, Tanzania

Source rock evaluation and basin modeling play important roles in understanding hydrocarbon potential in any sedimentary basin. Currently, there is limited research focusing on source potential in the Ruvuma Basin; most studies rely on a few samples. As a result, the variability in organic matter types and quality with respect to basin evolution has not been well constrained. In an effort to better understand the source rock potential in the Ruvuma Basin, this study was carried out using geochemical analysis of cutting samples (n=48) along with 1D basin modeling of sediments samples from the Karoo and Mtumbei Formations in the Lukuledi-1 well. Geochemical data reveal that both organic matter content and quality vary across stratigraphy. The organic richness in the sediments of the Mtumbei Formation fluctuates from 0.05 wt% to 0.14 wt%, with an average of 0.08 wt%. In the sediments of the Karoo Formation, TOC values fluctuate along stratigraphy as follows: in the upper part, TOC values range from 0.23 wt% to 2.79 wt%, with an average of 0.85 wt%; in



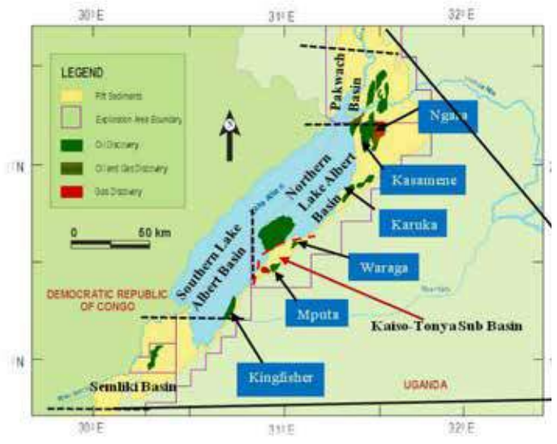
the middle part, they range from 0.23 wt% to 7.53 wt%, with an average of 2.35 wt%; and in the lower part, they range from 0.4 wt% to 78.74 wt%, with an average of 24.08 wt%. This variability in richness indicates varying hydrocarbon generating capabilities. The organic matter is exclusively made of

kerogen types II and III, which has been subjected to a wide range of thermal alterations ranging from immature to mature (oil to gas prone). The burial history curve reveals that the sediments of Ruvuma have undergone different tectonic phases, accompanied by six major episodes of deposition and erosion events from 293 million years ago until recent times. The thermal history model agrees with rock pyrolysis data interpretation (Tmax, Vr %), both providing insight into the thermal evolution of the basin.

ALBERTINE GRABEN DRY WELL ANALYSIS

David Mwongyere - Palynologist at Uganda's Ministry of Energy and Mineral Development (MEMD).

The Albertine Graben in the East African Rift System is Uganda's proven petroleum province, with significant exploration since 1986, with up to 21 commercial discoveries. However, the occurrence of some dry wells highlighted the need for robust dry well analysis for more effective



exploration strategies. This study presents a comprehensive analysis of over 100 wells drilled in the Graben, focusing on identifying factors contributing to well failure or success. The research integrates geological, geochemical, geophysical, petrophysical, and engineering data, along with well reports, to examine pre-drill risk assessments, target identification, drilling observations, well log/core analysis, and the quality of reservoirs, source rocks, seals, and traps. Key findings indicate that charge and migration issues accounted for 40% of dry wells, followed by trap or seal failure (30%), reservoir presence and quality (15%), hydrocarbon alteration (10%), and seismic misinterpretation in structurally complex areas (5%). These results highlight critical areas of focus for improving future exploration efforts and provide a foundation for more informed decision-making in this highly prospective petroleum province, ultimately enhancing the effectiveness of future exploration activities.

PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Johanes Kakoki-Palynologist Palynologist at the Tanzania Petroleum Development Corporation (TPDC)

boreholes X and Y of the same basin, located in the shal- low continental shelf of southern Tanzania were palynologically processed and studied to assess the chronostratigraphy, depositional environments, thermal maturity, and the correlation of bio events. The oldest interval in well X was Oxfordian, marked by Wanaea fimbriata, Wanaea clathrata and Gonyaulocysta jurassica while Homotryblium tenuispinosum marked the youngest Messinian section. In well Y, the oldest Hauterivian section was indicated by Coronifera oceanica while the youngest Rupelian horizon was marked by the Glaphyrocysta semitecta and Stoveracysta ornata. The depositional environments ranged from proximal shelf to deep basin with oxygen levels varying from oxic, dysoxic to anoxic conditions while type III and IV gas-prone kerogen dominated most of the samples. The abundance of fungal spores and hyphae indicated a humid climate, the presence of Apectodinium homomorphum was a hot climate signature, Pediastrum sp. signified a freshwater input, while plant pollen indicated a terrestrial influence. Thermal maturity varied from mature to over-mature for hydrocarbon generation. The correlation of six bio- events common in both wells showed changing sedimentation rates at some intervals and breaks in sedimentation in others, caused by variations in creation of accommodation space within the basin, due to changing sea levels and tectonic uplift and subsidence.

THE MANDAWA BASIN – A POTENTIAL SITE FOR THE CARBON CAPTURE AND STORAGE FACILITY

Wangese Matiko Misiwa - Senior Petroleum Geologist at the Petroleum Upstream Regulatory Authority (PURA), Tanzania.

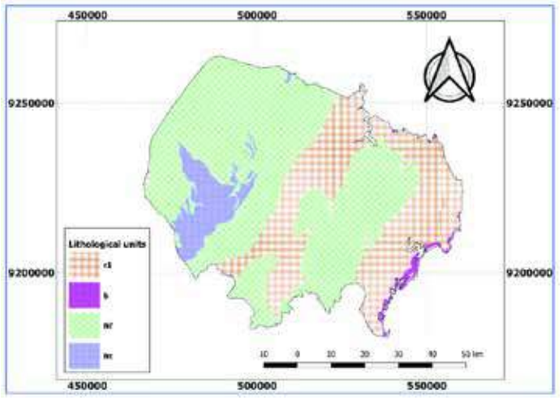
Mandawa Salt Basin, located in southeastern Tanzania, is part of the East African Rift System, known for its hydrocarbon resources, particularly natural gas. Although exploration efforts have focused on assessing its hydrocarbon potential through multiple drilled wells, no commercial discoveries have been made. Seismic interpretations and geological studies indicate the presence of deep-seated reservoirs, regional shale acting as a seal, and evaporite deposits—mainly salt and gypsum—averaging 1,395 meters in thickness. These geological structures create natural traps capable of securely storing fluids, including carbon dioxide (CO_2) and hydrocarbons, over extended periods. Additionally, Mandawa's proximity to natural gas fields in the neighbouring offshore basin to the east and the onshore Ruvuma Basin to the south makes it strategically suitable for CO_2 storage, particularly from natural gas processing. To fully utilize the basin's potential, detailed studies are needed to establish key infrastructure for continuous CO_2 storage monitoring that meets regulatory and safety standards. Monitoring techniques may include geophysical, geochemical, environmental sensors, satellite, and remote sensing technologies. A critical aspect of these studies will be assessing the integrity of the Mandawa Basin's cap rock to ensure its ability to effectively seal injected CO_2, other greenhouse gases (GHGs), and industrial waste. Leveraging the Mandawa Salt Basin for CO_2, GHGs, and industrial waste storage could provide significant environmental benefits for Tanzania, including reducing emissions from industrial sources, power plants, and processing facilities. It would also contribute to advancements in carbon capture and storage (CCS) technologies, which are vital for global climate change mitigation. This paper highlights the environmental protection potential of the Mandawa Salt Basin, drawing comparisons with the Salty Valley Anticline in the Paradox Basin, USA. Establishing CCS facilities in Mandawa would enable the capture of CO_2 emissions from power plants and industrial processes, preventing them from entering the atmosphere. The development of such facilities would play a crucial role in reducing CO_2 emissions, supporting industries in transitioning to low-carbon technologies, and achieving

key environmental protection goals.

REVIEW OF PETROLEUM GEOCHEMISTRY OF KIMBIJI AREA AND ITS IMPLICATION TO HYDROCARBON POTENTIALITY

Agnes Harold Chigolo - Geochemist at the Petroleum Upstream Regulatory Authority (PURA)

This paper investigates the petroleum geochemistry of the Kimbiji area with Campanian black shales source rocks from



the Ruaruke formation on the eastern shoreline of the Dar-es-Salaam Platform and highlights its potential for petroleum exploration. The study encompasses geochemical review of technical reports about the geochemistry of source rocks that was conducted on Kimbiji area and around Tanzania coastal basins, and associated research papers. The review identifies that, the organic matter richness ranges from non-source, fair to very good potential source rocks with the average T.O.C of 1.78–12.2 wt.% for Kimbiji East-1 and 1.48–1.83 wt.% for Kimbiji Main-1 wells. Also, the Campanian black shales are mainly Type III kerogen, gas prone with high levels of amorphous organic matter, low hydrogen indices (59-152) and minor gas shows. This is thought to be attributed by source rock over-maturation and early migration as revealed by vitrinite reflectance (Ro) of 1.2% and 1.4% for Kimbiji East-1 and Kimbiji Main-1 wells respectively. Generally, samples indicate maturity with Tmax of 450°C to 451°C that is thought to be associated with the increase of geothermal gradient with burial depth of the sediments. This review indicates that the source rocks are relatively thermally mature and ready for gas generation, however further studies should be conducted to ascertain the potentiality by integrating with other methods of exploration for hydrocarbon accumulations

EXPLORATION POTENTIAL OF THE EAST AFRICAN RIFT AND COASTAL BASINS: UNLOCKING HYDROCARBON RESOURCES FOR SUSTAINABLE DEVELOPMENT

Grace Nakyanzi - Petroleum Geoscience and Production student at Makerere University, passionate about sustainable energy

The East African Rift System (EARS) is a geologically significant region spanning multiple East African Partner States and hosting promising hydrocarbon basins. Initiated in the Early Oligocene (~30 million years ago), the system evolved through multiple tectonic phases, forming complex extensional basins. Key exploration frontiers include the Main Ethiopian Rift, formed in the Early Miocene (~20 million years ago), and offshore rift systems in the Indian Ocean like the Kerimbas and Lacerda rifts, influenced by volcanic activity from the Afar Plume. Despite extensive research, knowledge gaps persist, particularly in the western branch of the EARS, where deep strata remain largely untested. This study employs a multi-faceted approach to assess hydrocarbon potential in the EARS and coastal basins. Targeted 2D and 3D seismic surveys delineated fault systems, stratigraphic sequences, and basin structures, while well log analysis provided data on lithology, porosity, and source rock characteristics. Basin modeling simulated hydrocarbon generation and migration timing, with geochronological studies constraining tectonic events that influenced basin evolution. Offshore exploration involved advanced geophysical surveys and marine drilling to address challenges like seafloor faulting and recent tectonic activity. Preliminary findings highlight hydrocarbon-bearing basins, including the Albertine and Lokichar rifts, with significant oil discoveries. Favorable geothermal gradients and high total organic carbon (TOC) values support hydrocarbon generation, with migration occurring from the Late Miocene to Pliocene. However, challenges remain, including limited drilling in deep western strata, high geothermal gradients affecting source rock maturity, and logistical constraints in offshore and deep lake environments. To unlock EARS' full potential, strategic investments in advanced exploration technologies and geological research is necessary. Future efforts should focus on integrating underexplored data, enhancing offshore capabilities, and addressing logistical challenges to support energy security, industrialization, and sustainable economic growth across East Africa.

Key Recommendations

i. Set up a modernized seismic data management system to ensure that seismic data is preserved, digitized, and easily accessible for ongoing exploration.
ii. Adopt Integrated Exploration Models for more accurate assessments of hydrocarbon potential across the EAC region.
iii. Facilitate regional geoscientific research partnerships to reduce exploration costs and encourage knowledge transfer.
iv. Promote transparent resource governance, particularly in licensing, revenue management, and environmental compliance.

3.6.1.3. EXPLORATION ACTIVITIES AND OPPORTUNITIES

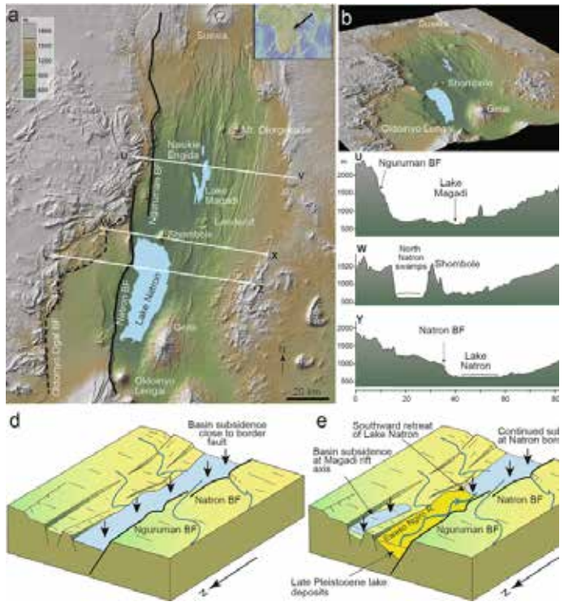
Moderator: Paschal Njiko, Director of Exploration, Development & Production, TPDC, Tanzania

The topics presented in this session include Zanzibar's oil and gas opportunities, highlighting its favorable fiscal terms, active PSAs, and extensive geological data. Presentations also covered the sequence stratigraphy of the Tanga Basin, revealing potential oil and gas reservoirs, and the hydrocarbon exploration prospects in Tanzania's coastal and deep offshore basins. Additionally, innovative 3D magnetotelluric imaging in Kenya's Magadi Basin and palynological analysis of Late Cretaceous sediments in Tanzania were discussed, showcasing advanced methods for exploring the region's petroleum potential. The session emphasized East Africa's growing attractiveness for investment in oil and gas.

USE OF 3D MAGNETOTELLURIC TO IMAGE MAGADI BASIN IN THE SOUTH TERTIARY RIFT

Godfred Andrew Osukuku - Chief Geophysicist, National Oil Corporation of Kenya

Magnetotelluric (MT) is a geophysical



method for imaging the electrical resistivity of the Earth's interior from the surface to the mantle transition zone based on the simultaneous measurements. of the horizontal components of time-varying natural electromagnetic (EM) fields on Earth's surface. Electrical conductivity varies over many orders of magnitude, making it suitable to differentiate Earth's materials especially when considering the geological setting, tectonic activity and other information. In particular, the interconnected conductive materials, often closely related to the tectonic processes, generally control the bulk resistivity of the subsurface. The MT method determines the resistivity distribution of the Earth's subsurface through the measurement of time varying electric and magnetic fields at the surface. At each MT site, data from five channels are recorded as a function of time, which is referred to as time series. These channels correspond to three orthogonal magnetic field components (Hx, Hy and Hz), and two horizontal electric field components (Ex and Ey).As an electromagnetic method, Magnetotellurics depends on Maxwell's law stating that a time-varying magnetic field induces an electric field in a conductor. The source are the time-varying horizontal magnetic fields (Hx and Hy), which are generated by two distinct phenomena. The high frequency source fields, greater than 1 Hz, are generated by lightning discharges of distant electrical storms. The low frequency source fields are generated by the interaction of charged particles, solar wind, with the earth's ionosphere. The output of the source fields convolved with the Earth consists of the horizontal electric field (Ex and Ey) and the vertical magnetic field (Hz). The actual parameters measured in the field are the time-varying voltage outputs of the electric and magnetic field sensors: Ex, Ey, Hx, Hy, and Hz.This paper presents results of 3D model obtained from data analysis and modelling of Magnetotelluric data acquired from Magadi Basin in the South Tertiary rift. The survey was carefully and regularly designed so as to yield both 2D and 3D grids. The interstation spacing was 1 Kilometer apart. The MT data was acquired using 5-channel MTU GPS synchronized receivers. Transient Electromagnetic data acquired at each MT respective site was used for static correction, before 3D modelling.The 3D model results show that Magadi Basin has a depocenter towards the boundary fault with sedimentation up to 6 kilometer. The apparent resistivity in the depocenter ranges from 1.4 to 7.9 ohm.meter.

ZANZIBAR OFFSHORE EXPLORATION OPPORTUNITIES

Khalid Bahorera - Petroleum Data Manager, Zanzibar Petroleum Development Company.

Zanzibar's oil and gas sector entered a new phase in 2015 with the enactment of Tanzania's Petroleum Act No. 21, which empowered the Revolutionary Government of Zanzibar (RGoZ) to manage its own oil and gas resources. This led to the establishment of the Oil and Gas (Upstream) Policy and the Oil and Gas (Upstream) Act No. 6 in 2016. Additionally, Zanzibar formed the Zanzibar Petroleum Regulatory Authority (ZPRA) in 2017 and the Zanzibar Petroleum Development Company (ZPDC) in 2018. In October 2018, Zanzibar signed its first Production Sharing Agreement (PSA) with RAKGAS Company for the Pemba-Zanzibar Block. The Zanzibar sub-basin, located between 4°41' and 6°50' S and 38°50' and 45° E, covers approximately 120,000 km², bordered by the Lamu Basin, Mafia sub-basin, the Indian Ocean and the Tanzanian coast. On 20 March 2024, Zanzibar launched its first offshore licensing round for eight blocks, covering a detailed surface area and water depths. Successful investors will negotiate PSAs with the Government. The Zanzibar sub-basin is part of the East African Margin, spanning from Ethiopia-Somalia to Mozambique-Madagascar. It experienced multiple rifting phases from the Permian to the Eocene (~35 million years ago), which significantly influenced the sub-basin's development. The Ministry, in collaboration with SLB and PRA, has provided technical reports, well data, seismic data (2D) and gravity & magnetic data for the licensing round blocks and the broader Zanzibar Basin. These data are available in digital formats, forming comprehensive data packages for potential investors. This licensing round marks an important step in Zanzibar's growing oil and gas industry.

UNVEILING HYDROCARBON EXPLORATION OPPORTUNITIES IN THE COASTAL AND DEEP OFFSHORE BASIN OF THE MAINLAND TANZANIA

Hulda Ramadhani Mangachi - Geophysicist, Petroleum Upstream Regulatory Authority

The Coastal and deep offshore Basin of Tanzania has emerged as an attractive region for hydro- carbon exploration and capturing considerable interest from the global oil and gas industry. This basin, characterized by its complex geological formations and vast potential, remains relatively underexplored, presenting substantial opportunities for hydrocarbon exploration. The basin's untapped potential, supported by high-quality seismic data from multiclient studies, makes Tanzania an attractive destination for exploration investment. By capitalizing on these opportunities, companies can unlock new hydrocarbon resources while contributing to Tanzania's economic growth and energy security. To fully realize the basin's hydrocarbon potential, the need cannot be overstated. This study delves into these opportunities, offering a detailed analysis of the basin's exploration potential through the lens of recent seismic data, geological assessments and the recent deep offshore basin gas discoveries in Tanzania. Through a detailed examination of available seismic data and geological characteristics, the study highlights areas with favorable conditions for hydrocarbon accumulation including traps, reservoirs and source rocks. Additionally, the study emphasizes the significant opportunities within Tanzania's Coastal and deep offshore Basin, particularly for companies looking to enter the market through Production Sharing Agreements (PSAs) and farm-in agreements.

HIGH RESOLUTION SEQUENCE STRATIGRAPHIC ANALYSIS OF MIOCENE TO PLIOCENE DELTAIC SYSTEMS OF TANGA BASIN

Ibrahimu Rutta - Senior Geologist, Tanzania Petroleum Development Corporation

The deltaic systems of Tanga Basin preserve the unique record of sequence stratigraphy of Miocene to Pliocene along the passive margin of East Africa as imaged in the high-resolution 3D seismic data characterized by different lithologies corresponding to base-level fall and base-level rises. The sequence stratigraphy analysis of this basin was conducted using the seismic data of two different vintages that cover the shallow and deep water area. The Miocene sequence is well recorded in the deeper part where the deltaic deposition is characterized by the clinoforms. The depositional cycles within Miocene are predominantly asymmetric whereby Transgressive System Tract are

thicker than the corresponding Regressive System Tracks which are separated by the Ravinement Surface/Transgressive surface or maximum regressive surface (MRS) as evidenced by seismic characteristics with normal regression pattern. The flooding event which corresponds to base level rise during the end of Miocene pushed the shoreline towards the land. This per- sisted to the beginning of Pliocene where the base level falling is recorded and characterized by forced regression events, where Falling Stage System Track and Lowstand System Tracts separated from young continental sediments by an unconformity. Numerous incised channel and carbonate platforms observed in seismic indicates low to intermediate accommodation space available and overall progradation of the ocean as observed in the upper part of the seismic section. The interpretation of the sequence stratigraphy framework of the Tanga Basin provides an improved understanding of shoreline shift between Miocene and Pliocene and associated facies distribution which can be used during exploration and production periods.

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS STRATA IN THE NANGURUKURU FORMATION, COASTAL TANZANIA

Innocent Mvamba - Senior Palynologist, Tanzania Petroleum Development Corporation

The aim of this study was to investigate palynomorphs in rocks in order to identify, date, and comment on depositional setting and thermal maturation of palynomorphs in the Nangurukuru Formation from selected boreholes. Thirty-five core samples from Tanzania Drilling Project (TDP) sites 21 and 24 from the Nangurukuru Formation, Kilwa Group from the southern coast of Tanzania have been processed and analyzed for their palynological content.

The samples yielded abundant well preserved marine and terrestrial palynomorphs with very few barren samples. One hundred and twelve species were identified and systematically described. These include 35 species of dinoflagellate assigned to 22 genera, 49 pollen grains of both gymnosperm and angiosperm accommodated in 31 genera, and 28 species of spores were placed in 21 genera. In addition, a single species of Chlorophycophyten algae, two species of Prasinophyta algae, Foraminifera test linings, and various fungal fructifications were observed.

The palynomorph assemblages are used in a palynostratigraphic age assignment based on comparisons with previously developed biozones for the Late Cretaceous of Gondwana. The recognized palynomorphs suggest Coniacian-Paleocene age for the Nangurukuru Formation. Palynofacies analysis was carried out and used to reconstruct palaeoenvironment, which revealed deltaic or shallow marine to open marine depositional settings. The thermal maturation of palynomorphs indicates that the sediments are marginally mature and capable of producing gas but not for commercial purposes.

Key Recommendations

i. Promote regional training and capacity-building initiatives in sequence stratigraphy and palynology for petroleum geologists.

ii. Develop policies that incentivize foreign and domestic investments in frontier basins.

iii. Invest in advanced geophysical technologies to enhance the accuracy of exploration efforts.

3.6.1.4. FIELD DEVELOPMENT AND RESERVOIR MANAGEMENT

Moderator: Eng. Modestus Lumato, Director of Economic Analysis and Monitoring, PURA, Tanzania; and Eng. Felix Nanguka, Manager Development and Production, TPDC, Tanzania

The session focused on a range of innovative approaches in field development and reservoir management. The topics discussed included the Ntorya Gas Field's development in Tanzania, outlining its discovery and development plans.

The presentations also covered reservoir uncertainties, the challenges of traditional slickline operations, and modern methods to optimize production, including Enhanced Oil Recovery techniques, the use of digital solutions, like unmanned well systems and artificial lift, to minimize the ecological footprint of oil and gas operations in sensitive areas, application of machine learning in predicting reservoir permeability, showcasing its potential to optimize resource exploitation emphasizing the need for modern technologies to enhance oil and gas recovery in the region.

INTEGRATED RESERVOIR MANAGEMENT AND RECOVERY OPTIMIZATION FOR COMPARTMENTALIZED HIGHLY VISCOUS RESERVOIRS: A SIMULATION-BASED APPROACH ENSURING COMMERCIAL VIABILITY OF JOBI-EAST FIELD IN UGANDA'S ALBERTINE GRABEN

Kasirivu Kigongo Wilson - Graduate Trainee Petroleum Officer, Ministry of Energy and Mineral Development

The Jobi-East field in Uganda's Albertine Graben holds 699 million barrels of highly viscous crude oil, presenting major development challenges due to its low-pressure, shallow, and heterogeneous Plio-Miocene lacustrine sands. Discovered in 2011, the field features complex geology with moderate permeability, faulted compartments, and lies beneath the ecologically sensitive Murchison Falls National Park. Fluid viscosities range from 100–1200 cP, with initial reservoir pressure around 50 bars, limiting development and posing cap rock integrity concerns. To address these, Steam-Assisted Gravity Drainage (SAGD) was identified as the optimal Enhanced Oil Recovery (EOR) technique. A detailed 3D geological model was created using Python, integrating seismic, well log, core, and petrophysical data. Dynamic SAGD simulations evaluated various scenarios over a 25-year production period using dual-horizontal well pairs. Key performance metrics—oil production rates (28,000–45,000 bopd), gas-to-oil ratios (20–50 SCF/STB), water cut, and breakthrough times—were optimized with steam injection at 250–350°C. Recovery factors of 37.31% to 59% were achieved with ideal well spacing of 4–6 meters vertically and 100–125 meters laterally. The results, aligned with global analogs like China's Karamay and Indonesia's Duri fields, confirm the field's commercial viability and minimal environmental impact, offering a scalable model for similar reservoirs.

RECOVERY EFFICIENCY, RESERVOIR UNCERTAINTIES, AND IMPLICATIONS FOR FUTURE FIELD DEVELOPMENT IN UGANDA'S ALBERTINE GRABEN

Olila Solomon Oteng - Petroleum officer, Ministry of Energy and Mineral Development, Uganda

This study examines recovery efficiency, reservoir uncertainties and parameters, and their implications for future field development strategies in Uganda's Albertine Graben, focusing on five major oil fields: Jobi-Rii (JR), Ngiri (NG), Gunya (GU), Kasamene-Wahrindi (KW), and Kigogole-Nsoga (KN). Recovery factors (RF) vary significantly, from 20.3% in JR to 36.8% in KW, with a strong negative correlation (-0.71) to oil viscosity, which ranges from 92.2 cP in JR to 4.0 cP in KW.

This inverse relationship emphasizes the importance of oil mobility, underlining the need for viscosity reduction techniques

and mobility ratio improvement in high-viscosity fields. Hydrocarbon Pore Volume Injected (HCPVI) analysis shows diminishing returns at higher injection volumes across all fields, with a moderate positive correlation (0.65) to RF. The greatest incremental recovery occurs in the 0-0.5 HCPVI range, highlighting the importance of early, optimized injection strategies. Early water injection is crucial due to low initial reservoir pressures, ranging from 683 psi in JR to 1247 psi in KW.

These pressures present risks of gas breakout near the bubble point, potentially reducing oil mobility and recovery efficiency, or in some cases, indicate dead oil scenarios, necessitating prompt pressure maintenance. Key static uncertainties and parameters include net reservoir distribution, sand proportion away from well control points, and net-to-gross within the reservoirs. Dynamic uncertainties vary by field, with JR characterized by reservoir heterogeneity's impact on viscous waterflooding, NG and KN's vertical and lateral continuity influencing displacement efficiency, GU facing potential compartmentalization risks, and KW's key uncertainty being sweep efficiency in its mouth bar-dominated H30 reservoir.

Future development strategies should prioritize early implementation of injection facilities, design surface facilities for high watercut production, consider zone-isolated injection for fields like GU, KW, and KN, and implement robust reservoir surveillance. For high-viscosity fields like JR, early chemical EOR is critical, while fields with variable viscosity like GU and KN may benefit from a phased EOR approach. In larger fields like JR, NG, and KN, phased development is recommended.

This analysis highlights the complex interplay between recovery efficiency, reservoir uncertainties and parameters, emphasizing the need for adaptive field development strategies that prioritize early injection optimization, field-specific EOR implementation, and robust reservoir management to maximize recovery and enhance overall economic performance

THE NTORYA GAS FIELD: PAST, PRESENT AND FUTURE

Erhan Saygi - General Manager, ARA Petroleum Tanzania

In 2020, ARA Petroleum Tanzania (APT) became operator of the Ruvuma PSA, which holds the Ntorya gas discovery. APT immediately set about conducting a 338-km2 3D seismic survey – one of the largest of such surveys onshore East Africa.

The results were outstanding, helping APT to trace the contours of the giant gas field, map the geological layers lying beneath it and estimate a higher resource base. It allowed APT to progress a busy work programme to achieve first gas. It also enabled APT to update its broader Field Development Plan, which now envisages a phased approach to maturing the gas field to a higher plateau production rate.

Ntorya gas will benefit the Tanzanian people considerably, increasing the reach and reliability of electricity supplies, supplanting dirtier fuels such as coal and wood, and helping boost the country's industrialisation. Its wider potential can transform Tanzania's energy landscape, providing gas to residents, industries and even export routes.

This presentation will explore Ntorya's exploration history, results of the 3D seismic survey and current plans for a future drilling campaign with consequent production rates.

ASSESSMENT OF SLICKLINE OPERATIONS IN GAS PRODUCING FIELDS: REDUCING LIGHT WELL INTERVENTION (LWI) FREQUENCY THROUGH ADVANCED TECHNOLOGIES. A CASE STUDY OF MNAZI BAY GAS PRODUCING FIELD

Eng. Ndau Leonard Ndau - Petroleum Engineer, Petroleum Upstream Regulatory Authority, Tanzania

Slickline operations are essential for managing and monitoring gas production fields. They play important roles in performing a variety of downhole mechanical services such as setting and retrieving plugs and valves, clearing obstructions, and retrieving downhole gauges that provide vital data on reservoir conditions like pressure, temperature, and flow rates. These operations ensure continuous data collection, which is vital for making informed decisions about production strategies, ensuring well integrity and optimizing reservoir performance. However, traditional slickline operations, often conducted biannually or more frequently in most natural gas producing fields face significant challenges such as high operational costs, production downtime, and associated risks from repeated well interventions. This has been the case in the gas producing fields in Tanzania such as the Mnazi Bay field which is addressed in this study. As the need for more efficient and cost-effective field operations grows, exploring advanced technologies to improve the slickline operations performance becomes increasingly important.

This paper aims to assess these technologies' potential to reduce the frequency of well interventions, thereby minimizing operational disruptions, enhancing well integrity and costs saving while maintaining data acquisition quality. To achieve this goal an assessment of the current slickline practices was conducted by identifying inherent challenges and setting the stage for a detailed discussion on integrating advanced monitoring systems into light well interventions (LWI) to achieve greater efficiency.

A review of various technologies such as Permanent real-time reservoir monitoring systems (PRMS) which offer continuous data collection without frequent physical interventions and wireless telemetry technologies, which enable real-time data transmission from downhole sensors to surface facilities, further reducing the need for physical gauge retrievals. In addition, the paper intends to explore the opportunity for integrating smart technologies in well drilling and construction by assessing its economic implications in terms of cost savings and benefits of adopting such technologies compared to traditional technologies. Further, the paper will provide actionable recommendations that address the appropriate technology for adoption and the operational impact of reducing well intervention frequency in natural gas-producing wells for continuous natural gas production and increasing the value of natural resources as a result of cost savings due to technological advancement.

DEVELOPMENT OF DIGITAL OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICALLY AND SOCIALLY SENSITIVE AREAS: A CASE FOR THE UPSTREAM OIL AND GAS PROJECTS IN THE ALBERTINE GRABEN - UGANDA

Angela Kampi - Petroleum Engineer, Petroleum Authority of Uganda

Uganda's oil and gas development projects are situated in an environmentally and socially sensitive region with several wellpads, and Enabling Infrastructure located within the Murchison Falls National Park (MFNP). MFNP is Uganda's largest national park spanning approximately 3,893 km2 (1,503 sq. mi) and a home to a remarkable diversity of wildlife including lions, giraffes, elephants, Hippos, buffaloes, leopards, antelopes (waterbucks, oribis, Uganda Kobs and the hartebeests) and 450 known bird species including the dwarf kingfisher, shoe-billed stork and the great blue turaco. This rich biodiversity underscores the park's ecological significance and highlights the critical need for careful management of oil and gas operations to protect its unique environment. The development strategy of Uganda's oil and gas projects involves drilling approximately 451 development wells across 33 wellpads, along with associated flowlines, pipeline systems, two (02) Central Processing Facilities (CPF) and facilities for re-injection of produced water. Given the nature of the operational environment and the range of activities during the production phase, these projects face several challenges, including potential human errors and hazards, heightened personnel safety concerns, and significant ecological risks including potential damage to the environment. In a bid to reduce in-field human operational activities to mitigate the above challenges, the projects need to implement remote monitoring and well control digital systems for production and injection activities. These systems need to be designed to automatically manage well operation and maintenance at individual, multiwell, and multifield levels, allowing for start-up, load shedding, preservation, and shutdown of wells across the above mentioned three levels. The intention is to incorporate a set of functions integrated into the Process Control Systems to perform automatic and recurrent actions to control production and injection operations on the wells, while enhancing petroleum production processes in terms of safety, reliability, efficiency and minimizing footprint and traffic in the environmentally sensitive region. This study presents the digital oilfield mechanisms designed for the production phase to minimize the surface footprint in ecologically sensitive areas, reduce the need for routine in-field interventions, and alleviate the overall physical workload of operators. This approach not only limits human physical exposure but also ultimately enhances operational efficiency and environmental protection.

PREDICTION OF RESERVOIR PERMEABILITY USING PETROPHYSICAL ROCK TYPING AND MACHINE LEARNING APPROACH IN TURACO WELLS, ALBERTINE GRABEN, UGANDA

Timothy Ashoka - Graduate Student (Research), Makerere University, Uganda

Accurately estimating reservoir permeability is key for effective reservoir characterization and decision-making in hydrocarbon exploration and development projects. This study proposes a hybrid approach integrating petrophysical rock typing (PRT) with supervised machine learning (ML) techniques to predict permeability in these uncored Turaco wells. It leverages the new data acquired from more exploration and development wells drilled in the region. This includes previous studies in the region, well-log data, and Routine Core Analysis data of 338 core plugs split into training and testing data sets. The study employed a combination of machine learning methods Convolutional neural network (CNN), Least squares support vector machine (LSSVM) and Multilayer extreme learning machine (MELM) to offer a novel framework for improving reservoir permeability prediction accuracy and reliability. The methods were optimized by hyperparameters determined using Particle Swarm Optimization (PSO) and Cuckoo Optimization Algorithm (COA) algorithms and validated using the test data set. The Petrophysical rock types (PRTs) were classified using pore geometry indicators such as Winland R35, and Flow Zone Indicator (FZI), and then validated through petrographic analysis using techniques such as SEM backscatter imaging and Energy Dispersive X-ray Spectroscopy (EDX) images. Six (06) PRTs were identified and were consistent with the Global Hydraulic Element (GHE). The refined PRT classifications, and identified distinct hydraulic units were used by the ML algorithms algorithm to accurately predict permeability. The MELM method provided the best predictions with a high accuracy of R^2 = 0.97-0.99. The predicted reservoir permeability in the reservoir zones is 200-9800mD which is beyond the inferred estimate of 200 – 500 mD. The practical implications of this research include enhancing reservoir management, particularly in optimizing well placement locations and production strategies. These advances have the potential to reduce operational uncertainties and improve economic benefits in the oil and gas sector. This research contributes to the understand-ing of reservoir properties, particularly rock types, pore geometries, and fluid flow behaviour, in the Late Miocene to Early Pliocene reservoirs of the Albertine Graben.

Recommendations

i. Adopt digital oilfield technologies for remote monitoring and well control in ecologically sensitive areas to reduce environmental impact and operational risks.

ii. Introduce machine learning and artificial intelligence (AI) for Advanced Reservoir Characterization and Optimization to improve reservoir permeability predictions, optimize well placements, and enhance hydrocarbon recovery.

iii. Promote modern technologies such as carbon capture, utilization, and storage (CCUS) and low-impact well technologies to reduce emissions and enhance sustainability in upstream operations.

3.6.2. MID AND DOWNSTREAM OPPORTUNITIES

3.6.2.1. CRUDE OIL AND REFINED PETROLEUM PRODUCTS PIPELINES AND STORAGE

Moderator: Eng. Dr. Geoffrey Ogwang, Ag. Commissioner, Midstream Petroleum Department, MEMD- Uganda

The discussion focused on the challenges and opportunities in the oil and gas sector amidst the global transition to cleaner energy. Presentations covered the regulatory framework for transboundary infrastructure, with a focus on the East African Crude Oil Pipeline (EACOP), the economic viability of refineries in Sub-Saharan Africa, and the role of petrochemical integration in sustaining refinery operations. The importance of adopting cleaner energy policies and incorporating petrochemical products into refinery revenue models was emphasized to ensure the sector's continued relevance and profitability.

A DISCUSSION OF THE KEY ECONOMIC FACTORS FACED BY CRUDE OIL REFINERIES IN SUB-SAHARAN AFRICA.

Daniel Muwooya - Head Commercial & Business Development, Uganda National Oil Company

The world's refining capacity exceeding demand presents a significant challenge to the refining sector. This is further complicated by the decline in petroleum product demand in the US since 2005 and in the EU since 2006. Additionally, the 40 refineries still operational in Africa face challenges such as low technical complexity, underutilization, logistical constraints, and political and fiscal instability. These factors continue to hinder the sector's growth and efficiency. Additional challenges that affect the industry globally include excess refinery capacity and reduced product demand in Europe and the United States of America. While these challenges disadvantage Africa's existing refineries, they create opportunities for new refinery projects to adapt and succeed. Inland refineries like Uganda's have additional advantages if they have access to cheap crude and significant domestic/regional markets. Several greenfield and brownfield refinery projects are currently underway or have recently been completed in Africa. These include the Dangote Refinery in Nigeria, three refinery projects in Angola, three refinery projects in Algeria, three refinery projects in Egypt, and a greenfield refinery project in Uganda, among others. However, the current financial environment presents challenges for greenfield and brownfield refinery projects in Uganda. This paper will evaluate the economic factors that are faced by refinery projects in Africa, including the contemporary issues regarding financing.

REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT

Naboth Mugyerwa - Manager Pipelines and Storage, Petroleum Authority of Uganda

There are numerous transboundary linear infrastructures globally, with the East African Crude Oil Pipeline (EACOP) being one of the notable examples. This 1,443-kilometer pipeline is designed to transport oil produced from Uganda's Lake Albert oilfields to the port of Tanga in Tanzania, where it will be exported. To ensure the seamless development of EACOP, the Governments of Uganda and Tanzania signed an InterGovernmental Agreement (IGA) that laid out a framework on how they would coordinate. However, the IGA is high-level and does not stipulate operational arrangements between the two States. It is from this basis that the Petroleum Authority of Uganda (PAU) and the Energy and Water Utilities Authority (EWURA) of Tanzania, as the entities responsible for regulating pipeline activities in each state, signed a Memorandum of Understanding (MOU) on 17th December 2020 to cooperate in the regulation and monitoring of the design, construction, operation, maintenance, and decommissioning of the EACOP Project. This is to ensure a safe and secure EACOP system is designed, constructed, operated, and maintained during the life of the project. This paper will elaborate on how the PAU and EWURA are working together in the regulation of the EACOP Project to ensure that the pipeline structural integrity is established, maintained, and operated in a safe and secure manner in order to protect people and the environment.

PETROCHEMICAL INTEGRATION: A CATALYST FOR REFINERY SUSTAINABILITY AMIDST THE ENERGY TRANSITION

Sarah Nanteza - Petroleum Officer, Ministry of Energy and Mineral Development, Uganda

The global energy transition from fossil fuels to renewables is reshaping the petroleum industry. Advances in transport electrification and alternative fuels like hydrogen and biofuels are gradu- ally reducing demand for high-value fossil fuels such as gasoline, diesel and LPG. This decline impacts gross refining margins, threatening the economic viability of the sector. New oil-producing countries face additional challenges, struggling to secure refinery investment due to increasing restrictions and investor concerns over diminishing returns. This shift creates long-term uncertainties for both established players and emerging oil economies. This research explores how petroleum refiners can mitigate these challenges by integrating petrochemical production with refining operations. Given their shared feedstocks, petrochemicals provide a growth opportunity as demand for monomers rises, particularly in renewable energy technologies.

Through refining process analysis, economic evaluation, mathematical modeling and optimization, the study examines alternative pathways for converting refinery feedstocks—including LPG, naphtha and gas oil—into high-value petrochemicals. It evaluates feedstock extraction, synthesis from smaller hydrocarbons and cracking of heavier materials to determine the most profitable conversion processes. The impact of crude oil properties on integration is also assessed. Key findings highlight that petrochemical integration enables refiners to produce high-demand products like olefins and aromatics. Naphthenic crude is optimal for aromatics, while paraffinic crude favors olefin production. Operational synergies, such as hydrogen integration, reduce costs and improve profitability. However, challenges include high capital costs for separating petrochemicals like benzene, toluene and xylene due to close boiling points with other hydrocarbons. This research provides a framework for refiners, investors and policymakers to optimize production, enhance profitability and navigate the evolving energy landscape effectively.

Key Recommendations

i. Establish shared refining infrastructure to reduce dependency on foreign refined products.

ii. Secure Long-Term Refinery Investments by developing strategies to attract investors despite global divestment from fossil fuels.

iii. Enhance regional regulatory cooperation to ensure safety, security, and environmental compliance.

3.6.2.2. NATURAL GAS PROCESSING, TRANSPORTATION AND DISTRIBUTION

Moderator: Janeth Mesomapya, Public Relations Officer, EWURA, Tanzania

The session focused on innovative solutions and challenges within Tanzania's energy sector. Key discussions included the potential of plastics to replace metallic structures in oil and gas infrastructure to reduce corrosion, the integration of Carbon Capture and Sequestration (CCS) technology in LNG projects to mitigate carbon emissions, and the economic feasibility of using virtual pipelines (CNG

and Min-LNG) for gas transportation, a case study of Morogoro Region. The development of the Tanzania Liquefied Natural Gas (TLNG) project was also highlighted, emphasizing its significant opportunities for job creation, energy security, and regional economic growth. The session stressed the importance of supportive regulations, infrastructure development, and local content in driving these initiatives forward.

ENGINEERING CRITICAL ASSESSMENT OF PLASTICS USED IN OIL AND GAS INFRASTRUCTURE

Neema Mdegela - Principal Engineer, TPDC-GASCO, Tanzania

Aliphatic polyketones (PKs) have emerged as promising materials for use in a variety of industrial applications due to their excellent mechanical properties and chemical resistance. As natural gas pipelines are subjected to harsh environmental conditions such as high pressures, temperature fluctuations, and chemical exposures, it is crucial to evaluate the performance and reliability of materials like PKs in these settings. This literature review-based project focuses on the engineering critical assessment (ECA) of aliphatic polyketones, specifically within the context of natural gas infrastructure. The review covers the material properties of aliphatic polyketones, including their tensile strength, fatigue resistance, and durability under conditions typical of natural gas environments. Additionally, the failure mechanisms of PKs are explored, including potential degradation due to cyclic loading and chemical attack from natural gas components.

This study also explores suitable inspection methods, including non-destructive testing (NDT) techniques, to detect early signs of material degradation and maintain the integrity of natural gas infrastructure. Furthermore, the study examines fracture toughness techniques applicable to polymers, focusing on those that would be most relevant for aliphatic polyketones, based on their material properties and failure mechanisms.

The role of natural gas as a feedstock for synthesizing aliphatic polyketones is also considered, as it could influence the material's properties and performance under stress.

THE TLNG PROJECT DEVELOPMENT AND ITS OPPORTUNITIES FOR EAST AFRICA

Hilat Gunda Juma - Student, Dar es Salaam Maritime Institute (DMI), Tanzania

The Tanzania liquified natural gas project (TLNG) is bound to bring a redefined picture of the nation's economy, transforming the natural gas reserve into a global energy powerhouse. As the project being the heart of East Africa's energy revolution, the multi million dollar project marks a bold strike toward the sustainable development and energy security not only in Tanzania but also for the entire region. Tanzania boasts an estimate of 57 trillion cubic feet (TCF) of natural gas reserves, positioning it as a strategic player in the global energy market.

The project aims to harness this potential by converting raw gas into a highly transportable and versatile form of liquified natural gas (LNG). Taking a stand by the implementation not just resolution, the project promises to deliver immense economic benefit, including the influx of foreign investment, using the human element to provide significant job creation to the people not only in Tanzania but also East Africa at large, and enhanced Government revenue through exporting. Going along with that it did not leave behind the environmentally friendly viable as a cleaner alternative to coal and oil, aligning Tanzania with the global vision concerns when it comes to environment and climate change.

Beyond the numbers, the TLNG project represents a transformative vision of Tanzania. It aims to catalyze industrialization by providing reliable energy access, foster social-economic growth bringing about the continental growth, through infrastructure development and positioning the nation as a hub for energy innovation in Africa. With the focus of local content and skill development, the project ensures the Tanzanians are not mere spectators but active participants in shaping the country's energy future.

Tapping into such opportunity, every path of success has a shared number of challenges, financing complexity, environmental sustainability and geopolitical dynamics require strategic foresight and innovative solutions. This paper dives into the comprehensive benefits, potential hurdles and strategic frameworks necessary for the TLNG project's success showcasing its role as a cornerstone for Tanzania's rise in the global energy arena. Putting aside all the collateral alignments the project is not just an infrastructure endovers, it is a story of ambition, transformation and innovation where the future of Tanzania takes a rightful place on the world stage.

ANALYSIS OF VIRTUAL PIPELINE (CNG AND LNG) NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: A CASE STUDY OF MOROGORO REGION

Mercy Kamuntu - Student, University of Dar es Salaam, Tanzania

Tanzania is among the countries with plenty of natural gas reserves (about 57 TCF). Currently, natural gas transportation infrastructures have been developed from producing fields along the coastal regions of Tanzania to Dar es Salaam.

The utilisation of this gas so far is on electrical power generation, fuel in industries, fuel in vehicles and cooking energy. Unfortunately this utilisation is limited to Dar es Salaam region. Considering transportation of natural gas to other

regions will increase utilization of the gas. A good example is the transportation sector, it will contribute to reduction of dependence on imported oil for vehicles. There are several methods that can be considered for transportation of natural gas to other regions. The determination of the best transportation method depends on the technical and economic analysis of each method. This work presents a comparative study between transportation of natural gas using virtual pipeline methods (CNG and Micro LNG). The case study considered gas for vehicles in Morogoro region (about 194 km from Dar es Salaam). CNG and LNG methods were analysed using Aspen Hysys Simulation software. The amount of natural gas considered was estimated from the amount of diesel and gasoline required in the transportation sector for Morogoro region.

The CNG method started with natural gas compression from 65 bar (pipeline pressure) to 233.7 bar and then transported by trucks to Morogoro town and finally depressurized to 9.49 bar ready for filling stations. In the micro LNG method, natural gas was liquefied at -161.6 oC and 1.013 bar, then transported by trucks to Morogoro town and finally regasified at 23.99 oC and 9.49 bar. When both of the methods were compared economically, it was found that CNG has CAPEX, NPV, IRR and payback time of 9.24 MMUSD, 36.93 MMUSD, 49%, 2.25 years respectively while LNG has CAPEX, NPV, IRR and payback time of 9.96 MMUSD, 34.64 MMUSD, 43%, 2.6 years respectively.

The comparison is based on 1359 to 2381 MMSCF gas volume. CNG was found to be the better method of transporting natural gas to Morogoro compared to micro LNG since it has higher IRR, NPV, lower CAPEX and payback time. It is recommended that the study should be considered when deciding the transportation method before investment. However the study should be expanded to other regions and consider other utilisation of natural gas when estimating the amount required for comparison. Again further studies should include environmental impact assessment to identify potential risk and their mitigation measures for each method.

INTEGRATION OF CARBON CAPTURE AND SEQUESTRATION (CCS) TECHNOLOGY IN LNG PLANT: CASE STUDY OF TANZANIA LIQUEFIED NATURAL GAS PLANT

Eng. Alex Buko - Petroleum Engineer, Petroleum Upstream Regulatory Authority, Tanzania

Tanzania has discovered significant natural gas reserves amounting to 57.54 TCF (2023). Given the country's strategic geographical location and market positioning, Tanzania plans to implement the Liquefied Natural Gas (LNG) Project to monetize the gas discovered deep offshore in blocks 1, 2, and 4. Central to the project is the natural gas liquefaction plant to be constructed at Likong'o, in Lindi Region.

Despite natural gas being regarded as the cleanest source of energy among fossil fuels, various processes involved in the natural gas life cycle including liquefaction have proven to be sources of greenhouse gas emissions including carbon dioxide (CO2). For instance, during the natural gas liquefaction process, the CO2 may be emitted as a result of gas processing or power generation. In Tanzania, the integration of Carbon Capture and Sequestration (CCS) Technology in LNG facilities can be particularly beneficial considering the country is poised to become a key player in the global LNG market, and adopting CCS can enhance the environmental performance of its LNG operations and hence present a significant opportunity to enhance sustainability and reduce greenhouse gas emissions in the energy sector. The integration will not only align with global sustainability goals but also position the country as a leader in the transition to a low-carbon energy future. This paper will discuss how the CCS technologies can be integrated into the TLNG to address the environmental concerns associated with CO2 emissions resulting from LNG operations while ensuring operational efficiency, sustainability, productivity and maximum benefits to the country.

Key Recommendations

i. Prioritize Local Content and Workforce Development to ensure skills transfer and job creation for East African citizens through training and capacity-building programs.

ii. Develop incentives to attract foreign and domestic investments while addressing financing complexities.
iii. Develop a carbon credit market for companies implementing Carbon Capture and Sequestration (CCS) technology in natural gas projects to finance additional initiatives.

3.6.3. RESOURCE REVENUE MANAGEMENT

Moderator: Ms. Angela Nalweyiso, Manager Cost Monitoring, Petroleum Authority of Uganda.

The session focused on strategies for managing resource revenue and monitoring costs in the petroleum sector. Discussions centered around global factors influencing crude oil pricing and the importance of effective cost estimation and fiscal oversight in petroleum projects. The session emphasized the need for effective resource management, cost control, and strategic partnerships to ensure sustainable development in East Africa's petroleum industry.

3.6.3.1. OIL AND GAS MARKETS AND IMPACT OF GLOBAL PRICES

ECONOMIC ANALYSIS OF PRICE DETERMINANTS AND PRICING MECHANISMS OF CRUDE OIL

Tonny Nenga - Petroleum Economist, Ministry of Energy and Mineral Development, Uganda

This study reviews international crude oil prices and economic theories of oil price determination, with a focus on OPEC's behavior. It introduces models for understanding long-run and short-run oil price dynamics and pricing mechanisms in physical markets. In an ideal competitive market, commodity prices are set by the intersection of demand and supply. However, in the oil market, the supply curve is determined by oil fields ranked by long-run marginal costs. As prices rise, higher-cost fields are called upon, and fields with higher marginal costs remain non-productive. As of 2016, OPEC countries held 72% of global proven reserves. A production cut by OPEC makes higher-cost fields marginal, raising the market price. This creates an economic rent for low-cost fields and ensures higher-cost fields break even.

The dominant firm model is a useful tool for analyzing oil price determinants, though it has limitations. The two-factor model views prices as a combination of long-run equilibrium price and short-term deviations. When prices exceed the long-run equilibrium, supply increases, reducing demand and putting downward pressure on prices. Crude oil is traded in spot markets or through long-term contracts. The pricing formula involves the benchmark price, such as Dated Brent or Dubai, adjusted for price differentials based on crude quality and market conditions. These benchmarks are used by oil companies, traders, futures exchanges, banks, and Governments for various transactions, including long-term contracts, futures, and taxes. In conclusion, while the dominant firm model offers a useful framework for analyzing oil price determinants, it is not commonly used for forecasting, due to the challenges in predicting variables like investment, income and technology, as well as reconciling the volatility in short-run oil prices.

3.6.3.2. PETROLEUM PROJECTS' COST MONITORING AND AUDITING

PETROLEUM PROJECT COST MONITORING AND AUDITING

Laura Robinson - President and CEO Swale House Partner Inc.

Petroleum project cost monitoring and auditing requires significant attention as it is an essential component of project oversight. Cost recovery audits provide assurance to the Contractor and its investors that the recoverable costs are agreed and they provide assurance to the resource owner (the Government and its citizens) that the costs are appropriate, according to the contractual and legal arrangements. This is particularly important to assuring citizens that the Government is protecting the value of the resource and the Government's total share. There are no international standards for how Contractors should account for petroleum projects.

The rules are written by the Governments and there is a learning curve by both parties on how to interpret those rules. Engaging with auditors using an agreed-upon procedures model allows for improved consistency from year to year and block to block, improved coordination on the interpretation of the rules and improved clarity between the entity executing the audit and the Government entity responsible for approval of recoverable costs. These improvements can reduce friction from the beginning of petroleum operations among the parties and enhance confidence in the quality of the cost recovery and production sharing processes. The presentation will address opportunities and challenges in cost monitoring and cost recovery auditing in East Africa and around the world.

Recommendations

i. Promote regional collaboration in oil price forecasting and risk assessment to mitigate market volatility and ensure stable revenues.

ii. Encourage diversification of crude oil export strategies, including spot market sales and long-term contracts, to optimize price advantages.

iii. Support the participation of local traders and financial institutions in futures and derivative markets, to hedge against oil price risks and improve market understanding.

3.6.4. ENERGY MIX AND JUST ENERGY TRANSITION

3.6.4.1. CLEAN COOKING INITIATIVES

Moderators: Charles Kamunya, Principal State Counsel at the State Department for Petroleum in Kenya; and **Jean Baptist Havugimana**, Director - Productive Sectors, EAC.

The discussion focused on the transition to clean cooking solutions in East Africa, particularly through the adoption of Liquefied Petroleum Gas (LPG). The presentations highlighted key strategies to accelerate LPG adoption, including infrastructure development, consumer education, and policy support. The discussion also addressed the broader impacts of clean cooking on health, the environment, and economic growth, stressing the importance of stakeholder collaboration and investment in the sector.

ACCELERATING LIQUEFIED PETROLEUM GAS (LPG) ADOPTION IN TANZANIA: STRATEGIES FOR A SUSTAINABLE CLEAN COOKING TRANSITION

Mbarouk Shaame - Petroleum Engineer-Inspection, EWURA, Tanzania

Tanzania, with its strategic location and a population exceeding 60 million, faces significant challenges in transitioning to modern clean cooking fuels and technologies. Most households rely on biomass energy sourced through inefficient production methods or unsustainable forest harvesting, leading to deforestation, indoor air pollution, and adverse health effects. To address these issues, the Government of the United Republic of Tanzania introduced the National Clean

Cooking Strategy 2024–2034, targeting 80% household adoption of clean cooking solutions and phasing out firewood and charcoal by 2034. LPG has been identified as a key transition fuel, yet barriers to adoption and the effectiveness of current strategies remain critical concerns. Tanzania's LPG market comprises 17 marketing companies, 116 licensed distributors, and over 1,000 dealers. However, infrastructure constraints hinder sector growth.

The LPG receiving terminal at the port accommodates vessels up to 6,000 MT, with a total storage capacity of just 17,700 MT. Additionally, 33 upcountry storage and refilling plants hold only 2,122 MT. Limited distribution networks, inadequate storage, and low consumer awareness further restrict the growth of LPG subsector. This paper analyzes Tanzania's LPG subsector, assessing its legal framework, infrastructure, market structure, pricing, and promotion strategies and highlighting barriers to its growth and efficiency. Drawing from successful large-scale LPG adoption in Kenya, Indonesia, India, Latin America, and Morocco, it explores adaptable best practices to accelerate Tanzania's clean cooking transition. Achieving widespread LPG adoption in

Tanzania requires collaborative efforts between the Government, international partners and private sector. The study recommends a national LPG master plan to coordinate infrastructure investments, policy implementation, awareness campaigns, affordability measures, and safety regulations. Implementing these recommendations will position LPG as a key component of Tanzania's energy mix, improving health outcomes, reducing deforestation, and decreasing reliance on biomass fuels—ultimately fostering a cleaner, healthier and more sustainable society.

LIQUIFIED PETROLEUM GAS: THE MOVER OF SUSTAINABLE DEVELOPMENT FOR EAST AFRICA

Wanjiku Manyara - General Manager, Petroleum Institute of East Africa

The global energy transition remains a key focus in future energy discussions, building on past shifts from wood to coal, oil, and natural gas. The current transition prioritizes low-carbon, renewable energy sources to mitigate climate change. Achieving this shift requires both technological advancements and decisive actions. Energy plays a central role in sustainable development, influencing social, economic, and environmental progress. The Sustainable Development Goals (SDGs) highlight energy's significance in achieving broader development objectives. In Africa, the energy transition is increasingly driven by the need for cleaner alternatives, emphasizing regional ownership of the process.

Replacing traditional biomass fuels like charcoal and firewood with cleaner options, such as liquefied petroleum gas (LPG), presents a rapid and impactful solution. Beyond advancing SDG 7 (Affordable and Clean Energy), this transition supports multiple SDGs, including SDG 1 (No Poverty), SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 13 (Climate Action). Expanding LPG use can reduce preventable deaths from indoor air pollution, preserve forests, enhance water catchment areas, and improve food security. Moreover, promoting LPG fosters economic opportunities within its supply chain, reinforcing sustainable development by addressing present needs without compromising future generations.

ESSENTIAL CLEAN COOKING EDUCATION AND ENVIRONMENTAL MOVEMENTS WITH ENERGY4ME

Daniel Chege Reuben - Student, University of Dar es Salaam, Tanzania

Clean cooking education is generally not common among the majority of people, including knowledge about the proper use of clean cooking methods and the side effects of unclean cooking methods on users. The Energy4me program under SPE (Society of Petroleum Engineers) University of Dar es Salaam Students' chapter has extended its roots to reach people and help the Government to achieve its National Clean Cooking Strategy Vision 2034. For many of them, the first strategy focuses on increasing awareness among citizens and institutions about the importance of using clean cooking solutions.

Through the Energy4Me program under SPE, several methodologies have been implemented, including community and school outreach programs, research week presentations for university students, and online virtual meetings via Zoom and Microsoft Teams. These efforts are carried out in collaboration with public servants from the Ministry of Energy and university academicians, aiming to impart knowledge to everyone, regardless of gender or status.

For instance, energy4me has approached villages and schools in Mwanga District in Kilimanjaro Region in March, 2024 together with University of Dar es Salaam students through research weeks in April and June. In all levels, there were assessment on the understanding of the education provided and feedbacks were received through questionnaires, online google responses and live interrogations to the audiences whereby most of people merited well essentiality of the education that we impacted them with and University of Dar es Salaam recognized this project as among the best multidisciplinary project of the year at unit levels. Through this project, it is

recommended that in our upcoming outreach activities next year in the Dar es Salaam and Pwani regions, as a starting point in our roadmap, a tree-planting campaign should be conducted in schools and communities to help restore the environment to its original green state, reminiscent of the time of creation.

SCALING UP PUBLIC-PRIVATE PARTNERSHIPS (PPPS) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

Elly Bogi - Geophysicist, Ministry of Energy and Petroleum, Kenya

Globally, 2.3 billion people do not have access to clean cooking technologies and less than 20% of residents in 29 sub-Saharan African countries have access to clean cooking solutions. In 2022, the number of individuals lacking access to clean cooking facilities rose to about 990 million making attainment of Sustainable Development Goal (SDG) 7 of universal access to modern energy remain a distant goal and will likely be unachievable by 2030 or even by 2050. As countries develop diverse mechanisms to meet SDG 7, Liquified Petroleum Gas (LPG) could play an important role in

this respect and also be an integral part of the solution as a modern energy and clean fuel alternative. The use of biomass contributes to the deforestation rate and its health implications are equally severe. Exposure to particulate matter and pollutants from inefficiently burned biomass leads to serious health issues like respiratory infections, heart disease, and even death, with women and children being disproportionately affected.

According to the World Health Organization (WHO), an estimated 3.2 million deaths occurred due to household air pollution, with over 237,000 of those fatalities involving children under the age of five by the year 2020. In Peri-urban regions of East Africa, access to Liquefied Petroleum Gas (LPG) remains limited due to underdeveloped distribution networks, high transportation costs, and insufficient infrastructure. However, Public-Private Partnerships (PPPs) can help in overcoming these challenges and expand LPG infrastructure and improve accessibility in Peri-urban regions of Rwanda, Uganda, Kenya, and Tanzania. By leveraging on collaboration between Governments, private companies, and local communities, these partnerships can expand LPG infrastructure, reduce costs, and ensure availability in remote regions in peri-urban and remote regions.

This paper explores how PPPs can be scaled to support the transition to clean cooking, improve rural livelihoods, reduce emissions, and enhance health outcomes, particularly for women and children.

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

Felistus Wavinya Kalungu - Senior Petroleum Officer, Ministry of Energy and Petroleum, Kenya

The necessity for clean cooking solutions has emerged as a critical global challenge, particularly in developing countries where reliance on traditional biomass fuels poses significant health, environmental, and economic risks.

This paper explores the role of Liquefied Petroleum Gas (LPG) in Kenya's transition to sustainable cooking. As nations strive to meet the United Nations Sustainable Development Goals (SDGs), particularly Goal 7, LPG presents a viable alternative to conventional cooking fuels. According to the World Health Organization, millions, especially women and children, are at risk of respiratory diseases due to smoke exposure from traditional cooking. LPG, a cleaner-burning fuel, reduces indoor air pollution, enhancing the overall well-being of people. It also lowers greenhouse gas emissions, supporting climate change mitigation. To increase LPG uptake, Kenya's Ministry of Energy and Petroleum is implementing initiatives such as subsidized 6kg cylinders for targeted households, LPG reticulation into affordable housing, promoting LPG use in public institutions of learning, enhancing LPG infrastructure to ensure a reliable supply of LPG, particularly in remote and underserved areas and private sector involvement. To lower costs, the Government has zero-rated Value Added Tax (VAT) on LPG, enhancing affordability and stimulating local economies by creating jobs in distribution and services. Consumer education and awareness campaigns further support LPG adoption. Collaborating with relevant stakeholders, the Government educates communities on LPG's health, environmental, and economic benefits. Training on safe handling and efficient use of LPG appliances empowers users and enhances safety.

A multi-faceted approach is essential to accelerate clean cooking adoption, with LPG playing a central role. Collaboration among Governments, NGOs, and the private sector is key to implementing LPG initiatives. Strategic policies, infrastructure investment, and community engagement will drive this transition, ensuring healthier and more sustainable cooking practices for millions of people worldwide. LPG is not only an alternative to traditional fuels but also a critical element in achieving broader energy transition goals and enhancing public health.

Recommendations

i. Establish a coordinated strategy to expand LPG infrastructure across EAC Partner States, ensuring adequate storage, transportation, and distribution networks.

ii. Offer incentives such as tax breaks and subsidies for private companies investing in LPG supply chains.

iii. Develop flexible financing models, such as pay-as-you-go (PAYGO) systems, to help consumers afford LPG refills and equipment.

iv. Encourage microfinance institutions to offer loans for LPG adoption, particularly for women-led households and businesses.

v. Launch nationwide public awareness campaigns on the benefits of clean cooking solutions focusing on health, environmental, and economic advantages.

vi. Integrate clean cooking education into school curriculums and community programs to drive behavioral change from an early age.

3.6.4.2. ENERGY INTEGRATION

Moderator: Emilian Nyanda, Head of Environmental Management Unit, Ministry of Energy Tanzania

The session delved into the integration of alternative fuels and decarbonization strategies in East Africa, emphasizing the importance of optimizing existing petroleum infrastructure for a sustainable energy future. Discussions revolved around the adoption of cleaner energy technologies, such as auto gas and compressed natural gas (CNG), and the need for infrastructure upgrades to support these transitions. Additionally, the session highlighted the role of policy development in addressing challenges related to clean energy access and technologies.

EFFECT OF BLENDING LIQUIFIED PETROLEUM GAS, LIQUIFIED NATURAL GAS AND COMPRESSED NATURAL GAS FOR COST EFFECTIVENESS

Gilbert Tindivale Nduguyu - Senior Mechanical Engineer, Kenya Pipeline

Kenya's liquefied petroleum gas (LPG) consumption reduced significantly between 2022 and 2023 from 8 kg per capita to 6.8 kg per capita. This was largely attributed to import costs that pushed low-income households to rely on firewood, charcoal and kerosene for cooking. There was also a decline in motor vehicle conversion from petrol fuel to LPG. Considering that the dollar exchange rate dictates the cost of the energy in the household, there is a need to consider other options of managing the cost of energy. The Indian Government is moving ahead with plans to start producing dimethyl ether (DME) for blending into LPG up to a level of about 20% to reduce its LPG imports. This will involve construction of a methanol plant from fossil fuels and biomass. This option can also be considered for blending with petrol fuel. The mandatory phased introduction will start at 1% for use in automobiles and households from

April 2025, it said. The share of mandatory blending will then be increased to around 5% by 2028. This paper therefore discusses the potential for Liquified Petroleum Gas (LPG), Liquified Natural Gas (LNG) and Compressed Natural Gas (CNG), the effect of blending these energy sources for a cost-effective energy mix.

INTEGRATING OIL AND GAS GEOLOGICAL AND GEOCHEMICAL LABORATORIES INTO THE CLEAN ENERGY TRANSITION: A STRATEGIC APPROACH TO AVOIDING STRANDED ASSETS

Clara Orora - Petroleum Geochemist National Oil Corporation of Kenya

The global energy transition, driven by climate change concerns and the need to reduce carbon emissions, is reshaping the energy sector. Traditional oil and gas assets face the risk of becoming stranded, leading to potential economic losses. However, integrating these assets into the clean energy transition can offer a strategic way to preserve value and support the broader energy sector's sustainability. Oil and gas geological and geochemical laboratories, essential for hydrocarbon exploration, can evolve to support sustainable energy solutions. These laboratories can apply their expertise to carbon capture and storage (CCS), geothermal energy and hydrogen storage. Geochemical analysis techniques used for evaluating hydrocarbon basins can assess geological formations for long-term CO_2 storage. Knowledge from oil and gas exploration can also be leveraged to explore geothermal energy, a renewable source with significant potential. Moreover, these laboratories can assist in biofuels and waste-to-energy processes, evaluating the quality and sustainability of alternative fuels. As biofuels grow in the energy mix, oil and gas labs can help monitor fuel characteristics and optimize production. Repurposing oil and gas laboratory infrastructure for renewable energy technologies can prevent the abandonment of assets, preserve value and support new energy industries. This integration fosters innovation, ensures employment continuity for skilled professionals and contributes to the energy transition. By aligning laboratory capabilities with clean energy technologies like CCS, geothermal and biofuels, the oil and gas sector can play a crucial role in accelerating the global shift toward a sustainable, low-carbon energy system.

INTEGRATING ALTERNATIVE FUELS AT EXISTING FILLING STATIONS IN TANZANIA: A FOCUS ON AUTOGAS, CNG, GASOIL, AND GASOLINE FACILITIES

Ibrahim Kajugusi - Senior Petroleum Engineer, EWURA, Tanzania

The petroleum industry is crucial to Tanzania's economy, accounting for 8% of energy consump- tion. While gasoline and diesel remain dominant, demand for LPG Autogas and Compressed Natural Gas (CNG) is expected to rise significantly over the next 30 years. This paper explores integrating Autogas and CNG into existing petrol stations in Tanzania, highlighting the shift to- wards alternative fuels and the trend of converting vehicles specifically for LPG or CNG. Since Tanzania's petroleum sector liberalization in 2000, the country has experienced substantial growth in petroleum consumption. In 2022/23, petroleum product use reached 4.4 billion liters, with diesel and petrol comprising 93.78%, supplied by 2,361 petrol stations. LPG consumption stood at 293,167 metric tons, primarily for cooking, with no stations designated for LPG Autogas. CNG infrastructure included five filling stations, and CNG vehicle numbers rose from 1,139 to 3,100, with 3.24 million kilograms dispensed—a 21% increase from the previous year. As traditional fuel demand grows, a transition to alternative fuels driven by the need for environmental sustainability, energy security and cost savings becomes evident. This paper examines infrastructural, regulatory, and economic aspects for co-dispensing Autogas and CNG into existing fuel stations, focusing on necessary modifications in station layout, safety protocols, and compliance with Applicable Standards and International Best Practice. It highlights key factors like safe storage, efficient dispensing systems, and robust safety measures for accommodating alternative fuels. Using qualitative and quantitative methods, the study reviews global case studies and empirical data to demonstrate the environmental and economic benefits of integrating alternative fuels, including reduced greenhouse gas emissions and lower operational costs. It also identifies major adoption barriers, such as inadequate infrastructure and the challenge of whether to build refuelling stations first or drive consumer adoption before expanding infrastructure. The paper concludes with policy recommendations, emphasizing strategic Government initiatives, public awareness campaigns, and regulatory adjustments. Strengthening infrastructure and promoting alternative fuel adoption could position Tanzania to capitalize on the benefits of a diversified fuel system.

DECARBONISING GREENFIELD OIL PROJECTS: A CASE STUDY OF THE KINGFISHER OIL AND GAS PROJECT IN UGANDA

Henry Tumusiime - Geophysicist, Ministry of Energy and Mineral Development, Uganda

The objective of the study was to analyze the strategies adopted by greenfield oil development projects to reduce the carbon footprint during operations, focusing on the Kingfisher oil and gas project with a production rate of 40,000 barrels per day and an electrical power requirement of approximately 24 MW. The study's findings show that decarbonisation of the industry will be achieved by implementing various strategies, such as using electricity from the national grid, limiting flaring and venting to emergency situations only, electrifying operations, converting excess associated gas into useful products such as LPG to replace biomass fuels, and increasing the use of carbon capture and storage through carbon credits. Decarbonization efforts aim to reduce greenhouse gas emissions to 30 kgCO2e /bbl from initial oil production. This study advances our knowledge of practical tactics that support decarbonization and thus promote sustainable energy transitions in the oil and gas industry.

Recommendations

i. Retrofit existing fuel stations to accommodate LPG Autogas, CNG, and other clean fuels, ensuring safe storage, handling, and dispensing systems.

ii. Provide incentives for vehicle conversion to Autogas and CNG to accelerate transition in the transportation sector.

iii. Implement electrification of oil production operations using renewable energy sources to reduce carbon emissions.

3.6.4.3. TECHNOLOGICAL ADVANCEMENT IN PETROLEUM INDUSTRY

Moderator: Mr. Philips Obita, General Manager Upstream – Uganda National Oil Company-Uganda.

The discussions focused on the technological advancement that can impact positively the petroleum industry. For instance, adopting blue and green hydrogen technologies, using drones to inspect pipelines and detect leakages, using ethanol blended fuel to reduce carbon emissions and composite metal repairs. It also provided an overview on the importance of embracing new technologies that align with Sustainable Development Goals (SDGs).

DRONE TECHNOLOGY: ADVANCED & COMPREHENSIVE MEANS FOR INDUSTRIAL INSPECTION

Elia Lema - Asset Integrity Management Coordinator, SolutionsTag Consulting Company Limited

Drones, initially used for recreational activities and security surveillance, are gaining popularity across industries, especially in oil and gas, for inspections. Drones can now be employed for visual examination in various sectors with maintenance processes. Furthermore, drones can capture detailed images, videos, and data that can be examined and saved for later use. Advanced and versatile drones like the MATRICE 350 RTK can inspect facilities such as storage tanks, boilers, pipelines, flare stacks, pressured vessels, bridges and power grid lines. Equipped with sensors like LIDAR, thermal imaging, camera and laser range finders, drones locate and identify internal and external defects like cracks, corrosion, and leaks, contributing to predictive maintenance. This study explores the barriers preventing the oil and gas industry, using Tanzania as a case study, from adopting drone inspections in their maintenance plans and suggests ways to facilitate their use. In this work, two upstream gas producing companies and ten downstream oil marketing companies were selected for in-depth study by collecting data on their inspection methods and challenges. Drone demos using the MATRICE 350 RTK were conducted with pre-programmed flight paths for automatic inspections. The raw data was analyzed, resulting in inspection reports for future use. A key challenge in adopting drone inspections is the lack of awareness among industry operators about the capabilities of drones. Additionally, there is resistance to the technology's reliability and accuracy. To overcome these challenges, educating the public through social media, articles, and webinars, as well as integrating advanced sensors for high-resolution data, is crucial. Advancements in drone technology and navigation systems now allow for precise and efficient operations in the energy industry. Drones improve safety by reducing workers' exposure to hazardous environments and save time by covering large areas quickly. They also provide more accurate data and reduce costs by minimizing shutdowns and the need for specialists or scaffolding.

GREENING KENYA'S ENERGY FUTURE: HARNESSING BIOFUELS, A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Dr. Abiudi Masinde - Geophysicist, National Oil Corporation of Kenya

Kenya is seeking innovative and sustainable solutions to address its growing energy needs and environmental concerns. The National Oil Corporation of Kenya (NOC-Kenya) is leading this initiative by producing biofuels, including sustainable aviation fuel (SAF) and biodiesel from Jatropha seeds. This cleaner energy source aims to reduce greenhouse gas (GHG) emissions. The pilot project, initiated in November 2023, targets 25,000 trees in 25 acres. An 8,668.9-hectare area in Kajiado County has been earmarked for this energy forestry project. Jatropha Curcas is well-suited for biofuel production due to its adaptability to arid and semi-arid climates like Kajiado County. It thrives in marginal soils where food crops cannot grow, ensuring that agricultural land remains dedicated to food production. Its deep-rooting system also prevents soil erosion and enhances soil health, contributing to environmental sustainability. Jatropha's seeds, which contain 30-45% oil with a high percentage of monounsaturated oleic and polyunsaturated linoleic acid, yield a sustainable feedstock for biofuel production. The press cake from the seeds, rich in proteins (60-63%), also serves as organic manure and an ideal protein source with high content of essential amino acids. By investing in Jatropha-based biofuels, Kenya can reduce its reliance on fossil fuels, lowering carbon emissions and contributing to global efforts to combat climate change. The dual benefits of environmental sustainability and economic development make Jatropha Curcas a strategic choice for the National Oil Corporation of Kenya's biofuel initiative. Jatropha Curcas is increasingly being recognized for its potential in biodiesel production due to its ability to grow in dry, marginal areas. Its oil content is estimated at 30-40% and is potentially the most valuable end product with possibilities such as low acidity, good oxidation stability. Fuel properties of Jatropha are considered to be as good as petro-diesel. This makes Jatropha a promising solution for biodiesel production, contributing to renewable energy efforts and reducing greenhouse gases.

EMBRACING ETHANOL-BLENDED FUELS AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

Jackson Imani - Geophysicist, National Oil Corporation of Kenya

Ethanol-blended fuels are a key global solution for cleaner energy. These fuels are created by blending ethanol with hydrocarbon-based fuels like petrol and diesel. Ethanol is a renewable biofuel derived from biomass feedstocks such as maize, sugarcane, and farm waste products. Common blends include E10 (10% ethanol) and E85 (85% ethanol), along with petrol and biodiesel blends such as E-Diesel. The blending process involves high-precision systems to ensure homogeneity through batch mixing or inline blending. These fuels improve fuel combustion efficiency, reduce fossil fuel dependency, and lower GHG emissions, making them crucial in combating climate change. Ethanol-blended fuels also produce less carbon monoxide (CO), unburned hydrocarbons (HC), and particulate matter (PM) in tailpipe emissions. Lifecycle analyses show that E10 can reduce GHG emissions by up to 20%, and E85 can reduce emissions by 50-60%. This is due to ethanol's carbon-neutral production, where CO_2 emitted during combustion is balanced by the CO_2 consumed by feedstock growth. The higher oxygen content in ethanol also promotes more complete combustion, resulting in cleaner air. Ethanol blending offers additional benefits, including contributing to sustainable energy through agricultural residues, improving energy security, promoting rural economic development and reducing dependence on imported oil. However, challenges such as land use changes, water resource management, and storage stability require ongoing research to maximize environmental benefits of ethanol. In conclusion, Ethanol-blended fuels are indeed an effective transitional energy solution in the fight against climate change through mitigation of emissions by renewable sources of energy. Their wide adoption comes in line with global carbon reduction targets and ways forward toward a sustainable energy future

COMPOSITE METAL REPAIR; ADVANCED TECHNOLOGICAL APPROACH TO PIPELINE REPAIR

Peter Kichogo - Managing Director, Solutions Tag Consulting Company Limited

Pipelines are crucial in the oil and gas industry for transporting crude and refined petroleum products. With increasing oil and gas exploration in East Africa, the number of pipelines is rising. Pipeline design typically lasts 20-30 years, and as they age, repair becomes vital for asset integrity management. Various repair technologies are available, with polymeric composites gaining popularity for restoring the strength and integrity of corroded and aging metallic pipelines. This abstract aims to assess the effectiveness of composite repair technology compared to traditional methods like welding and clamping. Ten real case studies were analyzed to assess cost effectiveness, revenue saving, level of associated safety risks, convenience and

operations interruption on composite application for pipeline repair. For each case, the surface for high pressure pipeline (to 70bars) was prepared using the Bristle Blaster® machine to ensure good bonding between the pipe and the composite repair system, followed by cleaning and degreasing with acetone. Results showed pipeline repairs with inline (no shutdown) composite application restored pipeline strength close to design pressure with repairs taking one to two days from pipeline preparation to curing. Composite repairs were 200% less expensive than traditional welding methods and eliminated downtime. Additionally, the use of composite materials reduced safety risks, operational interruptions, and costs, making it a convenient and efficient alternative to metal repairs. Overall, composite repair technology offers pipeline owners and operators a cost-effective solution, reducing repair time, safety risks, and maintenance costs while improving operational certainty.

BLUE HYDROGEN: A NECESSARY ADDRESS TO THE NET ZERO EMISSIONS INITIATIVES IN TANZANIA

Desmond Risso - Geologist, Petroleum Upstream Regulatory Authority, Tanzania

Tanzania is among the signatories of the Paris Agreement of 2015 which calls for increased efforts in climate change mitigation and adaptation. The agreement has resulted into a heightened requirement for substantial reductions in greenhouse gas emissions across the spectrum, including the petroleum industry, guided by the overarching goal of achieving net zero emissions by 2050. The prominence of the net-zero emission agenda has significantly influenced strategies in the exploration and development of new petroleum resources on a global scale. Among others, natural gas, due to its significantly lower Carbon dioxide (CO_2) emissions, has been recognized as a transitional energy source. The petroleum industry has conceived a number of reorganizations to attain a business model that is more sustainable, environmentally friendlier, potential for financing of its development projects and profitable to the parties whereby technology is central to the changes in the industry. Production of hydrogen from natural gas (methane) coupled with carbon capture use and storage is rapidly adopted and is projected to rise. Following a significant volume of natural gas discovered in Tanzania so far and the proportion of untapped volume therein, there is a potential of developing a blue hydrogen economy in the country. This paper shades light on opportunities in respect of the blue hydrogen production in Tanzania and challenges that require attention to warrant the potential of blue hydrogen production in Tanzania

Recommendations

i. Encourage local production of alternative fuels like methanol and biofuels to enhance energy security and affordability.
ii. Leverage existing and untapped natural gas reserves for hydrogen production in the region to support a clean fuel industry.
iii. Harmonize energy transition policies across the EAC to support regional trade, knowledge sharing, and investment in clean technologies.
iv. Promote research and development in the petroleum industry by establishing regional centers of excellence for energy technology innovation.

3.6.4.4. STRENGTHENING ENERGY SECURITY: THE ROLE OF PETROLEUM IN A DIVERSIFIED ENERGY MIX STRATEGY

Moderator: Abigail Mwangi, Petroleum Advisor, State Department for Petroleum, Kenya.

The discussions focused on exploring the evolving role of National Oil Companies (NOCs) amidst the energy trilemma of security, affordability, and transition, with a focus on their adaptation to a rapidly changing energy landscape. It emphasized the importance of gender inclusion, highlighting the critical role of women in Africa's energy transition, and the potential of natural gas, particularly in East Africa, as a bridge to cleaner energy solutions. The findings also stressed the need for NOCs to diversify into renewables, invest in Carbon Capture and Storage (CCS), and reform policies to support sustainable development and energy access.

NATIONAL OIL COMPANIES MUST BECOME TRUE ENERGY COMPANIES OR CHOOSE TO DIE

Dr. Shaidu Nuru Shaban - Senior Geologist, Tanzania Petroleum Development Corporation

A single barrel of oil constitutes about 4,053 human work hours equivalent to 2 years of 40-hour work weeks. Considering a labor rate of $20/hour, a barrel of oil is worth $81,000 dollars. However, we only pay $75 to $80 for that, which is less than 2%. The oil industry offers numerous benefits to humanity which contribute to a higher standard of living. Despite the oil and gas industry benefits, the industry has been facing significant challenges from other competing commodities, and now the climate change global pressure. Although the energy transition began 5500 years ago from domesticating working animals to first use of coal 3000 years ago, the shift to oil energy occurred only about 100 years ago, about 1,400 later after solar and wind energy sources were harnessed. We have enjoyed the hydrocarbon economy for a brief period before being faced with a disruptive transition, calling for immediate action. In this piece of work, we demonstrate how National Oil Companies (NOCs) may navigate this trap and emerge as resilient Energy Companies to become future fit. Further, we lay out the role of the oil and gas industry towards the global goal of net-zero carbon emission by 2050. NOCs must undergo significant transformation to meet the demands of the new energy future by utilizing their technology, financial strength, and expertise. Predicting what will constitute a profitable energy project in the next 25 years is becoming more challenging. Therefore, ignoring the alternative energy sources opportunities evolving now, the oil and gas companies are doomed to die in the post-carbon economy

THE ROLE OF PETROLEUM RESOURCES IN ACHIEVING A JUST ENERGY TRANSITION IN EAST AFRICA

Naluzze Pamela Praise - Student, Makerere University, Uganda

As East Africa strives to enhance its energy security and meet the projected 50% increase in energy demand by 2030, a diversified energy mix becomes crucial. This paper delves into the role of petroleum resources in achieving a just energy transition, integrating traditional energy sources with renewable alternatives. The region is undergoing a significant energy transformation aligned with Sustainable Development Goals (SDGs). Uganda's development of oil reserves in the Albertine Graben, with an estimated 6.5 billion barrels of oil, is anticipated to boost local energy access, create over 160,000 jobs, and fund renewable projects. Kenya's approach in utilizing over 2,000 MW of geothermal energy integrated with petroleum resources, aims to provide a reliable power supply, and particularly in remote communities. Clean cooking solutions are key to health and environmental sustainability. Liquefied petroleum gas (LPG) initiatives in Kenya and Rwanda offer cleaner alternatives to biomass fuels, which contribute to over 4 million premature deaths annually due to indoor air pollution. These initiatives

act as transitional solutions until more sustainable technologies become widely available. Technological advancements in petroleum can improve efficiency and reduce emissions. Innovations such as carbon capture and storage mitigate environmental impact while ensuring a stable energy supply. With annual investments in research and development estimated at $1 billion, sustainable extraction and processing practices align with global climate commitments. Strengthening energy security through a diversified energy strategy is essential for regional economic resilience. Tanzania's $30 billion LNG project highlights gas as a transitional fuel for electricity generation while facilitating future renewable investments. Petroleum remains vital in expanding energy access, especially in underserved regions. Regional cooperation and energy integration is key to maximizing East Africa's energy potential. Projects like the East African Crude Oil Pipeline, which is set to transport 200,000 barrels per day, enable resource-sharing and generate funding for renewables. A strategic approach to petroleum resources will drive sustainable development, economic growth, and environmental stewardship across the region.

BUILDING A GENDER - JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

Pauline Kiconco - Exploration Geophysicist, Ministry of Energy and Mineral Development Uganda

A just transition must go beyond green economies to ensure the full inclusion of all social groups. Despite contributing only 4% of global carbon emissions, Africa remains the most vulnerable to climate change. Addressing these challenges requires targeted action plans from Governments and non-Governmental entities. While the just transition concept is gaining traction, gender-specific issues remain largely unaddressed.

The shift to decarbonized economies, though necessary, disproportionately impacts vulnerable groups, especially women, who already face employment inequalities. Their limited inclusion in the transition process hinders effective participation in sustainable development programs. An equitable and inclusive plan is essential to protect women from these disparities. This abstract explores sustainable and inclusive strategies to ensure a gender-just energy transition in Uganda as highlighted below; Inclusive Decision-Making: In East Africa, and Uganda specifically, women remain underrepresented in the energy sector. While the green transition is expected to create over 400,000 jobs across Africa, women are projected to secure only 10%. Governments should involve women in policy-making and leadership roles. Education and Employment Opportunities: Encouraging women to pursue careers in Science, Technology, Engineering, and Mathematics (STEM) is critical.

By creating more opportunities and support systems for women in these fields, Uganda can harness their talents and contributions to tackle these challenges of the future. Removing Structural Barriers: Governments and energy sector stakeholders must dismantle structural impediments and address stereotypical gender norms to guarantee women's meaningful engagement as agents of change in renewable energy sectors. Cross-Sector Collaboration: Partnerships among Government agencies, academia, and NGOs are essential for research and data collection to overcome the dearth of data in our local context.These actions, among others, shall be studied in this paper and shall serve as a roadmap for facilitating and actualizing the just transition process toward a sustainable, green and gender-equal future for all in Uganda and East Africa.

AN ASSESSMENT OF THE SOCIO-ECONOMIC CONTRIBUTION OF COMPRESSED NATURAL GAS IN THE PUBLIC TRANSPORT SYSTEM IN TANZANIA

Wilfred Mwakalosi - Principal Communications Officer, EWURA, Tanzania

Tanzania has significant natural gas reserves, totaling around 57.54 trillion standard cubic feet (TCF). Since beginning extraction in 2004, natural gas use has been limited to electricity production, industries, a few households, and vehicles. In 2023, the natural gas processed amounted to 75,604.70 mmscf, with 54 industries and 1,514 households connected to the natural gas pipeline. The number of CNG-vehicle conversions increased from 1,139 to 3,100, and workshops grew from five to eight in the financial year 2022/23. Despite this progress, the transportation sector remains largely dependent on traditional fuels, particularly diesel and petrol.

For instance, diesel consumption rose from 2.15 billion litres in 2022 to 2.52 billion litres in 2023. This dependence resulted in an average monthly spending of USD 188.76 million on fuel imports in Tanzania between 2020 and 2024. Electric vehicle (EV) adoption is still in its early stages, with annual sales of around 3,000 two- and three-wheelers and 2 four-wheelers. The transportation sector plays a crucial role in economic growth by facilitating trade, commerce, and access to services. A well-functioning transportation infrastructure boosts productivity, lowers costs, and improves overall efficiency in industries, contributing considerably to the nation's economic growth. CNG vehicles are a promising alternative, reducing CO2 emissions by 33%, saving fuel costs, and im- proving performance, but they have not been widely adopted within the public transportation sector.

This paper assesses the socio-economic impact and benefits of using natural gas in public transport, focusing on CNG use in trucks, taxis, and tricycles in Dar es Salaam. Using both qualitative and quantitative methods, the study aims to identify the potential benefits and challenges of CNG in public transport and provide policy recommendations to diversify energy sources and promote sustainable economic growth in Tanzania.

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA

Roselane Jilo Ambasi - Senior Electrical Engineer, Kenya Pipeline Company

Natural gas is one of the mainstays of global energy. Worldwide consumption is rising rapidly and in 2020 gas accounted for almost half of the growth in total global energy demand. Contribution of gas to energy transitions varies widely across regions, between sectors and over time. China, Japan, South Korea and India are the world's leading importers of LNG. Despite the fact that they do not have any reserves of LNG, they are among the highest consumers of LNG in the world. For example, KOGAS of South Korea also has the largest storage capacity of LNG. 84% of household energy use in S. Korea is from LNG piped directly to homes. Tanzania is a sleeping giant as far as LNG is concerned. It has 57.54T of NG both offshore and onshore yet it is estimated that more than 95% of households in Tanzania use firewood and charcoal as their source of energy for cooking and with electricity access at only 39.9%. Tanzania's estimated natural gas reserves are enough to cover the country's domestic use and make Tanzania the next natural gas hub in Africa. The energy sector in Kenya is largely dominated by petroleum and electricity, with wood fuel supplying the basic energy needs of the rural communities, the urban poor, and the informal sector: wood fuel and other biomass account for 68% of the total energy consumption. Generally, firewood and charcoal is the main source of rural fuel in East Africa despite its harmful effect. This means that there is a need to reconsider further sources of energy especially for household cooking and heat- ing. The vast reserves of NG in Tanzania could just be the solution. Way forward is to understudy Angola that is involved in upstream, mid and downstream petroleum business. Upstream oil and gas business, Angola is involved in exploration. Adopting this strategy, East Africa and Tanzania in particular would ensure that they exploit the vast NG resources in the region, develop sufficient energy for the region for industrial and household use. This will ensure energy demands are met as well as provide better and healthy alternative cooking fuel.

Key Recommendation

i. Establish innovation hubs to drive technology-led transformation and align their strategies with net-zero goals and national climate commitments.

ii. Develop CNG infrastructure and mandate gradual conversion of public buses and city taxis to CNG in urban centers.

iii. Invest in storage infrastructure and expand access to affordable LPG for household and industrial use.

3.6.5. OTHER INVESTMENT OPPORTUNITIES

3.6.5.1. FARM IN PARTNERSHIPS AND MULTI-CLIENT STUDIES

Moderator: Angela Nalweyiso, Manager Cost Monitoring, Petroleum Authority of Uganda.

This session emphasized how joint ventures (JVs) and farm-in partnerships contribute to boosting investment and improving project efficiency in East Africa's oil and gas industry. JVs are key in the energy sector, enabling companies to share risks and leverage expertise in large-scale projects.

EVALUATION OF THE EFFECTIVENESS OF JOINT VENTURES IN ENERGY PROJECTS

Richard Nuwagaba - Head of Development & Production, Uganda National Oil Company

Joint ventures in the energy sector have become a common strategy for companies to share risks, leverage expertise, and enhance project outcomes. However, the effectiveness of these ventures can vary significantly, influenced by various factors, which is why the evaluation of joint ventures in energy projects is crucial for understanding what works and what does not. The paper will involve a comprehensive review of existing literature on joint ventures in the Energy sector, focusing on case studies and empirical research. Key performance indicators (KPIs) such as project timelines, costs, and production levels will be analyzed to determine the impact of joint ventures on project outcomes. Interviews with industry experts and stakeholders will also be conducted to gather insights on the enablers and barriers to effectiveness. The expected outcome of this study is to identify key success factors, challenges, and best practices for joint ventures. Through this analysis, the study aims to highlight the importance of effective communication, collaboration, and clear division of responsibilities to ensure alignment of business objectives. It will also address common barriers such as cultural differences, conflicting priorities, and a lack of transparency, which can hinder the success of partnerships. Finally, the study will outline best practices, including balanced joint venture structures, conflict resolution mechanisms, and continuous monitoring and evaluation, to help organizations overcome challenges and achieve long-term success in their collaborative efforts. The evaluation of joint ventures in energy projects is crucial for understanding what works and what does not. Through examination of the enablers and barriers to effectiveness, this paper aims to provide actionable insights for companies considering joint ventures, helping them to optimize their strategies and achieve better project outcomes.

Recommendations

i. Develop policies that encourage fair risk-sharing mechanisms and equitable benefits among JV partners.

ii. Establish partnerships between local institutions and international energy firms to facilitate knowledge transfer and technology sharing.

iii. Facilitate access to financing through regional investment funds or Public-Private Partnerships (PPPs) to support energy projects.

3.6.6. CROSS CUTTING ISSUES

3.6.6.1. LOCAL CONTENT AND CORPORATE SOCIAL RESPONSIBILITY

Moderator: Betty Namubiru, Manager National Content Monitoring, PAU, Uganda

The session delved into the strategic importance of enhancing local content to drive socio-economic growth, with a particular emphasis on local sourcing and workforce development initiatives. It also touched on the role of Corporate Social Responsibility (CSR) in fostering sustainable development in the EAC, evaluating how these initiatives can contribute to community welfare, environmental protection, and economic empowerment. Additionally, the need for building a skilled, collaborative workforce across the region and the value of Government involvement in the engineering activities of large-scale oil and gas projects were discussed. Together, these presentations highlighted the intersection of local content, responsible industry practices, and regional cooperation as crucial factors for ensuring that East Africa's energy future is both sustainable and inclusive.

ENHANCING LOCAL CONTENT IN THE EAST AFRICAN PETROLEUM SECTOR

Humphrey Asiimwe - Chief Executive Officer, Uganda Chamber of Mines & Petroleum

Promoting local content is vital for transforming East Africa's petroleum sector growth into tangible socio-economic benefits. By enhancing national business participation and fostering skills and technology transfer, local content initiatives maximize domestic value. In Uganda, local content is crucial to national development. The Petroleum (Exploration, Development, and Production) Act of 2013 mandates foreign companies to prioritize local sourcing and employ Ugandan nationals. By 2022, Ugandans comprised 40% of the industry's workforce, with projections reaching 70% by 2030. Achieving this requires significant investment in training, technology transfer and infrastructure development. Strengthening local supplier networks is essential.

The Petroleum Authority's National Supplier Database (NSD) has registered 3,059 companies by 2023, 80% of which are Ugandan. Among them, 631 firms have secured contracts, including 465 Ugandan businesses. Over 2,000 SMEs have also benefited from capacity-building programs in health, safety, bid management and financing. Between 2017 and 2023, Uganda's oil and gas sector recorded 4,812 procurements worth $5.14 billion, with $2.07 billion (40%) awarded to Ugandan companies. Additionally, $16.5 million was directed to community-based enterprises. Developing a skilled workforce remains a priority.

Currently, 60% of Uganda's oil and gas workforce has received specialized training aligned with international standards. Programs like the Youth Internship Program, managed by the Uganda Petroleum Institute and PAU, equip young Ugandans with industry-specific skills. However, a 40% skills gap persists, requiring sustained in- vestment in vocational training and higher education. Uganda's local content framework has been strengthened through recent amendments to the Petroleum Act, introducing stricter penalties for non-compliance.

A regional approach to harmonizing local content regulations could enhance investor confidence and ensure balanced growth across East Africa. Through business participation, workforce development and community engagement, Uganda's model promotes sustainable resource development and regional cooperation.

ASSESSING THE IMPACT OF CORPORATE SOCIAL RESPONSIBILITY INITIATIVES IN THE PETROLEUM INDUSTRY IN TANZANIA: THE CASE OF EACOP AND TPDC

Dr. Achilana Mtingele - Senior Economist, EWURA, Tanzania

Corporate Social Responsibility (CSR) emphasizes the need for corporations to contribute to the socio-economic development of their host societies, including workforce welfare and environmental protection. Businesses globally recognize CSR as crucial for sustainability, partly due to pressure from NGOs and advocacy groups concerned about corporate influence and its socio-environmental impacts. CSR entails adherence to legal, ethical and international best practices, reinforcing that businesses are integral to society and responsible beyond their operations. CSR mediates relationships between corporations, Governments and citizens, guided by sustainability, accountability and transparency. It impacts environmental protection, poverty alleviation, labor practices and human development. In Tanzania, CSR implementation is evident in the petroleum subsector particularly in the East African Crude Oil Pipeline Project (EACOP), a pipeline for transporting Uganda's crude oil to Tanzania's Tanga port. This paper assesses CSR initiatives in EACOP, evaluating their impact on host communities in alignment with CSR principles. Additionally, the study examines Tanzania's legal framework for CSR, its enforcement and measures to enhance CSR effectiveness in delivering socio-economic benefits. A desk review methodology will be used, analyzing documents such as strategic plans, annual and financial reports of relevant institutions. The paper underscores the need for corporations to economically and socially empower host communities through CSR initiatives. Findings and recommendations aim to reshape CSR strategies to ensure meaningful, sustainable benefits as well as addressing policy and legal gaps to help policymakers refine CSR regulations for enhanced community impact.

CORPORATE SOCIAL RESPONSIBILITY IN THE PETROLEUM SECTOR: A CATALYST FOR SUSTAINABLE DEVELOPMENT IN KENYA

Rose Nyongesa Naliaka - Petroleum Technologist, State Department for Petroleum-Kenya

The petroleum sector plays a crucial role in shaping East Africa's energy future, particularly in Kenya, where untapped resources offer opportunities for economic growth. However, long-term sustainability requires more than fossil fuel exploitation—it necessitates integrating Corporate Social Responsibility (CSR) into industry operations. This paper examines how CSR practices in the petroleum industry contribute to sustainable development while supporting a diversified energy mix aligned with Kenya's growth objectives. The theme, "Unlocking Investment in Future Energy: The Role of Petroleum Resources in the Energy Mix for Sustainable Development in East Africa," underscores the balance between resource exploitation and environmental and socio-economic sustainability. While petroleum remains a key energy driver, responsible policies are essential to mitigating negative impacts on communities and ecosystems. CSR has proven instrumental in addressing these challenges through environmental stewardship, economic empowerment, and community engagement. The sector must adopt responsible extraction processes that protect biodiversity, reduce carbon emissions, and comply with global environmental standards. Additionally, fostering local economic development through job creation, skills training, and business support is critical in reducing poverty in resource-rich areas. CSR initiatives also enhance social welfare by improving education, healthcare, and infrastructure.

Collaboration with Governments, NGOs, and stakeholders ensures sustainable, high-impact projects that align with national development goals. Beyond being a moral obligation, CSR strengthens the industry's social license to operate, enhances investment appeal, and fosters strong community relations. As Kenya transitions toward a diversified energy mix, petroleum will continue to play a role alongside renewables. CSR should support innovation in cleaner technologies, energy efficiency, and renewable investments. By prioritizing sustainability, the petroleum sector can attract investment, drive socio-economic progress, and position itself as a leader in East Africa's transition to a more sustainable and inclusive energy future.

EMPOWERING EAST AFRICA'S ENERGY FUTURE: BUILDING A SKILLED, COLLABORATIVE WORKFORCE FOR SUSTAINABLE GROWTH

Ayan Omar - GIS Data Analyst, National Oil Corporation of Kenya

As East Africa's petroleum industry continues to evolve, there is a growing need for skilled professionals who can navigate the sector's complexities and contribute to the sustainable development of the region's energy resources. One of the most effective ways to address this demand is through targeted capacity-building and training programs that not only enhance technical expertise but also promote regional collaboration. These programs should be designed to meet the specific needs of East African countries while fostering the exchange of knowledge and experiences across borders, creating a strong, interconnected workforce capable of driving the future of energy in the region. Each East African nation has made unique strides in the petroleum sector, from exploration and development to legal and regulatory frameworks. By bringing together local universities, international oil and gas companies, Government bodies, and regional organizations, East African nations can develop a shared curriculum and vibrant training ecosystem that reflects and develops the region's geological, economic, and social context, ensuring that professionals are equipped to handle the specific needs of the region by incorporating interdisciplinary skills needed for a just and inclusive energy transition In addition to technical skills, training programs should also emphasize leadership development, fostering a new generation of professionals capable of managing and driving change in the energy sector. These programs can include mentorship opportunities, field trips to exploration sites, and hands-on experiences that bring theory into practice.

THE VALUE OF INCLUSION OF GOVERNMENT OFFICERS IN THE ENGINEERING ACTIVITIES OF OIL AND GAS FACILITIES – A CASE STUDY FROM THE EACOP PROJECT

Linda Muwumuza - Senior Petroleum Officer, Ministry of Energy and Mineral Development, Uganda

In May 2017, the Governments of Uganda and Tanzania signed an Inter-Government Agreement (IGA) to facilitate the East African Crude Oil Pipeline (EACOP) Project. This was followed by Host Government Agreements, outlining obligations for each state and EACOP Ltd in the project's development and operation. EACOP Ltd began the detailed design in 2019, which was temporarily halted in 2020–2021. However, on October 7, 2020, the Petroleum Authority of Uganda (PAU) approved the Front-End Engineering Design (FEED). The FEED established key design elements, including pipeline routing, material selection, financial implications and project timelines, forming the foundation for detailed design. The detailed design resumed in 2022 and was successfully completed in 2024. Managing EACOP's complex structure, involving multiple contractors, required robust interface management systems. Unique engineering challenges included large-scale heat tracing, power supply architecture, leak detection systems and pipeline crossings, which were unique in the region. From 2019 and particularly from 2022 to completion, Uganda's Government deployed officers to design teams in London and Dar es Salaam. Their involvement spanned FEED validation, design reviews, HAZOP analysis, procurement insights, interface management and Factory Acceptance Tests (FATs). They also served as key liaisons between project developers and Government entities, ensuring alignment with regulatory requirements. This engagement provided the Government with critical insights into EACOP's development, enhancing decision-making and planning. This report and presentation will highlight the officers' journey in the EPCM process, lessons learned, their application in Uganda's midstream petroleum sector and key recommendations for future projects.

Recommendations

i. Develop and maintain National Supplier Databases to facilitate local business participation in oil and gas supply chains.
ii. Invest in vocational training and higher education programs to bridge the skills gap and ensure qualified local workforce.
iii. Develop a regional legal framework for CSR enforcement to ensure consistency in petroleum sector operations.
iv. Develop internal capacity within Government institutions to effectively monitor and regulate petroleum sector projects.

3.6.6.2. MANAGING ENVIRONMENTAL, HEALTH, SAFETY, SECURITY AND SOCIAL IMPACTS IN OIL AND GAS OPERATIONS

Moderator: Renatus Nyanda, Head of Risk Management Unit, Tanzania Petroleum Development Corporation (TPDC).

The session focused on the risks posed by oil and gas operations, emphasizing the need for comprehensive assessments that address environmental, social, and safety impacts. Presenters expounded the importance of stakeholder engagement, and technological innovations in managing these risks. A collaborative approach involving all parties—Governments, regulators, operators, and local communities—is essential for ensuring sustainable and responsible oil and gas operations.

EVALUATION OF THE EFFECTIVENESS OF ENVIRONMENTAL IMPACT ASSESSMENT FOR PETROLEUM LAND SEISMIC SURVEYS, TANZANIA

Faustine Kayombo - Senior Geophysicist, Tanzania Petroleum Development Corporation (TPDC)

Environmental Impact Assessment (EIA) is a crucial environmental management tool and a mandatory requirement for land seismic projects in Tanzania. Since the enactment of the Environment Management Act (EMA) in 2004, EIAs for land seismic surveys have been conducted, but their effectiveness remains a key concern. This study evaluates the effectiveness of EIA in petroleum land seismic surveys in Tanzania, focusing on four objectives: factors influencing EIA effectiveness, public engagement, implementation of Environmental & Social Management Plans (ESMPs) and monitoring plans & strategies for improvement.Three seismic survey projects were examined: Mtwara 3D seismic (2022), Ruvu 3D seismic (2021) and Kilosa-Kilombero 2D seismic (2013). Primary data were collected through 63 questionnaires, four interviews, two focus group discussions and site observations,

while secondary data were obtained from literature reviews. Findings indicate that 86 (83.5%) out of 103 proposed mitigation measures in Environmental Impact Statements (EISs) were implemented during project execution. The study concludes that EIA effectiveness in land petroleum seismic surveys is satisfactory. However, key areas require improvement, particularly in public engagement, implementation of mitigation measures and EIA follow-up. Strengthening these aspects will enhance EIA effectiveness and bridge the gap between the EIS, project ESMP and EIA follow-up processes. The study recommends further research on marine seismic surveys to assess the implementation of ESMPs and EIA follow-up, providing deeper insights into the effectiveness of EIA in petroleum seismic acquisition projects.

REVOLUTIONIZING OIL AND GAS EFFLUENTS TREATMENT: MICRO AND NANOBUBBLES AS A GREEN AND SUSTAINABLE TECHNOLOGY

Nachael Mwanga - Environment Management Officer at GASCO, Tanzania

The oil and gas industries are vital for energy availability, economic growth and development. However, crude oil and gas require extensive processing, consuming significant energy and generating large volumes of wastewater, posing environmental challenges. Traditional wastewater treatment methods, such as density separation, are often inefficient, time-consuming and may require chemicals, leading to sludge formation—a secondary pollutant. As a result, alternative methods like micro and nanobubbles (MNBs) are proven to enhance separation efficiency and simplify treatment processes. Microbubbles are widely used in water treatment, while nanobubbles aid in chemical reactions, oxygenation and contaminant removal in various industrial applications. Their unique properties make them valuable in advancing sustainable practices within the oil and gas sector. Integrating MNBs into oil and gas operations aligns with the theme of "Unlocking Investment in Future Energy: The Role of Petroleum Resources in the Energy Mix for Sustainable Development in East Africa." MNBs offer significant advantages in improving gas separation and wastewater treatment efficiency. In gas treatment, MNBs enhance hydrocarbon separation from water and impurities, reducing energy consumption and chemical usage. This improves process efficiency while minimizing environmental impacts. Additionally, MNBs improve wastewater treatment by effectively removing heavy metals and organic pollutants, ensuring compliance with environmental regulations. By adopting MNB technology, the oil and gas industry can significantly lower its environmental footprint while supporting sustainable development goals in East Africa. This approach not only meets regional energy needs but also aligns with global climate change mitigation efforts, positioning MNBs as a key component in the future energy landscape

EXTENDED WELL REACH DRILLING A GAME CHANGER IN ACCELERATING SUSTAINABLE DEVELOPMENT DRILLING IN ENVIRONMENTAL SENSITIVE AREAS

Winston Mugumya - Senior Petroleum Engineer-Development,Ministry of Energy and Mineral Development

Petroleum operations, if not well managed, can cause significant environmental damage, biodiversity loss, and risks to public health and safety, ultimately affecting sustainable development. Integrating environmental, social, and security considerations into petroleum industry planning is essential. Sustainable development ensures that current activities do not compromise future generations through environmental degradation or loss of biodiversity. Uganda's petroleum sector presents major socio-economic benefits. However, upstream and midstream activities occur near ecologically sensitive areas, while downstream operations are concentrated in populated regions.

This creates challenges in environmental protection, community cohesion, and cultural heritage conservation. Despite infrastructure improvements, petroleum development can also lead to population influx, resource competition, and increased crime. To mitigate these risks, Uganda must implement strategies to manage climate change impacts from petroleum operations. Since the discovery of commercial petroleum reserves in 2006, Uganda has faced delays in achieving first oil due to land acquisition challenges and inadequate infrastructure, including pipelines, roads, and processing facilities. To address these challenges, international oil companies (IOCs) in Uganda have adopted Extended Reach Drilling (ERD) technology. The Tilenga and Kingfisher projects plan to drill over 450 development wells using sub-horizontal drains exceeding 1,000 meters in length.

This approach minimizes surface impact, reduces waste, lowers emissions, improves drilling efficiency, and enhances safety by reducing the number of wells and drilling hazards. It is particularly beneficial in environmentally sensitive areas such as national parks, lakeshores, and community lands. However, during the exploration and appraisal phases in the Albertine Graben, most wells were drilled at inclinations below 30 degrees, leaving limited data on sub-horizontal well drillability. Applying ERD technology in Uganda's current 450+ development wells will provide valuable data for future applications across East Africa's rift systems. Addressing environmental, social, and climate risks in petroleum development is essential. By leveraging ERD, oil and gas operators can unlock additional hydrocarbon reserves, enhance project economics, and reduce environmental and social impacts. This paper examines the opportunities, challenges, and impacts of applying ERD in East Africa's environmentally sensitive petroleum basins.

Recommendations

i. Enforce environmental regulations mandating efficient and low-emission treatment technologies in petroleum operations to reduce environmental and social risks.

ii. Strengthen cross-sector coordination to monitor and mitigate cumulative environmental impacts.

iii. Establish a regional Petroleum Environmental Forum for sharing best practices, innovations, and policy harmonization.

Presenters of Data Management session

3.6.6.3. DATA MANAGEMENT

Moderator: Frank Mugisha, Assistant Commissioner Exploration, Ministry of Energy & Mineral Development (MEMD), Uganda.

This session focused on issues surrounding petroleum data management and technological advancements in the oil and gas sectors in the EAC. The discussion covered the management of petroleum upstream data, the integration of big data and machine learning to enhance decision-making, and critical cybersecurity concerns in virtual environments. Further, the session highlighted strategies for

improving data accessibility, governance frameworks, and the adoption of advanced technologies for sustainable resource management.

BEST PRACTICES, TOOLS, AND STRATEGIES FOR ENHANCING COMPLETENESS AND READABILITY OF E&P DATA WITHIN THE UPSTREAM SECTOR IN UGANDA

Susan Byona - Senior Geophysicist, Ministry of Energy and Mineral Development, Uganda

The oil and gas sector generates vast amounts of data, a crucial strategic resource. Effective seismic data management is essential for Exploration and Production (E&P) companies, ensuring data is available, discoverable and usable for informed decision-making. High-quality data enhances value by enabling geologists, geophysicists, engineers and researchers to conduct accurate analyses. This study explores techniques to improve the readability, completeness and quality of E&P data within Uganda's upstream oil and gas sector. According to the "garbage in, garbage out" principle, flawed input data leads to unreliable analysis. Inaccurate, incomplete and biased data compromise decision-making. The Petroleum Exploration, Development and Production Department (PEDPD) has established regulations and Standard Operating Procedures to ensure proper data handling. It has also acquired quality control tools, including MAGMA software, TechLog, Geosoft and Microsoft Excel to enhance data format, readability and completeness. PEDPD's best practices and strategies focus on ensuring high-quality and complete data for users. By implementing these measures, the sector can optimize data usability, improve decision-making and maximize value addition. Ensuring accessibility to reliable data is critical for sustainable growth in Uganda's oil and gas industry

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Kathleen Asena - Geophysicist, National Oil Corporation of Kenya

The oil and gas industry faces significant challenges in managing the vast amounts of data generated during exploration, drilling, and production activities. This data, derived from seismic surveys, well logs, production records, and reservoir simulations, presents complexities in terms of processing, analysis, and storage. Traditional data management techniques struggle to keep pace with the growing data volumes, resulting in inefficiencies and missed opportunities for optimization. Machine Learning (ML) and Artificial Intelligence (AI) have emerged as transformative technologies, providing advanced solutions for data handling, analysis, and decision-making in the oil and gas sector. This paper presents a comprehensive review of ML and AI applications that address critical challenges in the industry. Well logs play a critical role in reservoir characterization and drilling decisions, offering valuable insights into subsurface geology. However, due to the high costs and time associated with well logging, many wells have incomplete logs.

This shortage in well-logging data often results from technological limitations or economic constraints, leaving gaps in crucial information needed for formation characterization and resource evaluation. To address this, ML models such as Long Short-Term Memory (LSTM) and Gradient Boosting Machines have been successfully employed to predict missing well logs, with models achieving high accuracy, often reflected in root mean square error (RMSE) values below 5%.

This level of precision not only addresses data gaps but also integrates older wells with incomplete logs into modern data analysis workflows. The adoption of these technologies improves the overall efficiency of the oil and gas industry, enabling data-driven decisions by optimizing data management through predicting historically unavailable data, revealing underlying trends, and ensuring timely access to critical information for more informed operational choices. The use of ML in well-log prediction, combined with its broader applications in geophysical data interpretation, drilling optimization, and reservoir analysis, positions it as a key enabler for the future of data management in the oil and gas industry.

OPPORTUNITIES AND EMERGING ISSUES OF HANDLING BIG DATASETS IN THE OIL AND GAS INDUSTRY IN KENYA

Elizabeth Kimburi - Geologist, National Oil Corporation of Kenya

In the past decade, advancements in data processing architectures have emerged to address the unique attributes of large datasets. The process of acquiring, filtering, and cleaning data before storing in warehouses has improved significantly over time. The acquisition of large and complex datasets is driven by high energy demand from the oil and gas industry and evolution of technology globally.

These technological advancements have led to the generation of vast datasets in the oil and gas industry. Managing and analyzing this data to extract meaningful insights that add business value is a major challenge for industry players. Data is generated by various devices and sensors, leading to different data sizes and formats. In oil and gas, data originates from sources such as 3D geological models, seismic surveys, well drilling activities and production data. By leveraging and analyzing big data, oil and gas firms gain a competitive edge throughout the exploration, planning, production and field development phases. It helps maximize production, improve maintenance and forecasting, reduce time to discover oil or gas, lower operating costs and enhance asset productivity over the lifecycle.

This results in a continuous flow of accurate automated information in a short time. However, integrating this technology presents challenges such as high costs for data recording, storage and analysis. Data quality management is also a concern, particularly the time spent on data cleaning. To address these issues, there is a need for greater business support and awareness to overcome deficiencies in skilled manpower, poor data culture and the complexity of managing big data. Proper adjustments are necessary to enhance the industry's preparedness to handle and utilize these vast datasets effectively.

NAVIGATING THE CYBERSECURITY LANDSCAPE: SECURITY CONCERNS IN MODELING AND SIMULATING PETROLEUM DATA WITHIN THE SUBSURFACE METAVERSE

Allan Joel Obalim - Manager ICT,

Petroleum Authority of Uganda

The advent of the subsurface metaverse, a virtual environment that integrates advanced modeling and simulation technologies to represent the complex geologic and reservoir systems underlying the petroleum industry. It provides immense potential for transforming exploration, development and production strategies. However, this digital evolution also introduces significant cybersecurity challenges that must be addressed to protect sensitive petroleum data and ensure the integrity of operational processes. This study explores the security concerns associated with modelling and simulating petroleum data within the subsurface metaverse, focusing on three critical areas: data privacy, system integrity, and user authentication. By examining the unique characteristics of subsurface data, including its high value, complexity, and regulatory sensitivity, the research identifies potential vulnerabilities that cyber threats could exploit. This paper proposes a cybersecurity framework tailored to the needs of the subsurface metaverse, incorporating best practices from both the petroleum industry and broader cybersecurity domains. This framework includes strategies for data encryption, access control, anomaly detection, incident response and recommendations for fostering a cybersecurity culture among metaverse users. The findings underscore the importance of proactive risk management in developing and deploying subsurface metaverse applications. By addressing security concerns from the outset, stakeholders can mitigate potential risks, realise the full benefits of this innovative technology and safeguard against cyber threats.

DATA MANAGEMENT: ENHANCING OIL AND GAS DATA VISIBILITY AND ACCESSIBILITY IN KENYA FOR SUSTAINABLE DEVELOPMENT

Stephen Kitavi Mwoni - Senior Petroleum Officer, State Department for Petroleum, Kenya

Kenya's oil and gas sector has grown significantly due to hydrocarbon discoveries in the Tertiary Rift (Anza and Lamu basins). However, inadequate data management hampers operational efficiency and decision-making. This paper highlights the need for improved data visibility and accessibility, proposing a framework for enhanced data management. Effective data management is crucial for exploration, production, marketing and regulatory compliance. Challenges such as fragmented data silos, outdated systems and restricted stakeholder access hinder efficiency, transparency and accountability. A centralized data management system can provide real-time access to reliable information for Government agencies, investors and local communities. The proposed framework integrates cloud computing, big data analytics and geographic information systems (GIS) to enhance data visibility. A cloud-based repository will facilitate access to exploration data, production statistics and regulatory compliance information, streamlining data sharing and fostering collaboration. Additionally, strong data governance policies are essential to ensure data quality, security and compliance with international standards, promoting trust among stake- holders. Training initiatives are necessary to equip personnel with data management and analytical skills. Public participation is also vital, ensuring local communities' access to information on environmental and economic impacts, thereby fostering transparency and trust. Enhancing data visibility in Kenya's oil and gas sector is crucial for optimizing resource management and aligning with global best practices. A centralized system, advanced technologies and robust governance can address current challenges, support sustainable growth and ensure responsible development that benefits all stakeholders.

Recommendations

i. Adopt centralized, cloud-based data management systems to improve visibility, accessibility, and interoperability among Governments, investors, and stakeholders.
ii. Apply AI-driven solutions across oil and gas workflows to enhance decision-making and mitigate operational risks.
iii. Develop national and regional big data strategies tailored to the oil and gas industry, focusing on data acquisition, storage, and analysis.
iv. Harmonize data policies and standards across EAC to support cross-border investments and collaborative petroleum basin development.
v. Facilitate regional workshops and forums on digital transformation to share lessons and build capacity for data management.

3.6.6.4.GOVERNANCE IN EXTRACTIVE SECTOR

Moderator: Anastazia Ryoba, Head of Compliance and Reconciliation Section-Tanzania Extractive Industries & Transparency Initiative (TEIT)

This session explored critical aspects of policy, legal and regulatory frameworks, governance mechanisms, and the path towards economic sustainability. Further, it provided insights on the role of Environmental, Social, and Governance (ESG) factors in the energy transition, emphasizing the need for sustainable practices to minimize environmental impacts. Additionally, it outlined petroleum potential and investment opportunities, underscoring the importance of Government policies, infrastructure development, and regional cooperation to unlock future investment in the sector.

ENVIRONMENT, SOCIAL AND GOVERNANCE (ESG) TEASER FOR ENERGY TRANSITION

Agatha Cosmas - Head of Finance and Operations at Financial Sector Deepening Trust (FSDT)

The oil and gas sector is the main focus of East African Partner States as they strive to meet their Nationally Determined Contributions (NDCs) and reduce carbon emissions, which stem from energy-intensive activities like in households, transportation and manufacturing. The industry faces the dual challenge of managing emissions while capitalizing on opportunities to drive positive change. East Africa's energy sector is transforming with petroleum resources still playing a key role in bridging energy gaps and supporting economic growth. Despite the global shift toward renewable energy, oil and gas remain critical to the region's energy mix, attracting investment and fostering development. As the region transitions to cleaner energy, the industry must manage environmental, social and governance (ESG) risks and position itself to seize opportunities, particularly in providing clean energy for transport, households and industry. Proper preparation and understanding of sustainability are key to attracting investment and ensuring a sustainable energy future across upstream, midstream and downstream operations. In Tanzania, while efforts to transition to renewable energy are underway, the oil and gas sector continues to play a significant role in the global energy mix. Tanzania's natural gas, which is dry and low in carbon dioxide, presents a cleaner alternative for industrial use. The recent commissioning of a large hydroelectric dam will reduce dependence on natural gas for power generation, making more gas available for industrial use and offering a cheaper, more reliable energy source. Energy companies in East Africa must comply with international ESG standards, balancing these with local requirements. Effective management of ESG challenges is crucial for long-term sustainability. Companies should invest in technologies and practices to reduce emissions, prevent spills and minimize environmental and social impacts, while

collaborating with stakeholders and supporting local development initiatives to promote community welfare.

REGULATION AND STATE CONTROL OF THE OIL AND GAS INDUSTRY, A CASE STUDY OF UGANDA

Anthony Katusiime - Environment Officer, Ministry of Energy and Mineral Development, Uganda

Uganda's emergence as a potential oil producer has driven efforts to establish a regulatory framework that governs oil and gas activities while safeguarding social and environmental interests. With significant oil discoveries in the Albertine Graben, Uganda has implemented stringent laws and policies prioritizing sustainability, transparency and public welfare. This paper examines Uganda's regulatory mechanisms, focusing on the 2008 National Oil and Gas Policy, the Petroleum (Exploration, Development and Production) Act, 2013, and the Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013. Uganda's approach emphasizes strong state oversight to ensure compliance and accountability. The Petroleum Authority of Uganda (PAU) enforces legal standards, while the Uganda National Oil Company (UNOC) represents national interests in petroleum operations. This dual-entity model balances oversight and resource management, enhancing the state's regulatory capacity. Despite these efforts, challenges persist. Institutional gaps, including limited technical expertise within regulatory bodies, hinder effective governance. Political interference threatens transparency, while infrastructure constraints, particularly in pipelines and transport systems, limit sector growth and export potential. Environmental concerns remain critical, especially in ecologically sensitive areas. To address these issues, the paper proposes capacity-building initiatives to strengthen regulatory institutions, improve technical training and reduce political influence. Enhancing transparency through public information access and community engagement is crucial for trust-building. Strengthening environmental oversight mechanisms will ensure sustainable resource management. Given Uganda's strategic role in East Africa's oil frontier, the paper also explores cross-border dynamics, including the East African Crude Oil Pipeline. A regional regulatory body could harmonize environmental and legal standards, reducing cross-border impacts and promoting sustainable oil governance. In conclusion, Uganda's regulatory framework offers valuable lessons for East Africa's oil economies. Strengthening collaboration and policy adaptation can ensure responsible resource management, economic growth and ecological protection.

UNLOCKING FUTURE INVESTMENT INTO THE EAST AFRICAN PETROLEUM INDUSTRY

Esther Aguti - Senior Petroleum Economist Ministry of Energy and Mineral Development, Uganda

Despite the East African region's significant potential for hydrocarbon discoveries, much of its resource base remains underexplored. The region features both inland rift and coastal basins, some of which have already yielded commercial oil and gas finds. However, extensive exploration is still needed to realize the full potential of these basins. One major reason for the limited influx of petroleum investment in the region is a combination of factors, including investor concerns about climate change, the global shift towards energy transition, and increasing Environmental, Social, and Governance (ESG) requirements. Additionally, infrastructure gaps and the evolving nature of policy frameworks further hinder the growth of the petroleum sector in East Africa. Unlocking future investment into the region will require alignment of the investor and investee expectations, innovative project financing, favorable fiscal regimes, expedition of investments in the energy mix with more attention to cleaner sources of energy, attractive investment and Government policies, stable social and political environments geared towards reducing energy poverty.The unlocking of the petroleum investments in the region coupled with high petroleum demand versus lower supply greatly attracts mutual investor and investee benefits. This paper seeks to facilitate the commercialization of East Africa's Petroleum resources and recommendation of financing options for projects aimed at exploring and developing these resources.

Recommendations

i. Implement transparency mechanisms, including public reporting and community consultations, to build public trust and social license to operate.

ii. Design competitive fiscal and legal regimes that balance investor attractiveness with public benefit, including tax incentives for cleaner energy projects.

iii. Encourage innovative financing mechanisms such as blended finance, Public-Private Partnerships (PPPs), and green bonds to support exploration and infrastructure development.

iv. Ensure policy stability and clarity to attract long-term investments and reduce perceived risk for investors.

v. Promote domestic value addition to maximize economic returns and reduce dependency on imports.

Dr. James Andilile
Director General of EWURA United Republic of Tanzania

3.6.6.5. GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING

Moderator: Dr. James Andilile, Director General, Energy and Water Utilities Regulatory Authority (EWURA), United Republic of Tanzania

The session provided an in-depth analysis of how geopolitical factors influence petroleum demand, pricing, and energy security in East Africa. Discussions centered on the impact of global political events, such as conflicts in the Middle East and supply chain disruptions, on regional oil markets. The critical role of political stability in maintaining price stability and energy security, with a particular focus on the economic realities of oil drilling, refining, and transportation, was discussed. The session also explored strategic measures to mitigate risks, including enhancing infrastructure, developing regulatory frameworks, and developing strategic petroleum reserves.

THE STRATEGIC IMPERATIVE OF PETROLEUM RESERVES FOR EAST AFRICAN ENERGY SECURITY: A CASE STUDY OF TANZANIA

Dora Ernest - Ag. Manager Planning, Marketing and Investment, TANOIL - Tanzania

The establishment of Strategic Petroleum Reserves (SPR) is essential for ensuring energy security and economic stability in

East Africa, particularly Tanzania. As the region relies heavily on imported petroleum, it faces vulnerabilities from global supply disruptions, price volatility, trade currency fluctuations and geopolitical tensions. This paper explores the strategic necessity of SPR, using Tanzania as a case study. Tanzania's growing economy and rising petroleum demand require a strong energy security framework. SPR would act as a buffer against supply disruptions, ensuring continuous availability during emergencies and stabilizing markets amid price fluctuations. The study highlights SPR's benefits, including national preparedness, public confidence and economic growth through infrastructure development and job creation. The paper also examines the challenges of SPR implementation in Tanzania, such as storage facility requirements, integration with existing transport infrastructure and financial sustainability. A review of international SPR practices provides comparative insights and best practices relevant to Tanzania. By analyzing Tanzania's petroleum sector, legal and regulatory frameworks and the strategic plans of the Tanzania Petroleum Development Corporation (TPDC), the study presents a roadmap for successful SPR implementation. Findings emphasize the need for Government commitment, stakeholder collaboration and strategic infrastructure investments to ensure long-term sustainability. The paper concludes with recommendations for Tanzania and other East African nations to enhance energy security through effective SPR management, urging proactive policy measures and regional cooperation.

GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING

Amos Kangogo - Petroleum Technologist, Ministry of Energy and Petroleum, Kenya

Petroleum is a crucial global commodity, and geopolitical changes significantly impact its demand and pricing. Factors such as conflict, sanctions and political instability in oil-producing countries can disrupt supply chains, causing price hikes. Conversely, favorable political developments and agreements between major producers can stabilize or lower prices. A recent example is the Russia-Ukraine war, which led to a sharp increase in oil and gas prices. Research indicates that geopolitical tensions and conflicts in oil-producing regions directly affect supply, while sanctions and trade policies further influence petroleum pricing. Additionally, Government policies and regional stability impact investment in the sector, shaping supply and demand. Beyond geopolitics, decisions by major oil-consuming countries also play a role. Changes in energy policies or shifts towards alternative energy sources affect petroleum demand. The Organization of the Petroleum Exporting Countries (OPEC) also plays a significant role in regulating production and influencing global oil prices. However, stable political climates provide advantages, such as easier access to oil reserves, a better business environment and reduced risks for companies. While geopolitical factors can cause short-term price volatility or long-term market shifts, there is no definitive solution to eliminating these influences. To mitigate risks, stakeholders should implement strategies like fostering market competition, reducing subsidies and promoting transparency. Encouraging international cooperation can enhance collaboration and reduce geopolitical pressures. Governments can also establish strategic petroleum reserves to counter supply disruptions. In conclusion, the petroleum industry is highly sensitive to geopolitical events. While complete insulation from these effects is impossible, proactive policies and international cooperation can help manage market fluctuations and ensure a more stable global oil supply.

Recommendations

i. Develop national strategic petroleum reserves frameworks to ensure continuous petroleum supply during crises such as global price shocks, supply chain disruptions, or geopolitical tensions.

ii. Create a regional energy security coordination platform, focusing on shared petroleum reserves, joint procurement agreements, and synchronized response strategies.

iii. Digitize inventory and supply chain systems to enhance real-time monitoring and strategic planning of fuel reserves.
iv. Diversify import sources to reduce over-reliance on any single oil-producing country or region vulnerable to conflict or sanctions.
v. Encourage the development of local content and domestic energy production to reduce dependency on volatile international markets, and incorporate climate resilience into petroleum infrastructure planning.

3.7. POSTER PRESENTATIONS

The Poster Presentations provided a platform for showcasing new technologies and innovations in the petroleum sector in the region. The posters presented new ideas that are relevant in best practices for the upstream data management and hydrocarbon potential studies for the Coastal Basin of Tanzania. The posters are included in Annex 4.

S/N	TITLE	AUTHOR	POSITION	INSTITUTION
1	Cenomanian-Turonian Boundary Foraminiferal Assemblages, Offshore Southern Tanzania: Biostratigraphy and Faunal Response to OAE2.	Mr. Mrisho Kassim Mjige	Senior Micropalaeontologist	TPDC
2	Data Management Regimes in the Upstream Petroleum Sub-Sector of Tanzania.	Mr.Try-phone Ndubusa Dastan	Geophysicist	PURA
3	Endemic Ostracod Species Recovered from 2D Seismic Lines Uphole Samples_Eyasi Wembere Basin.	Mr. Fred-rick Kilewo	Micropaleontologist I	TPDC

3.8. CLOSING SESSION

The closing session was graced by H.E. Hon. Dr. Hussein Ali Mwinyi - President of Zanzibar and Chairman of the Revolutionary Council.

3.8.1. WELCOMING REMARKS

Eng. Felchesmi J. Mramba started by briefing the Guest of Honor about the fruitfulness of the discussions that had taken place since the conference began and how the conference provided a room for participants to deliberate on various issues aimed at promoting investment in EAC's oil and gas sector and advocating for a just energy transition.

In addition, he said, the conference provided room that enabled participants to discuss and strategize on how EAC Partner States and Africa in general can use the petroleum sector as a springboard toward realizing a transition to renewable and cleaner energies.

Eng. Felchesmi J. Mramba,
Permanent Secretary, Ministry of Energy Tanzania

He added that discussions featured various knowledgeable speakers and subject experts from both within and outside the EAC region who shared invaluable insights for the region's oil and gas sector to thrive. Through such discussions, participants were able to exchange ideas and information about cutting-edge technologies and how such technologies can be deployed to support the sustainable development of the oil and gas sector.

At the tail end of his speech, Eng. Mramba used the opportunity to encourage delegates to spend some time exploring the beauty of Tanzania by visiting astounding places such as Zanzibar and Arusha. He also wished them journey mercies as they travel back to their respective countries.

3.8.1.2. HON. SHAABAN ALI OTHMAN

Hon. Shaaban Ali Othman, the Minister for Blue Economy and Fisheries, Zanzibar, commenced by congratulating the President of Zanzibar and Chairman of the Revolutionary Council, H.E. Dr. Hussein Ali Mwinyi, and the President of the United Republic of Tanzania, H.E. Dr. Samia Suluhu Hassan for the great work they were doing to promote and open up the oil and gas sector in the country. He also thanked them for their invaluable guidance and directives that had enabled the steady growth of the sector.

Hon. Shaaban Ali Othman
Minister for Blue Economy and Fisheries, Zanzibar

Furthermore, he expressed his gratitude to the Deputy Prime Minister and Minister for Energy, United Republic of Tanzania, Hon. Dr. Doto Mashaka Biteko (MP), for his unwavering support and cooperation. Before winding up his speech and welcoming Dr. Biteko on stage, Hon. Shaaban commended the great work done in preparation for the EAPCE'25 and thanked everyone involved in making the event successful.

3.8.1.3. HON. DR. DOTO MASHAKA BITEKO

Hon. Dr. Doto Mashaka Biteko began his remarks by thanking the Guest of Honor for accepting the invitation to preside over the closing ceremony. He briefed the audience that the conference attracted over 1,500 delegates from within and outside the EAC. Such good attendance, he said, showed the commitment of the EAC Partner States to advance the agenda of reliable energy for the betterment of their people.

Hon. Dr. Doto M. Biteko, Deputy Prime Minister and Minister for Energy, Tanzania

He also said that the conference had provided a platform to share information on available investment opportunities within the region, and that everyone should take advantage of it. Upon conclusion, he welcomed the Guest of Honor, H.E. Dr. Hussein Ali Mwinyi, to officially close the EAPCE'25.

3.8.2. CLOSING SPEECH

H.E. Dr. Hussein Ali Mwinyi, President of Zanzibar and Chairman of Revolutionary Council

In his closing remarks, H.E. Dr. Mwinyi started by appreciating the opportunity granted to him to preside over the closing ceremony. He then expressed his sincere thanks to the President of the United Republic of Tanzania, H.E. Dr. Samia Suluhu Hassan, for her unwavering commitment to the development of all sectors of the economy, including oil and gas. Under her leadership, he said, Tanzania has seen substantial progress in the implementation of national and strategic projects in the oil

and gas sector. He stressed the importance of taking advantage of technological innovation, considering the fact that the world was moving at a breakneck speed in terms of technological advancement.

With regards to inadequate funding as one of the critical bottlenecks to developing the region's petroleum industry, H.E. Dr. Mwinyi explained that there was no time better than the present to advocate for the establishment of a Petroleum Fund, fulfilling the commitment outlined in Article 114 of the EAC Treaty which called for enhanced cooperation in the joint and efficient management of natural resources for the mutual benefit of the region.

With an emphasis on funding, H.E. Dr. Mwinyi recommended a lesson from the Africa Petroleum Producers' Organisation (APPO) that partnered with the African Export-Import Bank (Afreximbank) to establish the Africa Energy Bank (AEB).

Aside from funding, he stated the need for EAC Partner States to implement more cross-border oil and gas projects. Through such projects, he said, the region can efficiently harness the petroleum resources for the greater good of the Partner States. He cited the East African Crude Oil Pipeline Project (EACOP) as a landmark project and expressed his desire to see similar projects, such as the Tanzania–Kenya and the Tanzania–Uganda natural gas pipelines, which are meant to complement the EACOP coming to fruition.

He lauded the effort taken by EAC Partner States to promote investment opportunities in the petroleum sector for exploration. Through more exploration, H.E. Dr. Mwinyi said, the region will enhance oil and gas discoveries and become one of the leading players on the global stage.

In a similar vein, he encouraged Partner States to do more licensing rounds and participate in roadshows and conferences to aggressively promote investment in petroleum upstream operations. In this regard, he recommended the use of local experts, multi-client companies, and every means to ensure the region unlocks its hydrocarbon resources.
On the issue of energy transition, H.E. Dr. Mwinyi called on the EAC Partner States to create a balance between fossil fuel development and energy transition and to be mindful of the fact that the oil and gas sector has a pivotal role to play in the energy transition agenda and other crucial aspirations such as Mission 300.

In conclusion, he emphasized capacity development for the local workforce and efficient oversight of local content requirements so that nationals within EAC can be afforded priority during the implementation of oil and gas projects.

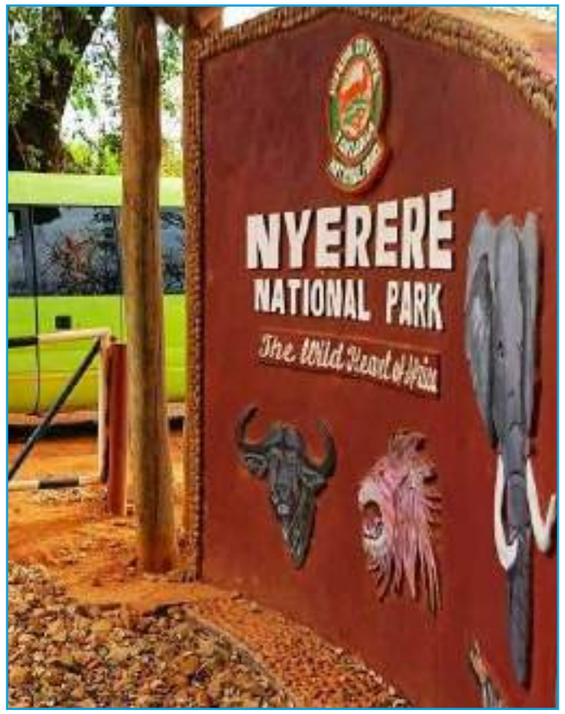
A token of appreciation: Guest of Honour, **H.E Dr. Hussein A. Mwinyi**, President of Zanzibar and Chairman of the Revolutionary Council receiving a plaque as a token of appreciation from **Dr. Doto M. Biteko**, Deputy Prime Minister and Minister for Energy, Tanzania

4.0 FIELD EXCURSIONS

EAPCE normally incorporates both pre- and post-conference field excursions to selected sites in each Partner State, allowing delegates to experience the region's geology, tourist destinations, and areas where petroleum exploration and development activities are ongoing.

Field excursions for the EAPCE'25 were scheduled from 1st - 3rd March 2025 and 8th -10th March 2025 for pre and post field excursions, respectively. The proposed areas for the visits were Tertiary Rift Basin, Kenya; Akagera National Park and Lake Kivu, Rwanda; the Central and Northern Albertine Graben, Uganda; and the Selous Basin and Julius Nyerere Hydroelectric Power Project (JNHPP), Southern Tanzania. The post-conference excursions were planned for Nyakazu Fault, Burundi; Lamu Basin, Coastal Region, Kenya; Bugarama Geothermal Hot Springs and Nyungwe National Park, Rwanda; the Southern Albertine Graben, Uganda; the Northern Circuit, Tanzania; and various sites in Zanzibar, Tanzania.

4.1. PRE-CONFERENCE FIELD EXCURSION TO THE SOUTHERN CIRCUIT



Two delegates undertook the Pre-Conference excursion to the Southern Circuit from February 28th to March 3rd, 2025. The excursion offered delegates a unique opportunity to explore the geological and natural wonders of the Ruvu Basin, Selous Basin, and Nyerere National Park in Tanzania. The team was led by two geologists from Tanzania Petroleum Development Corporation, and the areas/ sites visited were;

i. Msolwa Quarry and Msolwa Bridge: where delegates observed well-exposed sections of Permo-Triassic (Karoo) and Jurassic sediments. These sediments are important targets for hydrocarbon generation in the Ruvu Basin. Delegates also visited the contact point between the Mozambican Metamorphic Basement and the Ruvu Basin at Msolwa Bridge. The trip enhanced understanding of the geological framework of the Ruvu and Selous Basins, particularly the stratigraphic relationships between Permo-Triassic and Jurassic sediments. The contact between the Mozambican Metamorphic Basement and the Ruvu Basin was particularly significant for hydrocarbon exploration.

ii. Kivuma Village (Mkuyuni Ward): where delegates visited the Kivuma village to observe metamorphosed dolomitic marble at the Guandui abandoned mine, as well as an active marble mining site. The area provided insights into mining operations, showcasing both suspended and active quarry activities.

iii. Chamanyani Hill and Kilengezi Village: where delegates explored Chamanyani Hill, which offers a view of the Mvuha Sub-basin, part of the Selous Basin. The area was characterized by syn-rift Karoo sediments overlying the Basement. At Kilengezi village, delegates saw Permian to Triassic tillites, indicative of past glacial events.

iv. Julius Nyerere Hydroelectric Power Project (JNHPP): where delegates learnt about the ongoing construction of the dam, which, once completed, will be the largest power station in East Africa and the fourth largest in Africa. Delegates gained a deeper appreciation for the Julius Nyerere Hydroelectric Power Project, recognizing its potential to significantly impact East Africa's energy production. The project highlights the importance of large-scale renewable energy initiatives in fostering regional development.

v. Nyerere National Park, Lake, Siwandu, and Rufiji River, where delegates explored the Nyerere National Park, formerly the Selous Game Reserve. The park is renowned for its diverse wildlife, including lions, giraffes, crocodiles, and buffalo. The visit to Nyerere National Park, Siwandu and Rufiji River underscored the importance of conserving biodiversity in large, protected areas.

5.0 EAPCE'25 KEY RECOMMENDATIONS

The discussions during the EAPCE'25 Main Conference highlighted several thematic areas, including Exploration and Development, Mid and Downstream Petroleum Opportunities, Resource Revenue Management, Energy Mix and Just Energy transition, Cross-cutting issues, and Other Investment Opportunities. In light of these discussions, the following key recommendations are proposed for EAC Partner States to accelerate the oil and gas sector development in the region:

i. Develop global marketing strategies to attract international bidders and optimize participation in bidding rounds.

ii. Promote transparent resource governance, particularly in licensing, revenue management, and environmental compliance.

iii. Promote research and development, training, and capacity-building in the EAC region.

iv. Promote modern technologies such as carbon capture, utilization, and storage (CCUS) and low-impact well technologies to reduce emissions and enhance sustainability in upstream operations.

v. Facilitate access to financing through regional investment funds or Public-Private Partnerships (PPPs) to support energy projects.

vi. Promote regional collaboration in oil price forecasting and risk assessment to mitigate market volatility and ensure stable revenues.

vii. Establish a coordinated strategy to expand Liquefied Petroleum Gas (LPG) infrastructure across EAC Partner States, ensuring adequate storage, transportation, and distribution networks.

viii. Leveraging natural gas as a transitional fuel, supporting industrialization, and transportation through Compressed Natural Gas (CNG), and ensuring access to clean cooking energy.

ix. Enforce environmental regulations mandating efficient and low-emission treatment technologies in petroleum operations to reduce environmental and social risks.

x. Harmonize data policies and standards across the EAC to support regional investments and collaborative petroleum basin development.

xi. Create a regional energy security coordination platform, focusing on shared petroleum reserves, joint procurement agreements, and synchronized response strategies.

Steering Committee

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Mr. Aimé Nkurunziza
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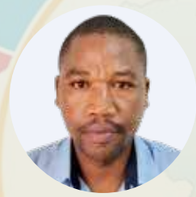

Mr. Gerard Bigirimana
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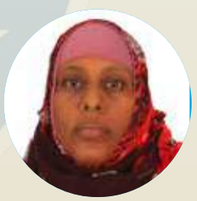
Ms. Charity Cheruiyot
KENYA

Mr. Josky Kisali
KENYA

Eng. Deogratias Dushime
RWANDA

Eng. Olive Tuyishime
RWANDA

Mr. Warsame M. Atteyeh
SOMALIA



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Eng. Herbert M. Mugizi
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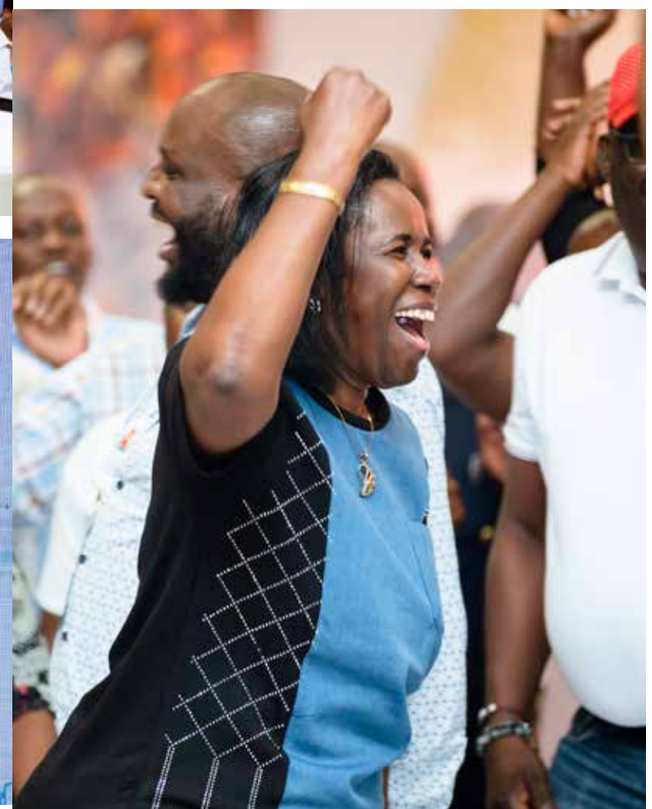


Speakers Profile

Dr. Doto Mashaka Biteko

Deputy Prime Minister and Minister of Energy, Tanzania

He is the Deputy Prime Minister of the United Republic of Tanzania and Minister of Energy. He is also the Member of Parliament for Bukombe Constituency in Geita Region. Dr. Biteko has an extensive background in education, leadership, and publicservice. He holds a PhD from the University of Dodoma, a Master in Business Administration, and a Bachelor in Education from St. Augustine University of Tanzania.Dr. Biteko began his career in the education sector before transitioning into politics and government leadership. He previously served as Deputy Minister and then Minister for Minerals, as well as Chair of the Parliamentary Standing Committee on Energy and Minerals. He was appointed Deputy Prime Minister and Minister of Energy in August 2023.

Hon. Can. Dr. Ruth Nankabirwa

Minister of Petroleum and Mineral, Uganda

Hon. Dr. Ruth Nankabirwa Ssentamu is Uganda's Minister of Energy and Mineral Development, appointed in June 2021. She previously served as Government Chief Whip and held ministerial roles in Agriculture, Finance, Defence, and the Office of the Prime Minister. A delegate to the 1994–1995 Constituent Assembly, she helped draft Uganda's 1995 Constitution. Dr. Nankabirwa holds a Master's in Conflict Studies and a Bachelor's in Fine Art from Makerere University. She represented Kiboga District in Parliament for 25 years. Her leadership was pivotal in securing Uganda's Final Investment Decision on oil and gas, advancing the country toward First Oil in 2025.

H.E. Dahir Shire Mohamed

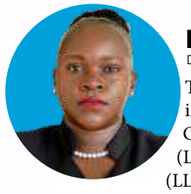
Minister of Petroleum and Mineral, Somalia

He is the Minister of Petroleum and Mineral Resources in Somalia, appointed in December 2024. With over 29 years of experience across education, development, and humanitarian sectors, he leads efforts to grow Somalia's energy sector, attract investment, and ensure fair resource distribution. He holds a Master's in Development Studies from Jomo Kenyatta University and certifications in multiple project management methodologies. Previously, he led Development Action Network (DAN) and held leadership roles with IRC and ADRA Somalia. His career is driven by a vision of a prosperous Somalia, guided by transparency, equity, and sustainable national development

Hon. James Opiyo Wandayi, EGH

Cabinet Secretary Ministry of Energy and Petroleum

He is the Cabinet Secretary for Energy and Petroleum, Kenya. Formerly Leader of the Minority Party in the National Assembly, he has represented Ugunja Constituency since 2013. A member of ODM and Azimio la Umoja, he advocates for equity and social democracy. He chaired the Public Accounts Committee (2017–2022) and served as Secretary-General of AFROPAC. His private sector career spans over a decade in senior roles, including at British American Tobacco. He holds degrees in Agriculture (University of Nairobi), Law (Daystar University), an MBA (JKUAT), and a Diploma in Business Management (Kenya Institute of Management).



Hon. Judith Kapinga

Deputy Minister for Energy, Ministry of Energy, Tanzania

The Deputy Minister for the Ministry of Energy in Tanzania, is a dedicated advocate of the High Court of Tanzania. She holds a Master of Laws (LL.M.) in Taxation and a Bachelor of Laws (LL.B.), both from the University of Dar es Salaam, underscoring her strong legal foundation and expertise. Her commitment to Tanzania's growth and development in the energy sector and beyond is a source of inspiration.

Eng. Felchesmi Mramba

Permanent Secretary, Ministry of Energy, Tanzania

He is the Permanent Secretary of Tanzania's Ministry of Energy (MoE), overseeing policies for sustainable energy development and nationwide access. He holds a BSc in Electrical Engineering and an MBA from the University of Dar es Salaam, with over 30 years of experience in Tanzania's energy sector. He previously served as Commissioner for Electricity and Renewable Energy at MoE and worked as Tanzania Electric Supply Company Limited's (TANESCO's) Managing Director. He is also a TAZAMA Pipeline and Export Processing Zones Authority board member. Eng. Mramba is a Registered Professional Engineer (T) pursuing his PhD in Business Administration at the University of Dar es Salaam.

Eng. Irene Bateebe

Permanent Secretary, Ministry of Energy and Mineral Development, Uganda

She is the Permanent Secretary of Uganda's Ministry of Energy and Mineral Development. Irene holds an MSc in Advanced Chemical Engineering (University of Manchester), an MSc in Mechanical Engineering – Sustainable Energy (KTH, Sweden), and a BSc in Chemical & Process Engineering (University of Dar es Salaam). With 18 years in the ministry, she has worked in Energy, Mining and Petroleum, leading key negotiations for the EACOP and Oil Refinery. She served 8 years on UNOC's inaugural board and chaired the Uganda Refinery Holding Company Limited's board, a subsidiary of UNOC.

Dr. Mohamed Liban

Principal Secretary, State Department for Petroleum, Kenya

He is the Principal Secretary of the State Department for Petroleum, Kenya. He holds a Master's in Public Health and Epidemiology (Kenyatta University) and multiple ophthalmology and community eye health diplomas. Previously, he was Chairman of the Ewaso Ng'iro North Development Authority and was Regional Elections Coordinator at the IEBC. He also worked as Regional Health Manager at the Kenya Red Cross Society and Deputy Chief Clinical Officer at the Ministry of Health. He is a Life Member of the Kenya Society for the Blind and Kenya Red Cross Society.

Dr. Donald Kaberuka

Economist and Former President of the African Development Bank (AfDB)

He is an economist and Rwanda's former finance minister. He holds a PhD in Economics from Glasgow University. Dr. Kaberuka is South Bridge's Chairman and Managing Partner, a Pan-African financial advisor and a senior advisor at the International Growth Centre (IGC). He was the 7th President of the African Development Bank and is credited for expanding the reach and impact of the African Development Bank (AfDB), Africa's premier financial institution. Dr. Kaberuka is currently chairing several Boards, including The Global Fund to Fight AIDS, Tuberculosis and Malaria, and serves on the Board of the Rockefeller Foundation, the Mo Ibrahim Foundation, the Centre for Global Development, and several other advisory boards.

Solomon Olila

Petroleum Engineer

He is a Petroleum Engineer, currently working at the Ministry of Energy and Mineral Development, Uganda. Solomon holds a Master of Science in Petroleum Engineering from the University of Aberdeen and a Bachelor of Science in Petroleum Geoscience and Production from Makerere University. He has evaluated numerous Field Development Plans, contributing to over $300 million in investment decisions. Previously, he worked as a Data Analyst at Olerex in Estonia and as a Research Analyst at Cobblestone Energy in Dubai.

Amos Kangogo

Petroleum Technologist

He is a skilled Petroleum Technologist at the Ministry of Energy and Petroleum in Kenya. Amos holds a Diploma in Petroleum Geoscience and currently pursuing a Bachelor's degree in Petroleum Exploration and Production. He has significant contribution to the development and management of the country's oil and gas sector in Kenya.

Felix Okot

Chemical and Process Engineer

He is a Chemical and Process Engineer working at the Uganda National Oil Company (UNOC). Felix holds an MSc in Refinery Design and Operations and a BSc in Chemical and Process Engineering. He is the Head of Refinary Development with over 15 years of experience in the oil, gas, and petrochemical industries in the UK and Uganda. Felix is a member of the Institute of Chemical Engineers (UK) and the Society of Petroleum Engineers.

Gayle Meikle

CEO, Frontier Energy Network

She is the Founder and CEO of Frontier Energy Network. Gayle holds a Commerce degree in Management & Entrepreneurship from Rhodes University, South Africa. With over 25 years of experience in energy communications and strategy, she specializes in advising and promoting emerging energy markets, particularly through Licensing Rounds. Her involvement in Mozambique's 6th and Zanzibar's 1st Licensing Rounds underscores her expertise. Before founding Frontier, she held key roles at Unilever, British Airways, the Institute of Directors and Global Pacific & Partners, managing global conferences.

Ndau Leonard Ndau

Petroleum Engineer

He is a Petroleum Engineer currently working at the Petroleum Upstream Regulatory Authority (PURA), Tanzania. Ndau holds a Bachelor of Science in Petroleum Engineering from the University of Dodoma. He is currently responsible for monitoring and managing petroleum upstream technical operations including exploration, development and production in Tanzania. Ndau is a registered professional engineer under the Engineers Registration Board (ERB)

Elizabeth Kimburi

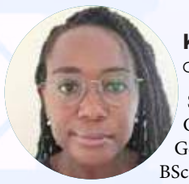
Geologist

She is a Geologist working as Assistant Manager at National Oil Corporation of Kenya. Elizabeth holds MSc. Petroleum Geoscience (Imperial College-UK), MSc. Computing and Information Systems (Greenwich University, UK) and BSc. Geology from the University of Nairobi. Elizabeth has work experience in Data/Information Management at the National Oil Data Centre with vast participation in research projects and a chronology of publications.

Susan Byona

Geophysicist

She is a Senior Exploration Geophysicist currently employed at the Upstream department of the Ministry of Energy and Mineral Development in Uganda. Susan holds a Master of Science in Exploration Geophysics (University of Leeds, UK). With 14 years' experience in the oil and gas industry, she has been involved in seismic data management and specifically transcribed legacy seismic data from obsolete media types. Susan has also participated in acquiring, processing, and interpreting gravity and magnetics data in frontier basins in search of additional hydrocarbons in the country.



Kathleen Asena

Geophysicist

She is a Geophysicist at the National Oil Corporation of Kenya. Kathleen holds an MSc in Geophysics (University of Aberdeen, UK) and a BSc in Mathematics (University of Nairobi, Kenya). She spearheads innovative research with a focus on the integration of renewable energy sources and the impact of energy transitions on greenhouse gas emissions. Kathleen's work includes developing predictive models using AI tools to forecast energy consumption trends and inform strategic policy decisions.

Stephen Mwoni Kitavi

Geophysicist

He is a Senior Petroleum Officer at the State Department of Petroleum, Kenya. Stephen holds a Bachelor degree of Science in Physics from the Jomo Kenyatta University of Agriculture and Technology. He closely monitors petroleum operations and informs stakeholders about the status of geophysical activities, while promoting innovative research programs in the field. Stephen is a member of the Geothermal Association of Kenya.

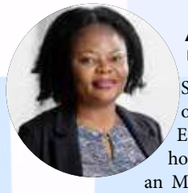
Speakers Profile

Obalim Allan Joel
ICT Expert

He is an ICT professional with a BSc in Computer Science (Gulu University), MSc in Information & Network Security (Robert Gordon University, UK), MSc in ICT Management, Policy & Architecture (Uganda Martyrs University) and MSc in Institutional Management & Leadership (Uganda Management Institute). Obalim is pursuing an LLB (Cavendish University Uganda) and MBA in Artificial Intelligence (University of Cumbria, UK). He holds certifications in MCSA, MCP, ITILV3, ISO/IEC 27001, ISO/IEC 27032, and ISO/IEC 27701. He is a member of organizations in ISACA, ISC2, OWASP and PMI. He has strong technical project management and leadership skills.

Laura Robinson
Founder and CEO Swale House Partner Inc.

She is the President of the International Consortium on Government Financial Management (ICGFM) and a Board of Trustee for New Producers for Sustainable Energy. Laura holds an International Diploma in Risk Management, an MPA from Columbia University and a Bachelor's in Accounting from the University of Southern California. With over 20 years of global experience in risk management, governance, audit and contract management, she specializes in oil, gas and mineral development. In 2015, she founded Swale House Partners, advising governments and regulators on risk, cost management and cost recovery audits across East Africa, South America and Asia.



Angela N Semakula
Engineer

She is a professional engineer with over 11 years of experience in Petroleum Cost Engineering, Economics, and Financial Evaluation. Angela holds a Global MBA from Imperial College London, an MSc in Petroleum Economics and Management from IFP School in France, an MSc in Technology Innovation and Industrial Development from Makerere University in Uganda, and a BSc in Industrial Engineering and Management from Kyambogo University in Uganda. Her expertise lies in estimating and analyzing the costs of petroleum projects, assessing investments in energy projects, and designing tax systems for the mineral sector.

Richard Nuwagaba
Petroleum Expert

He currently serves as the Head of the Development and Production Department at Uganda National Oil Company (UNOC). Richard holds a Master of Science in Petroleum Energy Economics and Finance from the University of Aberdeen, as well as a Master of Science in Petroleum Engineering from Heriot-Watt University With over 15 years of experience in the petroleum industry, he specializes in petroleum engineering, production optimization, reservoir engineering, energy economics, and project portfolio management. He is an active member of the Society of Petroleum Engineers (SPE).

Tonny Nenga
Petroleum Economist

He is a Petroleum Economist working at the Ministry of Energy and Mineral Development, Uganda. Tonny holds a Bachelor of Science in Quantitative Economics from Makerere University. He has over 5 years of economic modelling experience in the extractives industry.

Esther Aguti
Petroleum Economist

She is a Senior Petroleum Economist currently working with the Ministry of Energy and Mineral Development in Uganda. Esther holds a Master of Science in Energy Studies and Oil and Gas Economics from the University of Dundee, UK, as well as a Bachelor of Science in Economics from the University of Mouloud Mammeri Tizi-Ouzou, Algeria. With over nine years of experience in the industry, Esther has contributed to the development and management of the Uganda's energy sector.

Anthony Katusiime
Environment Officer

He is an Environment Officer at Uganda's Ministry of Energy and Mineral Development, responsible for integrating health, safety and environmental considerations. He holds an MSc in Environmental Management from Glasgow Caledonian University and a Bachelor's in Chemical Engineering from Kyambogo University. In his current role, Mr Antony develops and oversees HSE guidelines and regulations, contributes to strategic environmental assessments for Uganda's petroleum policy and evaluates international oil companies seeking exploration and production licenses.

Nachael Mwanga
Mechanical Engineer

He is an Environment Management Officer at Gas Supply Company Limited (GASCO), a subsidiary company of TPDC. Nachael holds a diploma in mechanical engineering from the Dar es Salaam Institute of Technology (DIT), a degree in environmental science from the Open University of Tanzania (OUT), and a master's degree in environmental science from Tongji University in China. He began his career as a mechanical technician in a cement production plant, and later joined into the oil and gas sector. Nachael is a pioneer in the "going green" initiatives.

Kabahuma Belindah Nancy
Student

She is a Petroleum Engineering and Environmental Management student at Mbarara University of Science and Technology. Nancy is the Society of Petroleum Engineer (SPE) Secretary, MUST Chapter, and participated in the 2024 PetroBowl Championships, winning National and Regional titles. During internships at the Ministry of Energy and Mineral Development and at the Petroleum Authority of Uganda, she gained experience in industry software tools and geochemical evaluation projects. A 2024 National Youth Parliament delegate and UN Millennium Campus Network 2023 graduate, she is researching the conversion of water-based drilling waste into construction cement. She is an active member SPE.

Matthew S. Kinyanjui
Process Engineer

He is a Process Engineer at the Petroleum Authority of Uganda (PAU). Matthew holds an MSc in Advanced Process Integration and Design (University of Manchester) and a BSc in Chemical and Process Engineering (Kyambogo University). Matthew has 7 years of experience in petroleum storage and processing facilities. He currently oversees the design, construction, commissioning and operation of midstream facilities in Uganda. Matthew is a registered engineer and certified Project Management Professional

Winston Mugumya
Petroleum Engineer

He is Senior Petroleum Engineer at the Ministry of Energy and Mineral Development (MEMD), Uganda. Winston holds a Master of Laws in Oil and Gas from Aberdeen University, UK, and in Petroleum Engineering from Herriot University, UK and Bachelors degree in Mechanical and Manufacturing Engineering from Kyambogo University Uganda He also holds various Diplomas and Certificates specialised training in Petroleum-related Operations and Development from IFP France and JOGMEC Japan.

Alex Buko Stephano
Petroleum Engineer

He is a Petroleum Engineer currently working with the Petroleum Upstream Regulatory Authority (PURA), Tanzania. Mr. Stephano holds a Bachelor of Engineering in Oil and Gas Engineering and a Diploma in Civil Engineering, both from the Dar es Salaam Institute of Technology. He is also pursuing a Master of Science in Petroleum Engineering at the University of Dar es Salaam. Previously he had worked with Schlumberger and EPCM Holdings.

Mark James Malinzi
Student

He is a BSc Petroleum Geology Student at the School of Mines and Geosciences, University of Dar es salaam, Tanzania.

Edward Misana
Geologist

He is Geologist working with the Petroleum Upstream Regulatory Authority (PURA). Edward holds an MSc in Petroleum Geology from the University of Dar es Salaam and BSc in Geology from the University of Dar es Salaam. Previously he had worked with Geological Survey of Tanzania (GST) where he contributed to various geophysical projects in mineral exploration, environmental studies, geohazard assessments, and groundwater prospecting. Notably, he helped assess geohazards at Mtumba Government Plot and traced groundwater sources at Williamson Diamond Mine.

Andrew Mashoonte Meitamei
Geophysicist

He is a Geophysicist at the National Oil Corporation (NOC), Kenya. He holds a diploma in Geophysics from the Kabete National Polytechnic and is in his fourth year pursuing a BSc in Energy Engineering at Mount Kenya University. At NOC, he specializes in geophysical data acquisition, analysis, interpretation, and modelling, as well as seismic dataset management, transcription, duplication, and storage to support exploration activities.

Faustin Kayombo
Geophysicist

He is a Senior Geophysicist at the Tanzania Petroleum Development Corporation (TPDC). Faustine holds a Master's degree in Engineering Management (Project Management) from the University of Dar es Salaam and a Postgraduate Diploma in Exploration Geophysics from the University of Leeds. He is currently leading the Data Management Section in the Department of Upstream at TPDC. Faustine is a member of the Society of Exploration Geophysicists (SEG).

Innocent Kimoita
Geophysicist

He is a Geophysicist working with the National Oil Corporation (NOC), Kenya. Innocent holds a Bachelor's Degree in Physics from the University of Nairobi and a Master's Degree in Geophysics from Curtin University in Australia. His expertise spans a wide range of geophysical techniques, including seismic methods, electromagnetism, gravity, and magnetism. With a strong background in Exploration Geophysics, Innocent has been instrumental in conceptualizing and providing strategic input on various oil and gas exploration projects.

Desmond Risso
Geologist

He is a Geologist at the Petroleum Upstream Regulatory Authority (PURA), Tanzania. Desmond holds BSc. Geology from the University of Dar es Salaam and MSc. Reservoir Evaluation and Management from Heriot-Watt University. He has an extensive experience in the academia, mining and petroleum industry having worked for the University of Dodoma, Barrick Gold and Schlumberger.

Speakers Profile

Petro Theonest
Geophysicist

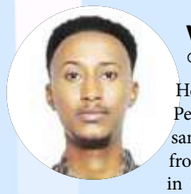
He is an Exploration Geophysicist currently working with Tanzania's national oil company (TPDC). Petro holds Bachelor of Science in Mathematics from St. Augustine University of Tanzania and a Master of Science in Exploration Geophysics from Curtin University, Australia. His work includes developing a static model for Mnazi Bay Gas Field, 3D modeling with Full Tensor Gradiometry data, and designing a 2D seismic survey for Lake Tanganyika North. His research interests include geophysical data acquisition and quantitative seismic interpretation.

Wangese Matiko Misiwa
Geologist

He is a Senior Petroleum Geologist at the Petroleum Upstream Regulatory Authority (PURA), Tanzania. Wangese earned an MSc in Integrated Petroleum Geosciences from the University of Aberdeen and a bachelor's degree in Applied Geology from the University of Dodoma. Previously, he worked as a Technical Internal Auditor at the Tanzania Petroleum Development Corporation (TPDC) and as a Junior Geologist at Tanzoz Uranium Limited, exploring uranium, nickel, and graphite in central and southeastern Tanzania.

Mrisho Kassim Mjige
Micropaleontologist

He is a Senior Petroleum Micropaleontologist at the Tanzania Petroleum Development Corporation (TPDC). He holds a Master's degree in Applied and Petroleum Micropaleontology from the University of Birmingham, UK. His expertise lies in analyzing microfossils—such as Foraminifera, Ostracods, and Nannofossils—to determine the age of rock strata and interpret depositional environments, aiding in the exploration of oil and gas reserves within sedimentary basins.

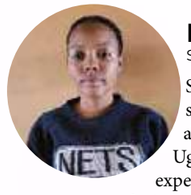


Warsame Atteyeh
Geologist

He is a Petroleum Geologist at the Ministry of Petroleum and Mineral Resources, Somalia. Warsame holds a Master's in Petroleum Geoscience from the University of Nairobi and a Bachelor's in Geology from the International University of Africa. With extensive experience in geological and geophysical data analysis, environmental impact, and project management in the oil and gas industry, Warsame combines technical expertise with leadership skills to promote efficient and sustainable resource exploration. His work at the Ministry reflects his dedication to advancing energy solutions that adhere to industry standards and sustainability.

David Mwongyere
Petroleum Geoscientist

He is a Palynologist currently working at Uganda's Ministry of Energy and Mineral Development (MEMD). David holds an MSc in Integrated Petroleum Geosciences from the University of Aberdeen (UK) and a BSc in Petroleum Geoscience and Production from Makerere University (Uganda). Previously, he worked at Dana Petroleum E&P (UK), TGS Water Limited (Uganda), and Samta Mines and Minerals (Uganda). He received the prestigious Dr. Stuart Archer Award (2024) and won the 2018 Petrol-Bowl Challenge under SEG-SPE (Makerere University Chapter).



Nakyanzi Grace
Student

She is a Petroleum Geoscience and Production student at Makerere University, passionate about sustainable energy. She interned at the Uganda National Oil Company (UNOC), gaining experience in Petrel and Techlog software while analyzing Kingsfisher and Tilenga data. Grace has excelled in writing, winning essay competitions at the 9th Oil and Gas Convention and the 13th Mineral Wealth Conference. As President of the Society of Petroleum Engineers, she organized knowledge-sharing events. She has also mapped Isingiro-Igayaza's geography and aspires to impact Africa's energy sector significantly.

Agnes Harold Chigolo
Geochemist

She is a geochemist at the Petroleum Upstream Regulatory Authority (PURA), Tanzania. Agnes holds a Bachelor of Science with Geology from the University of Dar es Salaam. She has experience in the oil and gas industry and deep knowledge of geochemical sample preparation.

Mussa Mathew Nalogwa
Geophysicist

He is currently working as a Geophysicist at the Tanzania Petroleum Development Corporation (TPDC). Mussa holds BSc from the University of Dar es Salaam, an MSc in Geophysics from the University of Aberdeen, Scotland and a Master of Engineering Management from the University of Dar es Salaam. Previosly he had worked at the Tanzania Civil Aviation Authority (TCAA). His research interests include hydrocarbon exploration and digital image processing, currently engaged in hydrocarbon exploration along the East African Rift System (EARS) and the coastal basins of Tanzania.

Hulda Ramadhani Mangachi
Geologist

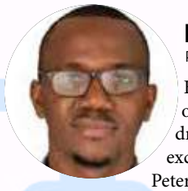
She is a Geologist currently working with Petroleum Upstream Regulatory Authority (PURA), Tanzania. Hulda holds a Bachelor of Science in Geology from the University of Dar es Salaam. Previously Hulda served as a Geophysicist at Tanzania Geothermal Development Company Limited (TGDC), where she contributed to geothermal energy exploration projects.

Khalid Bahorera
Geoscientist

He is a Marine Geoscientist and Petroleum Data Manager at Zanzibar Petroleum Development Company (ZPDC). Khalid holds a Master's degree from Vrije University of Brussels and a Bachelor's degree in Geology from the International University of Africa in Sudan. As Petroleum Data Manager, he leads a team focused on verifying geological and geophysical data from operators.

Ibrahim F. Rutta
Geologist

He is a Petroleum Geologist at the Tanzania Petroleum Development Corporation (TPDC). He holds an MSc in Integrated Petroleum Geoscience from the University of Aberdeen. He has participated in extensive studies of the Ruvuma Basin, Tanga Basin, and Offshore Mafia Deep Basin, focusing on basin evolution and factors influencing sediment deposition. Currently, he is working on the onshore Lindi Block to assess its hydrocarbon prospectivity for future exploration ventures.



Peter Sereka Kichogo
Petroleum Engineer

He is the founder and Managing Director of Solutions Tag, where he leads a team to drive business development and operational excellence in Tanzania's oil and gas industry. Peter holds a Bachelor's in Petroleum Engineering from the University of Dar es Salaam and a Business Management certificate. Under his leadership, Solutions Tag has successfully managed major projects, including Well workover project for PAET and Major pipeline inspection and repair for 27 km gas pipeline from Mnazi Bay field and Well drilling project in the Mnazi Bay Block both under M&P E&P (T) Ltd.

Josiah Amon Mwabeza
Economist

He is a Senior Economist currently working as Acting Manager of the Infrastructure and Services Section at the Planning Commission in Dodoma, Tanzania. Josiah holds a Master of Arts in Development Economics from Erasmus University, Rotterdam, and a Bachelor of Arts in Economics from the University of Dodoma.He specializes in economic and development planning, public policy analysis, and project management. Previously, Josiah served as a Senior Economist at the Ministry of Finance and Planning.

Cosmas Lematia
Geoscientist

He is a Geoscientist Currently, working at the Uganda National Oil Company (UNOC). Cosmas holds Master's Degree in Petroleum Geosciences from Makerere University. With over six years of experience in the Oil and Gas sector, Cosmas has contributed to geological mapping exercises, geological modeling and basin modeling of the Kasuruban Contract Area. He has also undertaken other projects in the Albertine Graben, Uganda, including characterization of the active basement fault zone situated along the southeastern shoreline of Lake Albert.

Godfred Andrew Osukuku
Geoscientist

He is a Chief Geophysicist at the National Oil Corporation (NOC), Kenya. Godfred holds a Ph.D. in Petroleum Geoscience from PAU-University of Ibadan, Nigeria and M.Sc. in Applied Geophysics from TU Delft (Netherlands), ETH Zurich (Switzerland), and RWTH Aachen (Germany). He specializes in geophysical field data acquisition, seismic data processing, and reservoir modeling for hydrocarbon and geothermal fields.

Innocent Mvamba
Palynologist

He is a Senior Palynologist currently working at Tanzania Petroleum Development Corporation (TPDC). Innocent holds M.Sc. in Palynology and Palaeoecology (Merit) from the University of Sheffield, a B.Sc in Aquatic Environmental Science and Conservation from the University of Dar es Salaam. He is interested in analyzing and describing organic walled microfossils (Pollen, spore, fungal spores, and dinoflagellates) for stratigraphic dating. Innocent has a particular research interest in Bio sequence stratigraphy, organic-walled dinoflagellate cysts (Mesozoic -Cenozoic), Cretaceous vegetation development, Mesozoic anoxic events and Paleozoic miospores and climate change.

Joshua Atuta
Geologist

He is a geologist currently working at National Oil Corporation (NOC), Kenya. Joshua holds a BSc. Geology, University of Nairobi. His expertise includes Geological Field Mapping, Hydrogeology, Petrology, and a variety of geophysical field survey techniques. Joshua excel in data Management, Processing and Interpretation, utilizing industry-standard Geological and Geophysical software tools.

Hilat Juma Gunda
Student

She is oil and gas engineering student at Dar es Salaam Maritime Institute (DMI), Tanzania and a leader within the university's SPE student chapter. Throughout her studies, Hilat has gained invaluable hands-on experience, including fieldwork at Dar es Salaam Institute of Technology (DIT), the Petroleum Upstream Regulatory Authority (PURA) and Tanzania Petroleum Development Corporation (TPDC).

Speakers Profile

Sindi Maduhu
Geophysicist

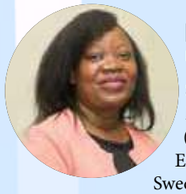
He is a Geophyscist working at the Tanzania Petroleum Development Corporation (TPDC). His expertise lies in geophysical data acquisition, processing, and interpretation, specializing in potential field data. Currently, he is the Project Manager for the Eyasi Wembere Exploration Project. Previously he worked at the Geological Survey of Tanzania, where he supervised an airborne geophysical survey for the MMRP project and as a consultant in the mineral sector with various companies.

Kasirivu Kigongo Wilson
Petroleum Engineer

He is a petroleum engineer specializing in oil and gas production. Kasirivu holds a Bachelor of Science in Oil and Gas Production from Kyambogo University. He has gained hands-on experience through internships at the Ministry of Energy, CNOOC Uganda Ltd, and SCOUL, as well as HSE roles at EMEX Engineering. Certified in RigPass, IWCF Level 1, and ISO 45001:2018, he has contributed to projects on carbon capture and solar energy. Kasirivu is a member of the Society of Petroleum Engineers (SPE) and (IAENG).

Achilana M. Mtingele
Economist

She is a Senior Economist at Tanzania's Energy and Water Utilities Regulatory Authority (EWURA). Achilana holds a PhD and advanced degrees in economics, specializing in economic regulation and policy research. She is currently leading efforts to establish a regulatory library at EWURA, enhancing knowledge accessibility and research in economic regulation. Achilana is dedicated to impactful change, focuses on policy frameworks, collaboration, and professional development to drive meaningful progress.



Linda Muwumuza
Petroleum Engineer

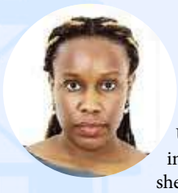
She is a Senior Petroleum Officer at Uganda's Ministry of Energy and Mineral Development (MEMD). Linda holds a Master's in Sustainable Energy Engineering from the University of Gävle, Sweden, an MBA, and a Postgraduate Diploma in Accounting and Finance from Amity University, India. She also earned a Bachelor's in Mechanical Engineering from Makerere University. As part of the core government team, she contributed to developing the legal framework (EACOP Act 2021, HGA) enabling Uganda's petroleum pipeline projects.

Selly Rono
Geochemist

She is a Geochemist at the National Oil Corporation of Kenya, where she focuses on assessing the hydrocarbon potential of sedimentary basins. She holds a Bachelor's degree in Industrial Chemistry from the University of Nairobi and a Master's degree in Petroleum Geochemistry from Newcastle University in the UK. Selly is certified in project management and is passionate about integrating oil and gas resources with clean energy solutions, contributing to Kenya's sustainable energy strategy. Her professional expertise spans project management, energy transition governance, and geochemical analysis. Beyond her work, Selly has a keen interest in energy resource management and organizational transformation. In her free time, she enjoys cooking and journalin

Rose Nyongesa
Petroleum Technologist

She is a Petroleum Technologist at Kenya's State Department for Petroleum. Rose holds a Diploma in Analytical Chemistry and a Bachelor's Degree in Industrial Chemistry, providing her with a strong foundation in chemical sciences. She is known for her precision and passion for innovation in her field. Committed to continuous learning, she actively seeks opportunities to enhance her expertise. Her curiosity and dedication drive her to contribute meaningfully to Kenya's energy sector, ensuring she stays at the forefront of industry advancements.



Pauline Kiconco
Petroleum Geologist

She is a Petroleum Geologist at the Ministry of Energy and Mineral Development (MEMD), Uganda. She has over five years of experience in the energy and innovation sectors. Previously, she successfully led and participated in designing and implementing projects at the Ministry of Works & Transport and the Ministry of Science, Technology & Innovation.

Jackson Imani
Geophysicist

He is a Geophysicist at the National Oil Corporation (NOC), Kenya. Jackson holds a diploma in Petroleum Geoscience, he is pursuing a degree in Energy Engineering at Mount Kenya University. Jackson specializes in geophysical techniques like electromagnetism, gravity, and magnetic methods for oil and gas exploration. He also contributes to biofuel development at National Oil, supporting Kenya's sustainable energy transition.

Naboth Mugyerwa
Petroleum Engineer

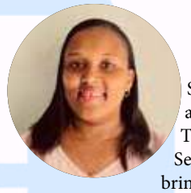
He is a Petroleum Engineer currently working with Petroleum Authority (PAU), Uganda. Naboth holds a Master of Science in Offshore and Ocean Technology (Pipeline Engineering) from Cranfield University, UK; Bachelor of Science (Hons) in Electrical Engineering from Makerere University; and a Higher National Diploma in Electrical and Electronic Engineering from University of Portsmouth, UK. As a Manger Pipelines and Storage at PAU Naboth has been involved in the development and regulation of petroleum pipelines in Uganda.

Sarah Nanteza
Chemical Engineer

She is a Petroleum Officer-Chemist at Uganda's Ministry of Energy and Mineral Development. Sara holds an MSc in Advanced Chemical Engineering from the University of Manchester, UK and a BSc in Industrial Chemistry from Makerere University. Her expertise includes refinery configuration design, hydrogen and heat integration, product quality assurance and control and the development of sustainable energy systems.

Shaidu Nuru Shaban
Geologist

He is a senior Petroleum Geologist at Tanzania Petroleum Development Corporation (TPDC). Shaidu holds a BSc in Geology from the University of Dar es Salaam, an MSc in Petroleum Geoscience from the University of Manchester, and a PhD in Earth Sciences from Syracuse University where he also served as a Research and Teaching Assistant. Shaidu specializes in geological and structural mapping, drilling supervision, geological logging, geological and geophysical interpretations, geological modelling, petrophysical analysis, basin modelling, basin analysis, and contract negotiations. Previously, he worked as a Resource Evaluation Geologist at African Barrick Gold.



Agatha Cosmas
Geophysicist

She is currently serving as the Head of Finance and Operations at Financial Sector Deepening Trust (FSDT). Prior to this, Agatha served as a Senior Audit Manager and ESG Lead at KPMG, bringing over 13 years of leadership experience in the financial and public sectors, with a focus on audit, ESG, risk management, and regulatory compliance. She has demonstrated success in advising on Environmental, Social, and Governance (ESG) issues, including sustainability reporting, climate-related risk management, and stakeholder engagement. As she transitions to the role of Head of Finance and Operations at FSDT, Agatha aims to make a strategic impact by increasing Tanzania's financial accessibility, supporting organizational objectives, influencing policy, and promoting research-driven innovations that improve the affordability of financial services for all.

Humphrey Asiimwe

He is the Chief Executive Officer of the Uganda Chamber of Mines & Petroleum.

Naluzze Pamela Praise
Student

She is a Petroleum Geoscience and Production student at Makerere University. Naluzze gained hands-on experience through an internship at the Directorate of Geological Survey and Mines within the Ministry of Energy and Mineral Development, Uganda. Naluzze has served as Vice President of the American Association of Petroleum Geologists (AAPG) Makerere University Chapter and actively participates in energy-related initiatives.

Daniel Muwooya
Economist

He is the Head of Commercial & Business Development at Uganda National Oil Company (UNOC). Daniel holds a master's degree in Oil & Gas Economics & Finance from the prestigious Centre for Energy Petroleum and Mineral Law & Policy at the University of Dundee; and a bachelor's degree in quantity surveying from Makerere University. He is a Project Management Professional (PMP) and has attained numerous professional qualifications & certifications in commodity trading, petroleum supply chains, finance, negotiations, trading, HSE, and cost engineering. Daniel he is a member of the Society of Petroleum Engineers (SPE), the International Association for Energy Economics (IAEE), the Project Management Institute (PMI) and the Association for the Advancement of Cost Engineering (AACE).

Costa Ambroce Mosha
Economist

He is a Senior Economist working at the Planning Commission of Tanzania, analyzing energy projects, monitoring and evaluation, and preparing development plans. Costa holds a Master's degree in International Energy Studies and Energy Economics from Dundee University and a Bachelor's degree in Economics and Statistics from the University of Dar es Salaam. With over 10 years of experience in Tanzania's energy and mining industries Costa is skilled in economic analysis, project and data management, financial modeling and project evaluation, he is committed to national and international development. Previously, he served at the Ministry of Energy and the Mining Commission

Neema Mdegella
Petroleum Engineer

She is a petroleum engineer currently serving as a Principal Engineer at Tanzania Petroleum Developmnent Corporation (TPDC). Neema holds a Master's degree in Oil and Gas and Renewable Energy, along with a Bachelor's degree in Industrial Engineering and Management. She has over 14 years' experience in oil and gas engineering, with a strong background in various industries. She specializes in the design, construction, and installation of oil and gas facilities, pipeline operation and maintenance, project management, flow assurance, structural integrity, and failure analysis.

Speakers Profile

Felistus Wavinya Kalungu
Chemist

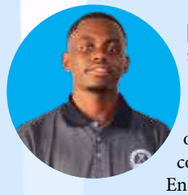
She is a Chemist at the State Ministry of Energy and Petroleum, Kenya. Felistus holds a Master's and a Bachelor's degree in Chemistry from Masinde Muliro University of Science and Technology (MMUST). She is specializing in geochemical field mapping for upstream oil and gas. Previously, she worked as an intern and laboratory analyst at MMUST and taught Organic and Analytical Chemistry as a part-time lecturer.

Wilfred Mwakalosi
Communication Expert

He is a Principal Communications and Public Relations Officer at the Energy and Water Utilities Regulatory Authority (EWURA) in Tanzania. Wilfred holds a Master's Degree in Mass Communications with a keen interest in Communications Research. Mr Wilfred has contributed immensely to EWURA's achievements in stakeholder engagement and positive media relations over the last 12 years.

Roselane Jilo Ambasi
Engineer

She is a Senior Engineer at Kenya Pipeline Company, Coast Region. Roselane holds a BSc in Electrical and Electronics Engineering from the University of Nairobi, an MBA in Strategic Management from KeMU, and is pursuing a PhD at Jomo Kenyatta University of Agriculture and Technology. From 2011 – 2022, she held various leadership roles in the Council of Institution of Engineers of Kenya (IEK), Mombasa Polytechnic University College Council, and Council of Technical University of Mombasa. She is currently serving in the board of Engineers Board of Kenya (EBK).



Daniel Chege Reuben
Student

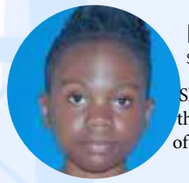
He is a BSc Petroleum Engineering student at the School of Mines and Geosciences, University of Dar es salaam. Driven by his interest in clean cooking, Daniel initiated a project under the Energy4me program in Society of Petroleum Engineers (SPE) aiming to educate communities about the importance of using clean cooking energy. He has successfully increased awareness of clean cooking solutions among students and local communities. He is an active member of the Society of Petroleum Engineers (SPE), TGS, OpenAir, Society of Geophysics (SEG), and the Tanzania Renewable Energy Association (TAREA), continuously working toward a cleaner energy future

Mbarouk Shaame
Petroleum Engineer

He is a Petroleum Inspector at the Energy and Water Utilities Regulatory Authority (EWURA) in Tanzania. Mbarouk holds a Bachelor's degree in Petroleum Engineering from the University of Dodoma and a Master's degree in Oil and Natural Gas Engineering from the China University of Geosciences (Wuhan). His experience spans industry and academia, including roles as a Project Engineer at Total Energy Solution Company and Assistant Lecturer at the University of Dodoma. With expertise in petroleum inspections, research, and compliance, he has contributed to regulatory frameworks and sustainable practices in East Africa's petroleum sector.

Gilbert T. Nduguyu
Mechanical Engineer

He is a mechanical engineer currently working at Kenya Pipeline Company. Gilbert holds BSc in Mechanical Engineering degree from Jomo Kenyatta University of Agriculture and technology. He is an ISO certified (ISO 9001:2015 QMS, ISO ISO/IEC 17025:2017 laboratory management: IS0 45001:2018 occupational health and Safety management systems) trainer in SAP, system improvement and maintenance.



Mercy Kamuntu
Student

She is a BSc Petroleum Engineering Student at the School of Mines and Geosciences, University of Dar es salaam, Tanzania.

Clara Orora
Petroleum Geochemist

She is a Geochemist at the National Oil Corporation (NOC), Kenya. Clara holds a MSc in Petroleum Geochemistry from the Newcastle University UK and a Bachelor degree in Industrial Chemistry, from the Jomo Kenyatta University of Agriculture and Technology, Kenya. She is passionate about Analytical chemistry, geochemistry, geology as well as other geoscience tools applied in the fascinating world of oil and gas industry.

Henry Tumusiime
Petroleum Geoscientist

He is a Geoscientist at the Ministry of Energy and Mineral Development (MEMD), Uganda. Henry attained a BSc. Petroleum Geoscience and Production and MSc. Petroleum Geosciences in both from Makerere University. At MEMD he is responsibilities of Policy development and exploration for frontier plays in Ugandan Basins. Previously he has worked and consulted for a number of independent companies and consultancies including Kuruga Geospace Technologies and Natgas Uganda Limited mainly in Upstream operations and new business ventures.

Wanjiku Manyara
General Manager PIEA

She is the General Manager of the Petroleum Institute of East Africa (PIEA) with over 20 years of advocacy experience in the petroleum industry. Wanjiku represents the sector in government-led policy, regulatory, and infrastructure planning. She serves on key committees, including the Oil & Gas Strategic Environmental & Social Assessment Advisory Committee and the World LPG Global Cylinder & Technology Network. Wanjiku also coordinates the Women in LPG National Chapter and sits on the Anti-Corruption Committee under the National Council on the Administration of Justice. Additionally, she is a certified mental health champion and advocate for community inclusion.

Timothy Ashoka
Geoscientist

He is Geoscientist currently pursuing a Master of Science in Petroleum Geoscience. Timothy holds a Bachelor of Science in Petroleum Geoscience and Production from Makerere University. He is passionate about geomodelling and AI-assisted workflows and predictions, and mentorship. He formerly worked with Excellence Logging (EXLOG) on the Tilenga Project as a mud logger and with Geotechnical Engineering Laboratory (GETLAB).

Neema Mdegella
Petroleum Engineer

She is a petroleum engineer currently serving as a Principal Engineer at Tanzania Petroleum Developmnent Corporation (TPDC). Neema holds a Master's degree in Oil and Gas and Renewable Energy, along with a Bachelor's degree in Industrial Engineering and Management. She has over 14 years' experience in oil and gas engineering, with a strong background in various industries. She specializes in the design, construction, and installation of oil and gas facilities, pipeline operation and maintenance, project management, flow assurance, structural integrity, and failure analysis.

Tarimo Antipass Josephat
Student

He is a BSc Petroleum Engineering Student at the School of Mines and Geosciences, University of Dar es salaam, Tanzania.

Elly Mulumbu Bogi
Geopysicist

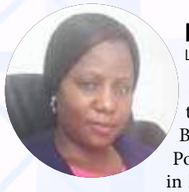
He is a geophysicist with 5 years of experience at the State Ministry of Energy and Petroleum, Kenya. Elly began his career as a processing geophysicist in the private sector where he developed expertise in analyzing subsurface geophysical data before joining that State Department for Petroleum of the Ministry of Energy and Petroleum of Kenya. His work has contributed to advancing petroleum resource exploration and development in Kenya.

Abiud Masinde
Petroleum Geophysicist

He is the Energy Transition & Joint Business Ventures Lead at the National Oil Corporation (NOC), Kenya. Abiud expertise spans geophysical data interpretation, energy transition strategies, and joint venture negotiations, with a current focus on integrating renewable energy solutions and enhancing the sustainability of Kenya's energy sector. As seasoned geophysicist with extensive experience in Kenya's oil and gas sector, Abiud has been instrumental in advancing seismic exploration, basin analysis, and subsurface imaging to support hydrocarbon discovery and development.

Elia Lema
Petroleum Engineer

He is a Petroleum Engineer working as an Asset Integrity Management (AIM) Coordinator at SolutionsTag Consulting Company Limited,Tanzania. Elia holds a BSc in Petroleum Engineering from the University of Dar es Salaam. Previously he worked as a Project Engineer at Star Oil Tanzania Limited, gaining expertise in project management and structural design.



Betty Namubiru
Local Content Expert

She is a Local Content Expert and Manager at the Petroleum Authority of Uganda (PAU). Betty holds a Master of Science in Economic Policy and Planning and a Bachelor of Science in Economics and Statistics, both from Makerere University. With 20 years of experience, she has worked with various institutions in Uganda, including the Belgian Development Agency as a National Technical Advisor for the Support to Skilling Uganda Project. She is also a member of the Oil and Gas Sector Skills Council.

Fredrick Kilewo
Micropaleontologist

He is a Micropaleontologist at the Tanzania Petroleum Development Corporation (TPDC). Fedrick holds a Master of Science in Earth Science and Environment from the University of Wollongong, Australia. With ten years of experience in the petroleum industry, he has participated in geological fieldwork across Tanzania's petroleum basins and the Sydney Basin in Australia. He has also been involved in borehole drilling and seismic campaigns in the Eyasi Wembere Basins.

Speakers Profile

Gayle Meikle
CEO, Frontier Energy Network

She is the Founder and CEO of Frontier Energy Network. Gayle holds a Commerce degree in Management & Entrepreneurship from Rhodes University, South Africa. With over 25 years of experience in energy communications and strategy, she specializes in advising and promoting emerging energy markets, particularly through Licensing Rounds. Her involvement in Mozambique's 6th and Zanzibar's 1st Licensing Rounds underscores her expertise. Before founding Frontier, she held key roles at Unilever, British Airways, the Institute of Directors and Global Pacific & Partners, managing global conferences.

Moses Ekunu
Legal Expert

He is a manager office of the Executive Director Petroleum Authority of Uganda. Moses holds an LLM in Oil and Gas Law and Policy at the University of Dundee, Scotland and an MSc in Oil and Gas Management from Coventry University, England. He has over 14 years' experience in the oil and gas industry. Moses is a certified Oil and Gas Safety practitioner by the Institution of Occupational Safety and Health (IOSH), UK, a Certified ISO 9001:2015, Lead Auditor by IRCA, UK and a Chartered Personal Executive Assistant by the Association of American Academy of Project Management (AAPM).

Ibrahim Kajugus
Mechanical Engineer

He is a Mechanical Engineer currently working at Energy Water Utilities Regulatory Authority (EWURA), Tanzania. Ibrahim holds Master's degrees in Engineering Management, and Procurement & Supply Chain Management, and a Bachelor's in Mechanical Engineering, pursuing a PhD at the University of Dar es Salaam. He has 17+ years of expertise in petroleum regulations, operations, infrastructure design and inspections. As a Senior Engineer - Petroleum at EWURA, he leads regulatory compliance and petroleum standards development. His previous roles include Petroleum Inspector, Terminal Manager, and Depot Manager.

Dora Ernest
Chemical & Process Engineer

She is a Consulting Engineer at the National Oil Company of Tanzania (TPDC). Dora holds a Master's Degree in Gas Engineering and Management (University of Salford, UK), Master's Degree in Renewable Energy (University of Dar es Salaam) and Bachelor's Degree in Chemical and Process Engineering (University of Dar es Salaam). She is a registered Consulting Engineer with the Engineers Registration Board (ERB) of Tanzania and certified Project Management Professional (PMP) with the Project Management Institute. She has over 11 years of experience in the midstream and downstream oil and gas value chain.

Johanes Kakoki
Palynologist

He is currently a senior palynologist at the Tanzania Petroleum Development Corporation (TPDC). Johanes obtained a Master's degree in Applied and Petroleum Micropalaeontology from the University of Birmingham, UK. With 10 years of experience Johanes has conducted various studies in onshore and offshore sedimentary basins in Tanzania.

Felix Nanguka
Production Engineer

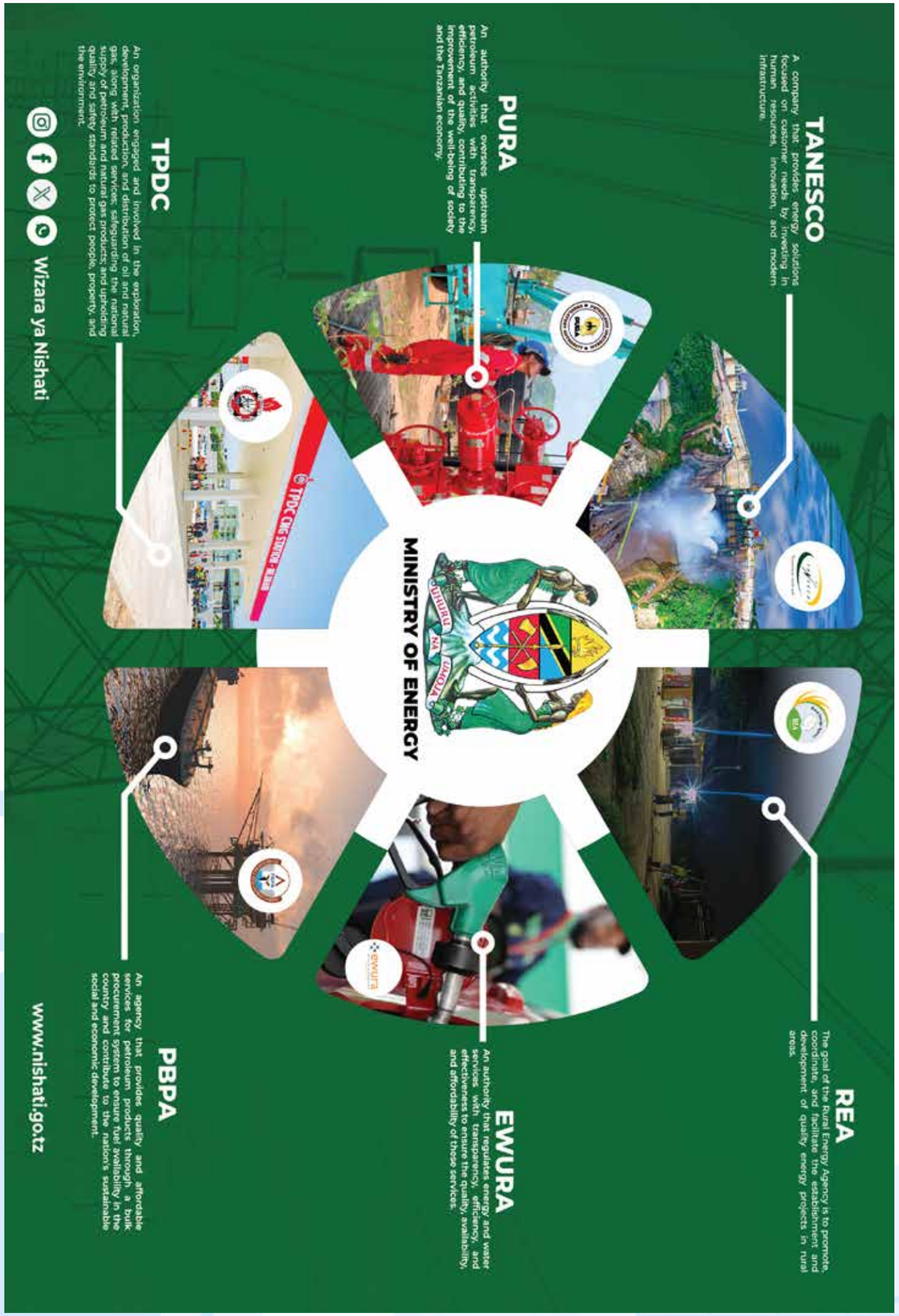
He is a Development and Production Manager in the upstream department of the National Oil Company in Tanzania (TPDC). Felix holds an MSc. in Petroleum Engineering (Heriot Watt University) and BSc. in Mineral Processing Engineering (University of Dar es Salaam). He has 14 years' experience in the Oil and Gas Industry with a strong background in Reservoir and Production engineering.

Stephen Mwoni Kitavi
Geophysicist

He is a Senior Petroleum Officer at the State Department of Petroleum, Kenya. Stephen holds a Bachelor degree of Science in Physics from the Jomo Kenyatta University of Agriculture and Technology. He closely monitors petroleum operations and informs stakeholders about the status of geophysical activities, while promoting innovative research programs in the field. Stephen is a member of the Geothermal Association of Kenya.

Angela Kampi
Petroleum Engineer

She is a Petroleum Engineer at the Petroleum Authority of Uganda (PAU). Angela holds a Bachelor of Science in Petroleum Geoscience and Production from Makerere University. She was among the top 20 women trailblazers under 40 years in Uganda's Energy and Extractives industry, specifically in the Oil and Gas sector, highlighting her significant contributions to the development of the country's oil and gas industry.



AGNESS CHINGOLO

REVIEW OF PETROLEUM GEOCHEMISTRY OF KIMBIJI AREA - ITS IMPLICATION TO HYDROCARBON POTENTIALITY

REVIEW OF PETROLEUM GEOCHEMISTRY OF KIMBIJI AREA- ITS IMPLICATION TO HYDROCARBON POTENTIALITY.

Presenter: Agnes Chigolo

March, 2025

Introduction

- Kimbiji forms part of Coastal sedimentary basins of Tanzania and located on the Eastern shoreline of the Dar es Salaam Platform in Temeke District.
  - It is an open Block with two onshore and one offshore exploration wells where studies have been conducted to unveil its petroleum potential.
  - Exploratory history: 2D Seismic acquisition and drilling of three wells
    - Kimbiji Main-1 and Kimbiji East-1 wells (1978 to 1980)
    - Tancan-1 well (1983) offshore part of Kimbiji.

ANNEX | EXPLORATION

AGNESS CHINGOLO

REVIEW OF PETROLEUM GEOCHEMISTRY OF KIMBIJI AREA - ITS IMPLICATION TO HYDROCARBON POTENTIALITY

Methodology

- Literature review of Technical reports on geochemistry of Kimbiji area source rocks and research papers which highlights the use of:
  - **Rock-eval pyrolysis measurement** by Thermal conductivity detector and Flame ionization detector
  - **Vitrinite reflectance measurement** using reflected light microscope

Results

- Type of kerogen; Based on Rock- eval pyrolysis data(HI and OI), the source rocks are of kerogen type III, gas prone with low HI(50-150) and high OI (81-735).
- Vitrine Reflectance data (Ro) indicates maturity at oil window and the source rock is over-matured with the values of (1.2%-1.4%).

ROCK-EVAL PYROLYSIS DATA		
TOC(%)	0.12-0.68	1.78-12.1
HI (mg/g)	50-150	
OI (mg/g)	81-735	
PI	0.014-1	
Tmax (0C)	0-431,442	450-451
RO	0.54/0.05	0.99/0.03

Table 1: Summary of Results

AGNESS CHINGOLO

REVIEW OF PETROLEUM GEOCHEMISTRY OF KIMBIJI AREA - ITS IMPLICATION TO HYDROCARBON POTENTIALITY

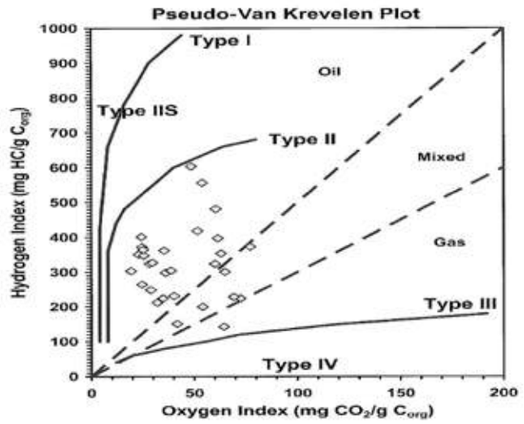
Results……

- The organic matter richness (source rock quality) ranges from non-source, fair to good potential source rocks excellent source rock with average T.O.C of 1.78%–12.2 % for Kimbiji East-1 well and of 1.48%–1.83 wt% for Kimbiji Main-1 well.

S/N	TOC STANDARD%	TOC MEASURED(%)	IMPLICATION
1	<1	0.12-0.68	Poor source rock
2	1-5	1.48–1.83	Good source rock
3	> 5	12.1	Excellent source rock

Table 2: source rock quality

Results……



Depth	Tmax	Comment
1400m-2800m	<430^{0}C	Immature
3150m-3550	430^{0}C- 450^{0}C	matured
3582	451^{0}C	over-matured

Table 3:Source rock maturity based on Tmax

AGNESS CHINGOLO

REVIEW OF PETROLEUM GEOCHEMISTRY OF KIMBIJI AREA - ITS IMPLICATION TO HYDROCARBON POTENTIALITY

Conclusion

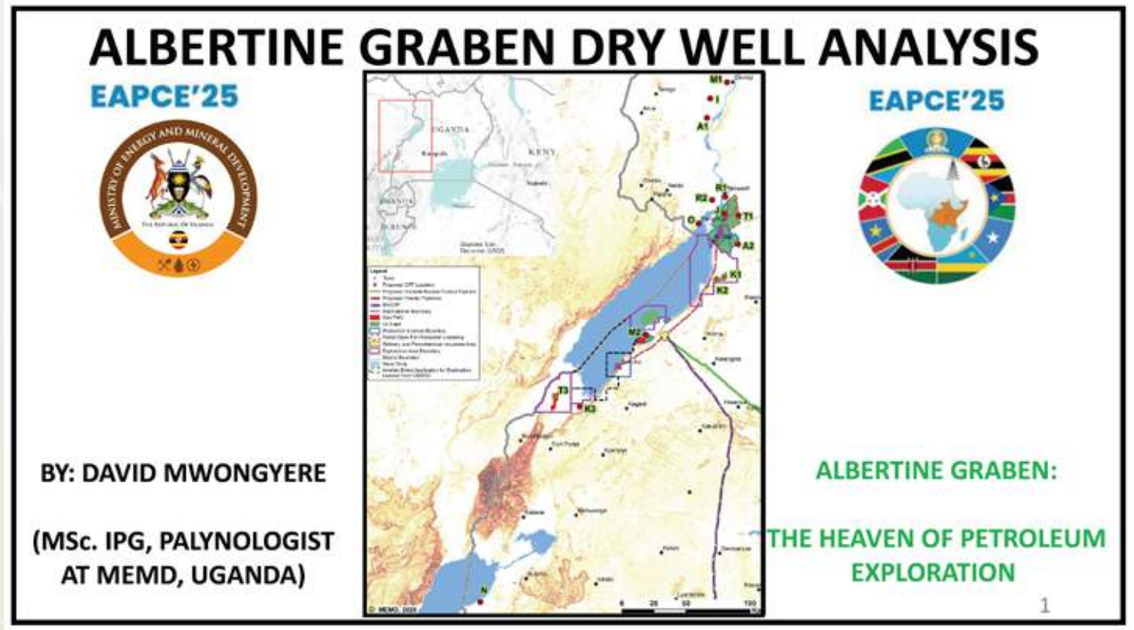
Based on the review of the studies conducted on petroleum geochemistry around the Kimbiji area, the source rocks are primarily kerogen type III, with a high oxygen index, indicating a potential for gas generation.

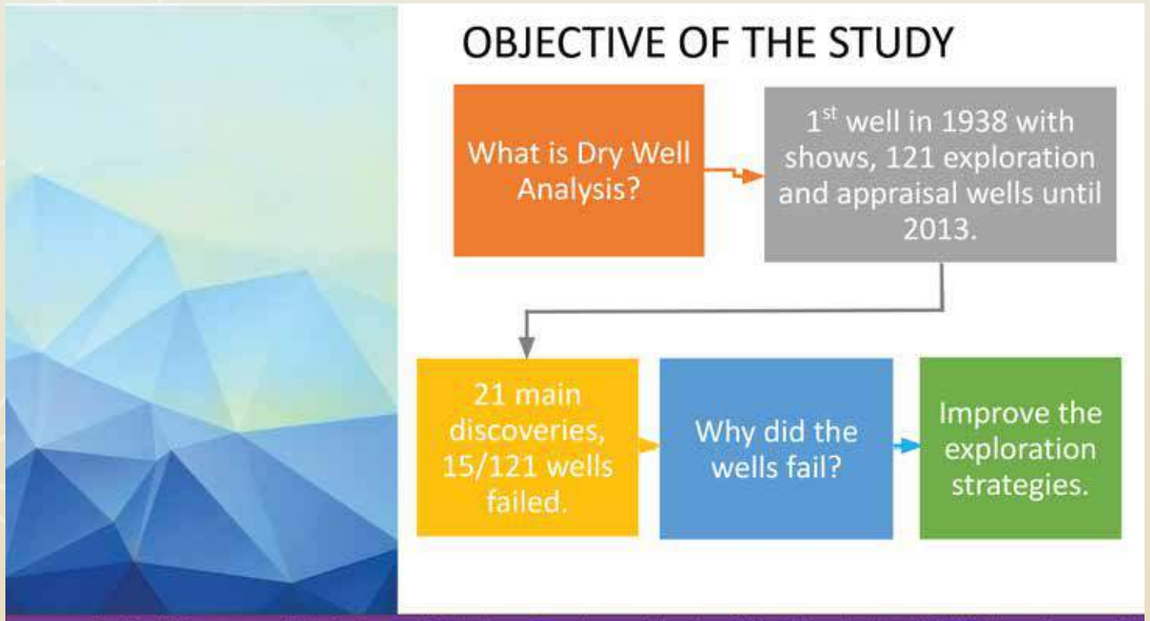
Business Opportunity:

The findings of this review provides information for IECSs and investors to conduct further studies by integrating different methods of exploration.

DAVID MWONGYERE

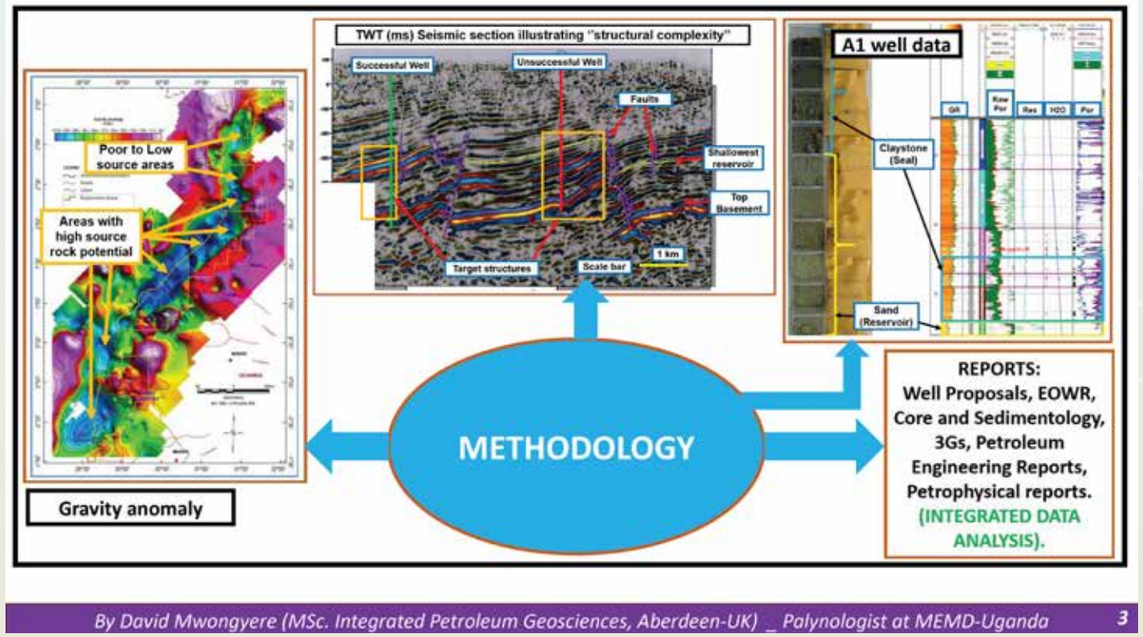
ALBERTINE GRABEN DRY WELL ANALYSIS

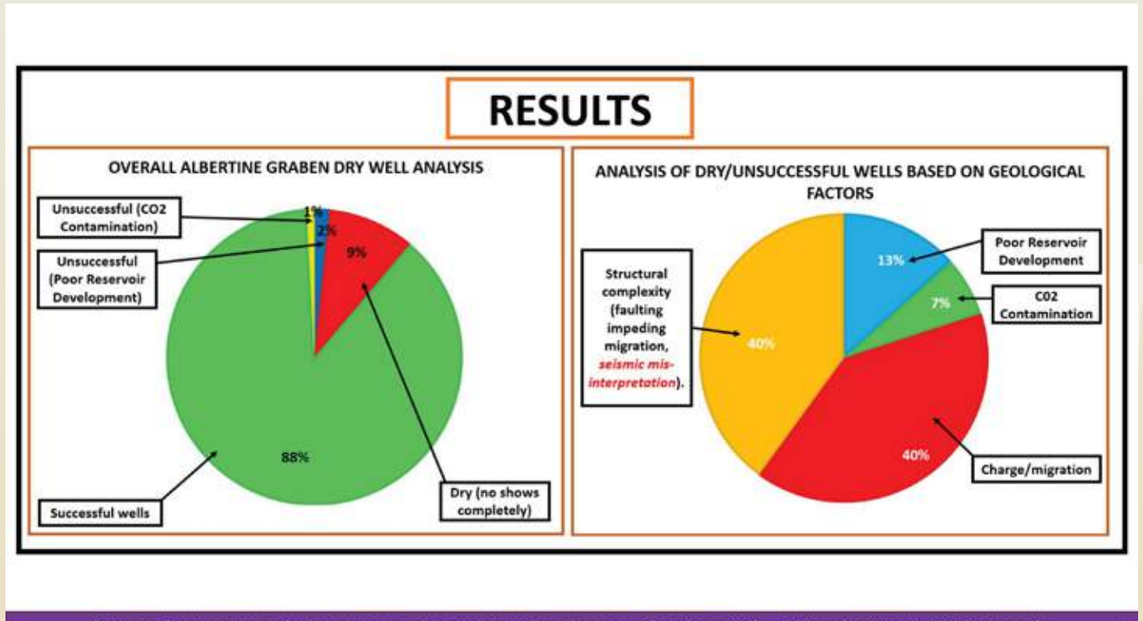




DAVID MWONGYERE

ALBERTINE GRABEN DRY WELL ANALYSIS

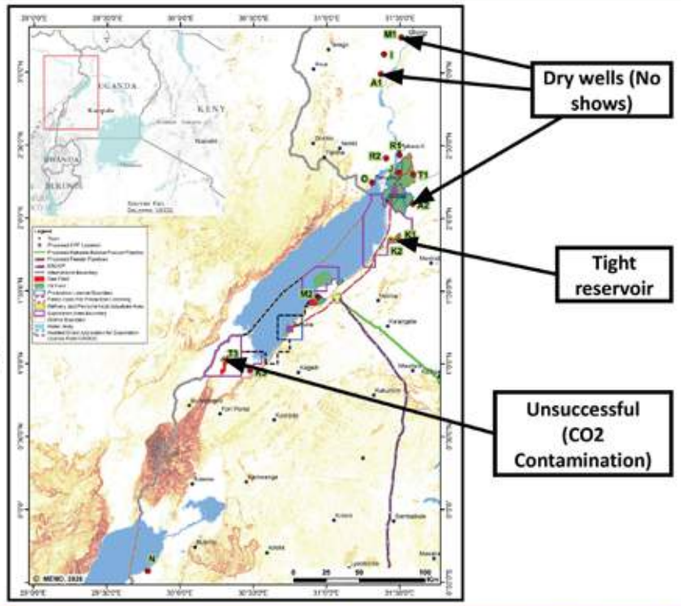




DAVID MWONGYERE

ALBERTINE GRABEN DRY WELL ANALYSIS

Map of the Albertine Graben dry/unsuccessful wells



Recommendations (Government)

- PROPER DWA SIMPLIFIES PROMOTION AND LICENSING.
- IMPROVED POLICIES AND REGULATORY OVERSIGHT.
- EFFICIENT RESOURCE MANAGEMENT.
- MINIMIZING EXPLORATION COSTS.

DAVID MWONGYERE

ALBERTINE GRABEN DRY WELL ANALYSIS

Recommendations (Business or Private sector)

- IMPROVED EXPLORATION STRATEGY.
- OPTIMIZING WELL PLACEMENT.
- ENHANCED GEOLOGICAL UNDERSTANDING AND MODELS.
- INCREASED RETURN ON INVESTMENT.
- OPTIMIZING PORTFOLIO MANAGEMENT.

Conclusions

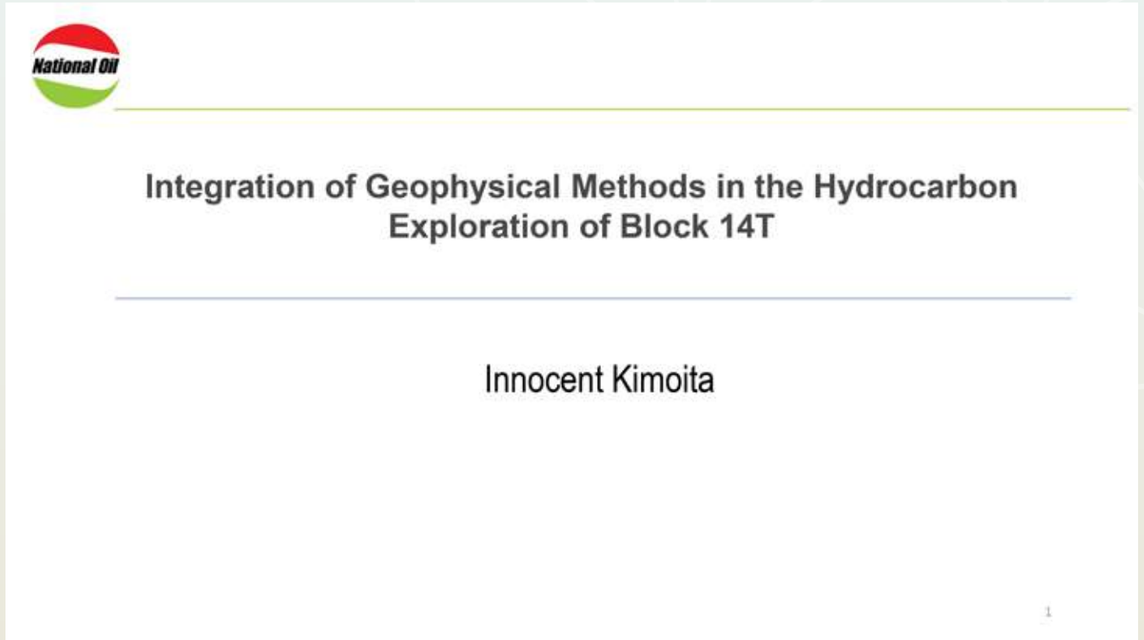
- Highest drilling success rate world-wide (88%).
- Structural complexity: Highest risk, impedes further migration, and gives *seismic misinterpretation*
- Charge ranks second.
- Reservoir quality weakly contributes
- Evidence of very effective seals.
- CO_2 contamination is a minor risk.
- ***With Proper DWA, the dry well areas can be derisked.***
- ***ALBERTINE GRABEN, THE HEAVEN OF PETROLEUM EXPLORATION***

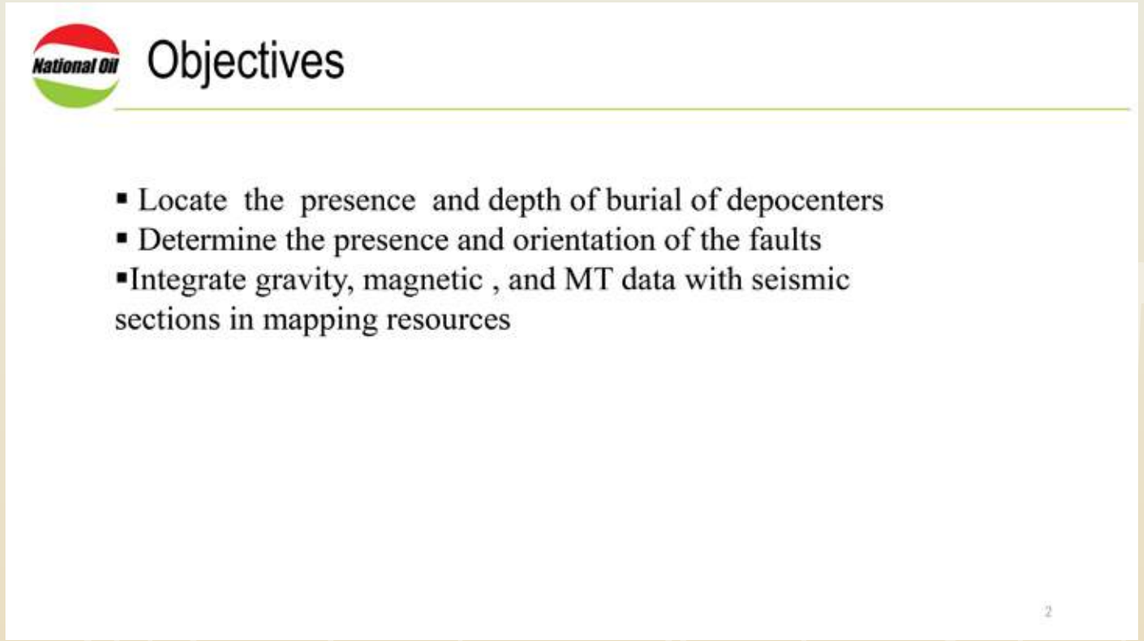
DAVID MWONGYERE

ALBERTINE GRABEN DRY WELL ANALYSIS

INNOCENT KIMOITA

INTEGRATION OF GEPHYSICAL METHODS IN THE HYDROCARBON EXPLORATION OF LOCK 14T





INNOCENT KIMOITA

INTEGRATION OF GEPHYSICAL METHODS IN THE HYDROCARBON EXPLORATION OF LOCK 14T

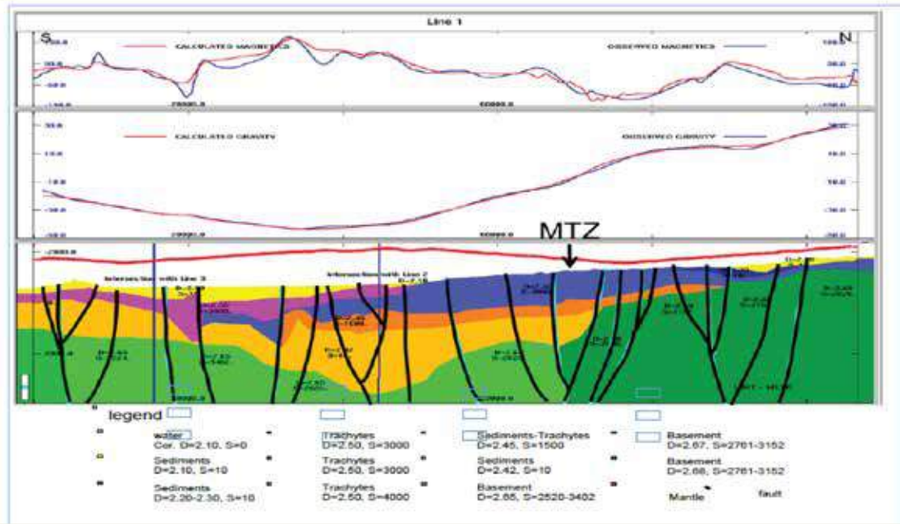
Introduction

- Magadi trough in the Kenyan Tertiary rift basin holds the promise of substantial hydrocarbon reserves.
- An FTG survey was carried out to establish the possible presence of sediments in the subsurface between the volcanic flows
- Seismic survey and ground gravity survey was also done
- A Magnetotelluric survey was also conducted to discriminate between sedimentary units and volcanic units

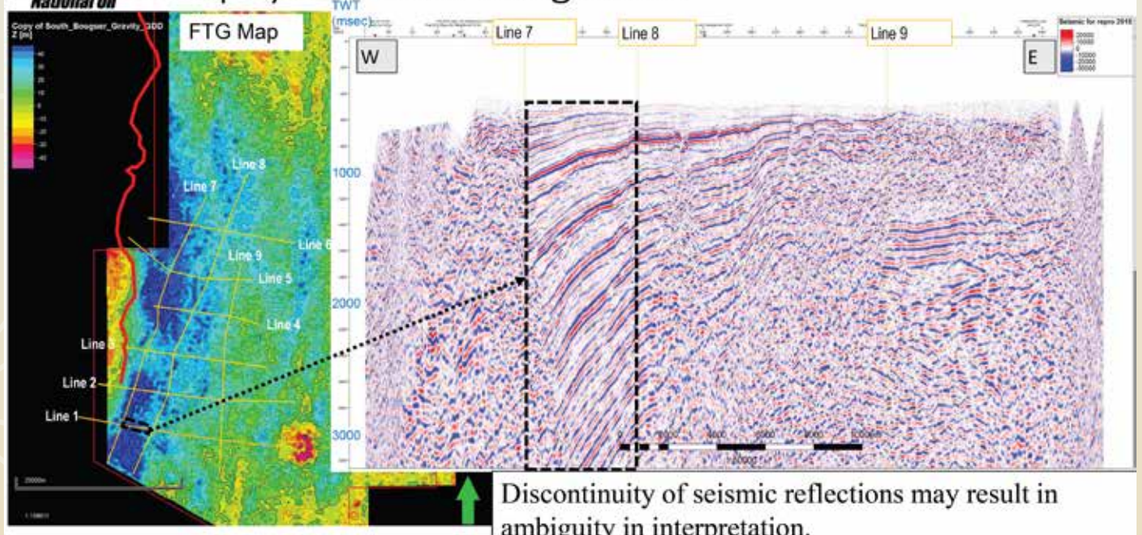
INNOCENT KIMOITA

INTEGRATION OF GEPHYSICAL METHODS IN THE HYDROCARBON EXPLORATION OF LOCK 14T

Modelling of Gravity and Magnetic Data

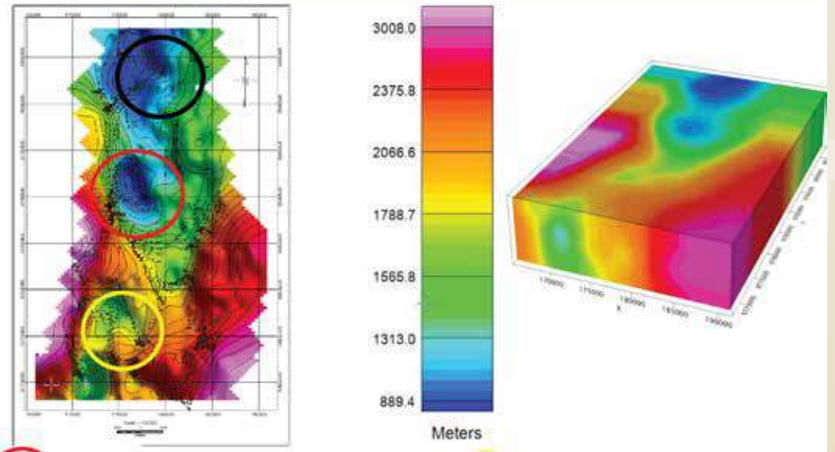


Geophysical Data Integration



Discontinuity of seismic reflections may result in ambiguity in interpretation.
Hence the need to deploy various geophysical methods

SBA Grid



Musenke depocenter

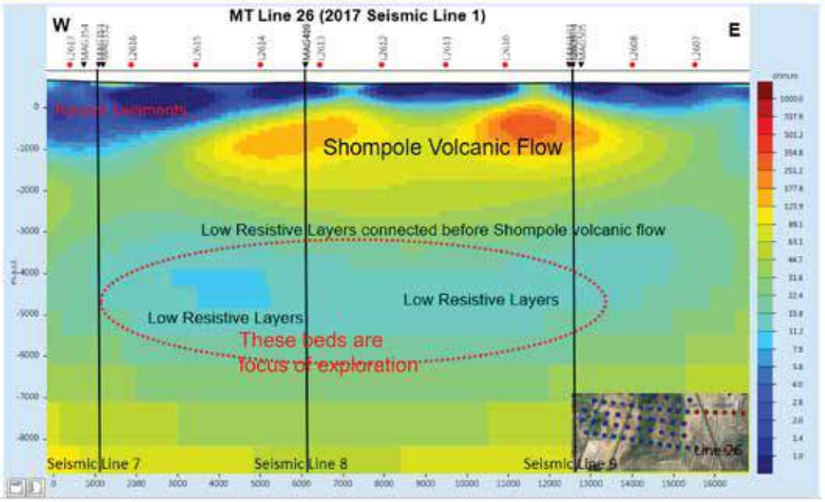
Olkiramatian depocenter

Parkase depocenter

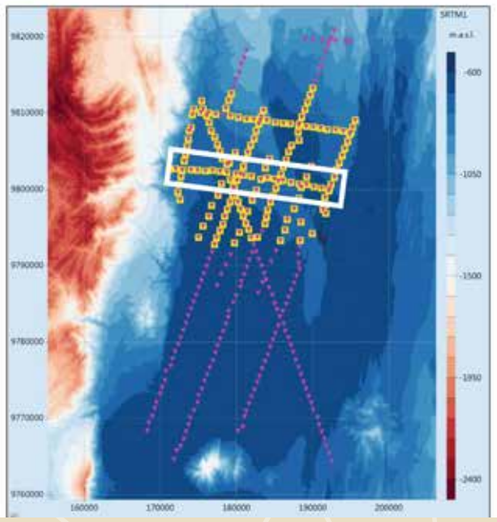
INNOCENT KIMOITA

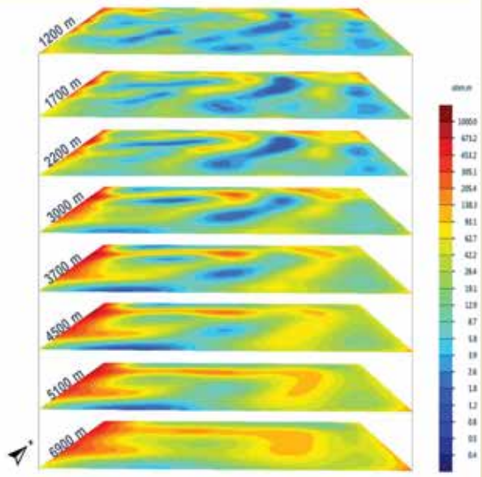
INTEGRATION OF GEPHYSICAL METHODS IN THE HYDROCARBON EXPLORATION OF LOCK 14T

Magnetotellurics (MT)



Magnetotelluric Survey (MT)





INNOCENT KIMOITA

INTEGRATION OF GEPHYSICAL METHODS IN THE HYDROCARBON EXPLORATION OF LOCK 14T

Conclusion

- The sediment packages of interest are buried at a minimum depth of around 3km
- These sediments lie below the volcanic layer; this increases the complexity
- SBA grid from ground gravity survey reveals the presence of three depocenters
- Top basalt is the probable seal recognized from MT studies.
- Seismic/Gravity interpretation shows a fault pattern that is likely to be the trapping system.

THANK YOU

KAWI Complex, Popo Lane, Off Red Cross Road, South C, Nairobi Kenya.
P.O. Box 58567, 00100 Nairobi, Kenya
Telephone: +254-20-6952000 | Mobile: 0734-333000 / 0722 203 748 / 0726 610 102
Email: upstream@nockenya.co.ke | Website: www.nationaloil.co.ke

www.nationaloil.co.ke

GRACE NAKYANZI

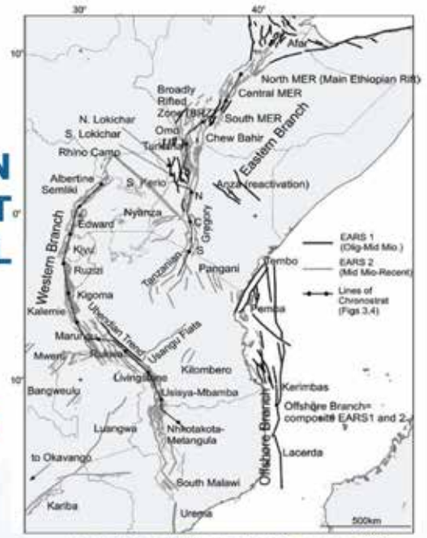
HYDROCARBON EXPLORATION POTENTIAL OF THE EAST AFRICAN RIFT AND COSTAL BASIN

EAPCE'25
2025

HYDROCARBON EXPLORATION POTENTIAL OF THE EAST AFRICAN RIFT AND COASTAL BASINS

PRESENTED BY GRACE NAKYANZI
YEAR IV PETROLEUM AND GEOSCIENCE STUDENT

Sponsored by: *Uganda National Oil Company* UNOC



East African Rift Basin Map(Macgregor, 2015)

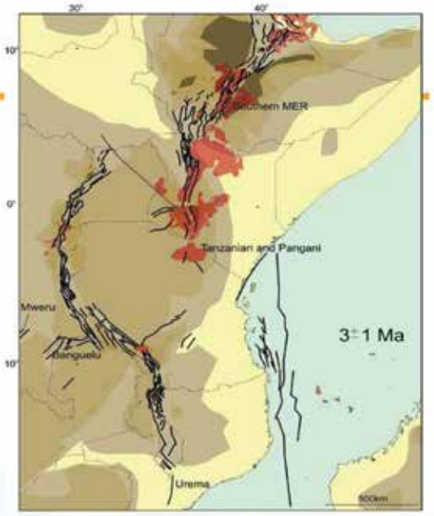
The Objective of study

Main Objective

To analyze existing literature on the hydrocarbon potential of the East African Rift System(EARS) and coastal basins

Specific Objectives

1. To examine the geological evolution of Rift and Coastal Basins
2. To compare the hydrocarbon prospectivity in Rift and Coastal Basins
3. To provide insights for sustainable resource development and future directions



Geological map showing regional fault lines and tectonic features (Macgregor, 2015)

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HYDROCARBON EXPLORATION POTENTIAL OF THE EAST AFRICAN RIFT AND COSTAL BASIN

The Methodology Adopted

Literature Review Approach

System search of peer- reviewed journals, technical reports and government publications.

Inclusion criteria

- EARS geology and tectonic evolution(Macgregor, 2015) Hydrocarbon indicators and petroleum systems(Mvile et al., 2020)
- Exploration challenges and offshore constraints(Davison& Steel, 2017)

Data Analysis

Categorization of findings into structural evolution, source rock potential, reservoir quality and risk factors.
Comperative assessment of onshore and Offshore Basins

The Results Obtained
Hydrocarbon Potential & Challenges

Comparison of Rift vs. Coastal Basins

East African Rift Basins (Onshore)	Coastal Basins (Offshore & Nearshore)
Albertine Rift: Proven oil reserves (~6.5B barrels, Uganda), strong source rocks.	**Rovuma Basin:** 180+ TCF gas, LNG projects, but security concerns in Mozambique.
South Lokichar: 1B+ barrels discovered but lacks pipeline infrastructure.	**Lamu Basin:** Gas potential but delayed by Kenya-Somalia border disputes.
Rukwa: Underexplored, but good geological potential.	**Tanzania Basin:** High TOC, strategic location for LNG exports.
Turkana: Limited wells drilled, needs more exploration	**Mozambique Basin:** Potential extension of Rovuma's gas system.
	Morondava & Somali Basins: Underexplored, require more seismic data

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HYDROCARBON EXPLORATION POTENTIAL OF THE EAST AFRICAN RIFT AND COSTAL BASIN

Policy Implications - Government Perspective

- REGULATORY FRAMEWORK
- DATA & RESEARCH
- INFRASTRUCTURE DEVELOPMENT
- REGIONAL COOPERATION
- CAPACITY BUILDING

5/29/2025 5

Business Opportunities - Private Sector

Sector	Opportunities
Upstream	Exploration partnerships, seismic data investment, enhanced oil recovery(EOR) techniques
Midstream	Pipeline development, refineries, LNG terminals and storage infrastructure
Downstream	Petrochemical industry expansion, regional fuel distribution, alternative energy integration
Innovation and Technology	AI driven exploration, digital oilfield transformation and CCS

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ANNEX | EXPLORATION

GRACE NAKYANZI

HYDROCARBON EXPLORATION POTENTIAL OF THE EAST AFRICAN RIFT AND COSTAL BASIN

Conclusion

- Future Focus: AI and Seismic Imaging
- Biggest Gap: Unexplored Rift Basins
- Opportunity : Investment

5/29/2025 7

HULDA MANGACHI

UNVEILING HYDROCARBON EXPLORATION OPPORTUNITIES IN THE COSTAL AND OFFSHORE BASIN OF THE MAINLAND TANZANIA

PETROLEUM UPSTREAM REGULATORY AUTHORITY

UNVEILING HYDROCARBON EXPLORATION OPPORTUNITIES IN THE COASTAL AND OFFSHORE BASIN OF THE MAINLAND TANZANIA

Presenter: Hulda Mangachi

March, 2025

INTRODUCTION

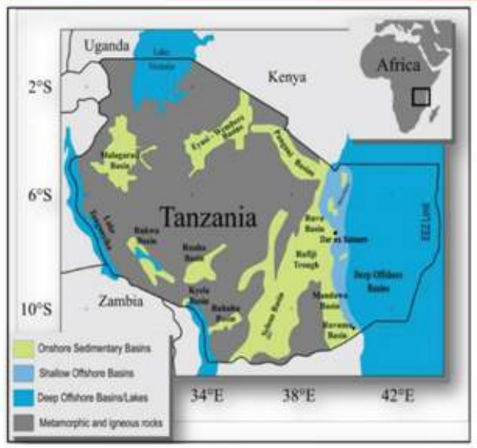
Sedimentary Basins of Tanzania

i. Coastal Basin

ii. Modern East Africa Rift basin

iii. Cratonic Sag Basin

iv. Deep offshore basin



Source: TPDC, 2021

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UNVEILING HYDROCARBON EXPLORATION OPPORTUNITIES IN THE COSTAL AND OFFSHORE BASIN OF THE MAINLAND TANZANIA

SOME OF THE FISCAL AND CONTRACTUAL TERMS

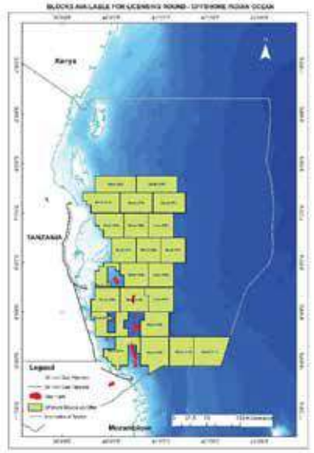
Production Sharing Agreement (PSA)

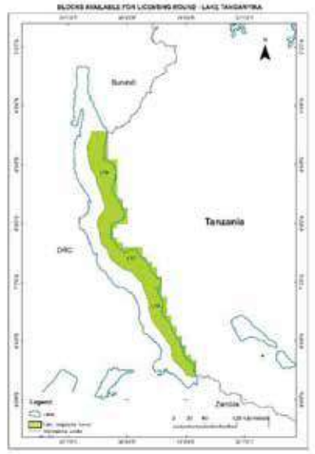
- Exploration period: 9 years (4, 3 and 2 years for the initial, first extension and second extension period respectively)
- Appraisal Period: usually 2 and 3 years for oil and gas respectively
- Development and Production Period: 25 years with the possibility of an extension of up to 20 years

Work Program

- The minimum work program & expenditure for each Exploration Period must detail the geological and geophysical activities to be implemented.

BLOCKS FOR THE UPCOMING 5TH LICENCING ROUND





Twenty-six (26) Blocks will be available for licensing

- Twenty-three (23) Offshore Blocks
- Three (3) Lake Tanganyika Blocks

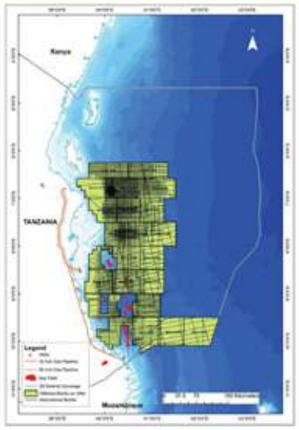
HULDA MANGACHI

UNVEILING HYDROCARBON EXPLORATION OPPORTUNITIES IN THE COSTAL AND OFFSHORE BASIN OF THE MAINLAND TANZANIA

AVAILABLE DATA

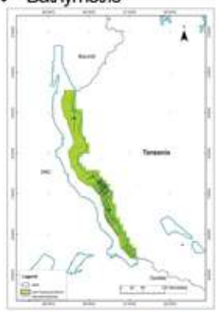
The Offshore Blocks contains:

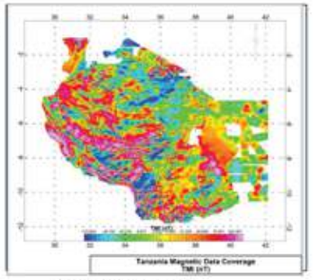
- Gravity/Magnetic
- Bathymetry
- Vintages of Seismic 2D/3D
- 37 Exploration and Appraisal Wells
- Technical reports



Lake Tanganyika Contains:

- Gravity/Magnetic data (FTG & AGG)
- Vintages of Seismic 2D
- Bathymetric





Coastal Areas:

- Gravity/Magnetic data (FTG & AGG)
- Vintages of Seismic 2D
- Wells

TGS

The offshore datasets can be accessed through TGS

AVAILABLE INFRASTRUCTURE

- Natural gas processing infrastructure i.e. SS 140 MMSCF and Madimba 210 MMSCF.
- The National Natural Gas Infrastructure (NNGI) from Madimba – Mtwara to Tegeta – Dar es Salaam has 551 kilometers.
- East African Crude Oil Pipeline (EACOP) i.e. runs from Kabaale (Uganda) to Chongoleani (Tanzania).
- Tanzania railway

ANNEX | EXPLORATION

HULDA MANGACHI

UNVEILING HYDROCARBON EXPLORATION OPPORTUNITIES IN THE COSTAL AND OFFSHORE BASIN OF THE MAINLAND TANZANIA

CONCLUSION

You are all welcome to invest in petroleum upstream operations to unlock the hydrocarbon potential in Tanzania.

THANK YOU

IBRAHIM RUTTA

HIGH RESOLUTION SEQUENCE STRATIGRAPHIC ANALYSIS OF MIOCENE TO PLIOCENE DELTAIC SYSTEMS OF TANGA BASIN

TANZANIA PETROLEUM DEVELOPMENT CORPORATION

High Resolution Sequence Stratigraphic Analysis of Miocene to Pliocene Deltaic Systems of Tanga Basin.

EAPCE 2025
Ibrahim Rutta

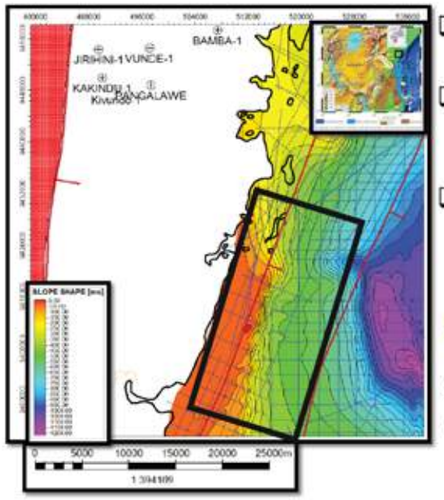
Presentation Outline

- ❑Introduction
- ❑Basin evolution
- ❑Sequence stratigraphy
- ❑Seismic facies and Facies association
- ❑Palaeogeographic map
- ❑Conclusion

IBRAHIM RUTTA

HIGH RESOLUTION SEQUENCE STRATIGRAPHIC ANALYSIS OF MIOCENE TO PLIOCENE DELTAIC SYSTEMS OF TANGA BASIN

Introduction

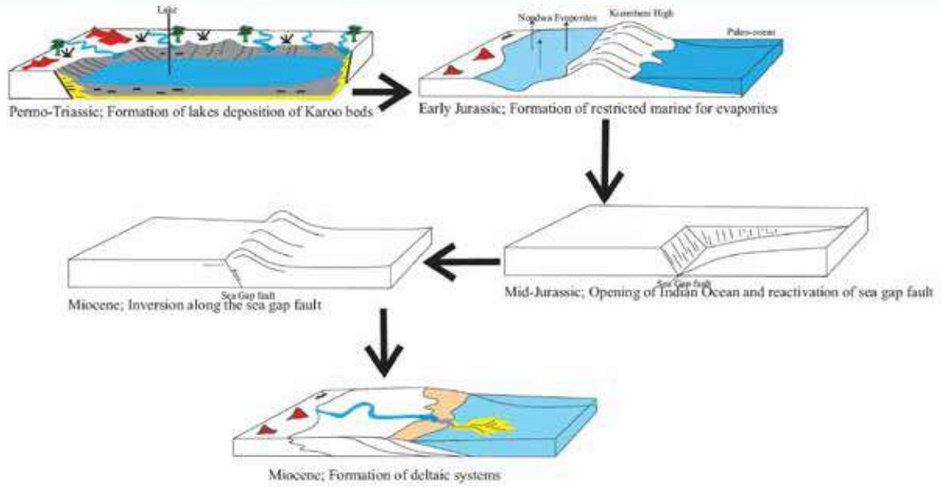


- ❑Tanga basin is located northern coastal of Tanzania
- ❑Is a rift basin formed in Permo-Triassic and Early Jurassic related to break up of Gondwana
- ❑Number of exploration activities carried out at different stages

Objective

Shoreline shift and its implication to facies changes. Using 2D seismic data

Regional stratigraphy and evolution



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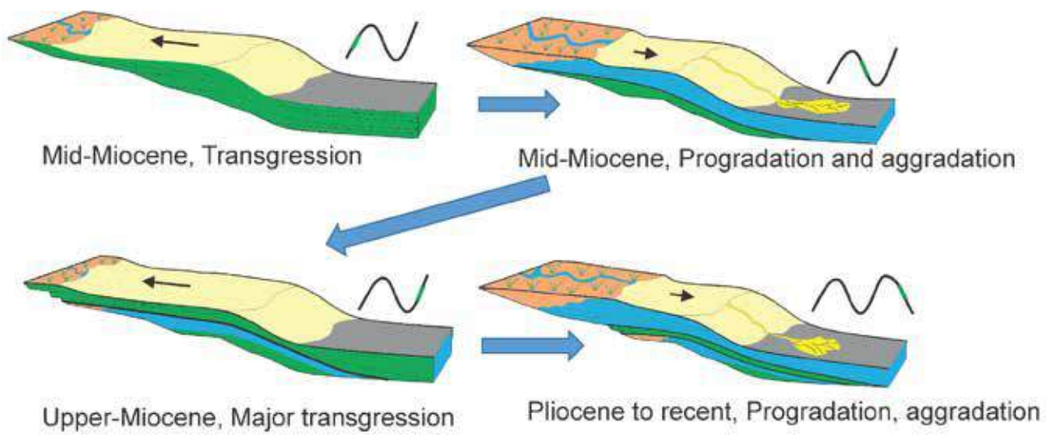
HIGH RESOLUTION SEQUENCE STRATIGRAPHIC ANALYSIS OF MIOCENE TO PLIOCENE DELTAIC SYSTEMS OF TANGA BASIN

Basin Evolution



ANNEX | EXPLORATION

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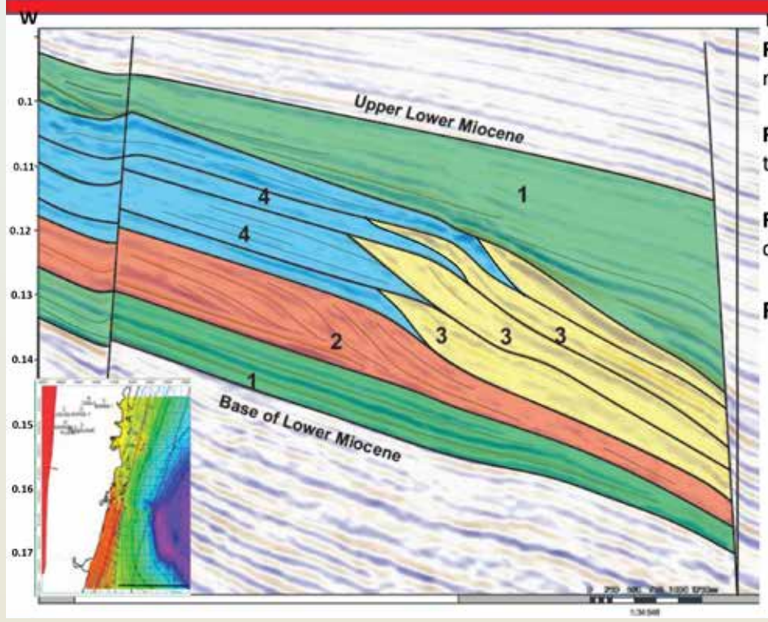
HIGH RESOLUTION SEQUENCE STRATIGRAPHIC ANALYSIS OF MIOCENE TO PLIOCENE DELTAIC SYSTEMS OF TANGA BASIN

Facies and Facies associations



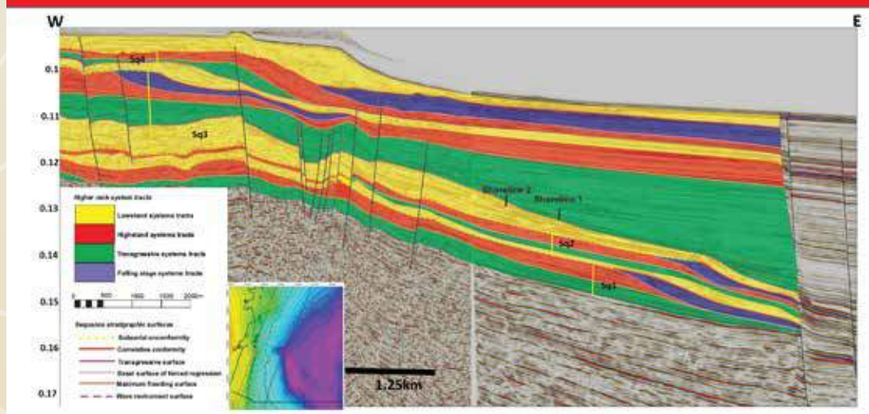
Fa1; Shelf margin, parallel reflectors, turbidites.

Fa2; Sigmoidal slope clinoforms, turbidites.

Fa3; Sigmoidal to oblique slope clinoforms, turbidites.

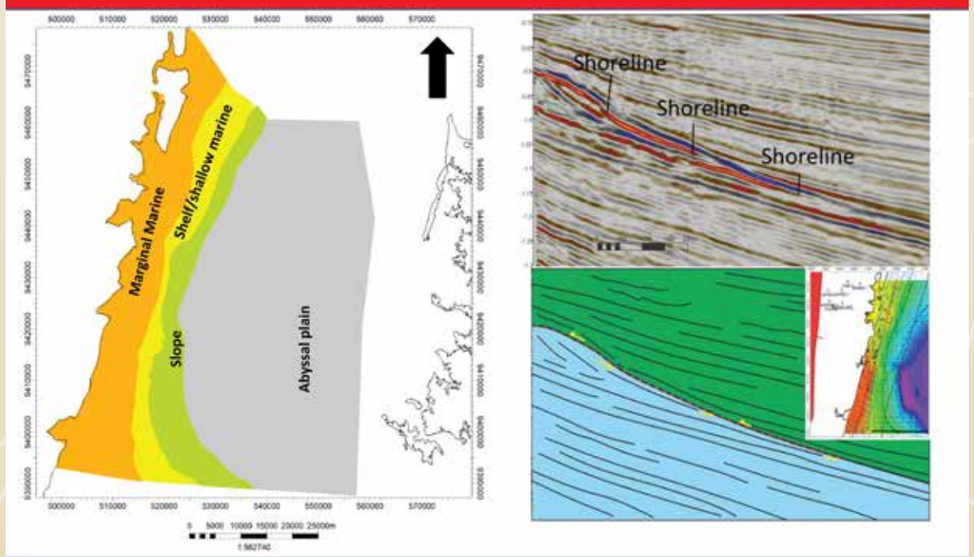
Fa4; Parallel topset deposits.

Sequence stratigraphy



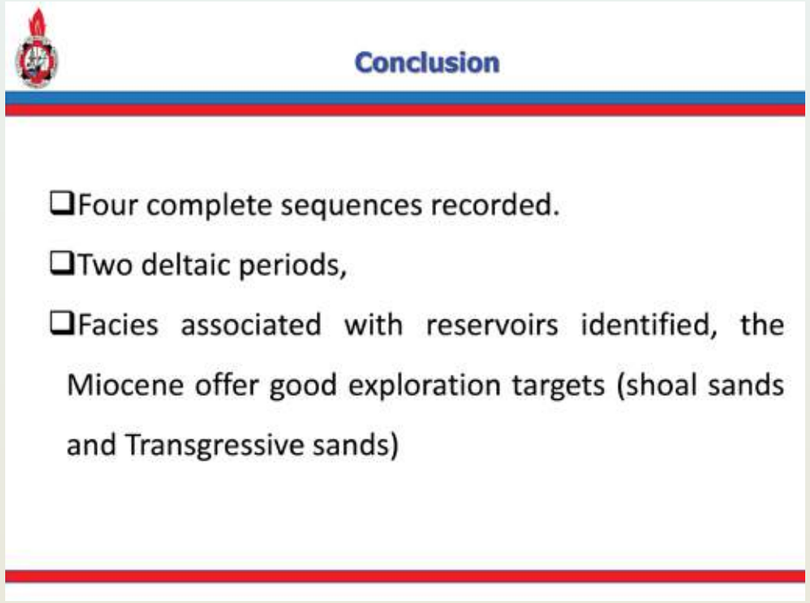
- ❑ Four complete sequences identified
- ❑ Unconformities and correlative conformities as bounding surfaces
- ❑ Shoreline variation through time

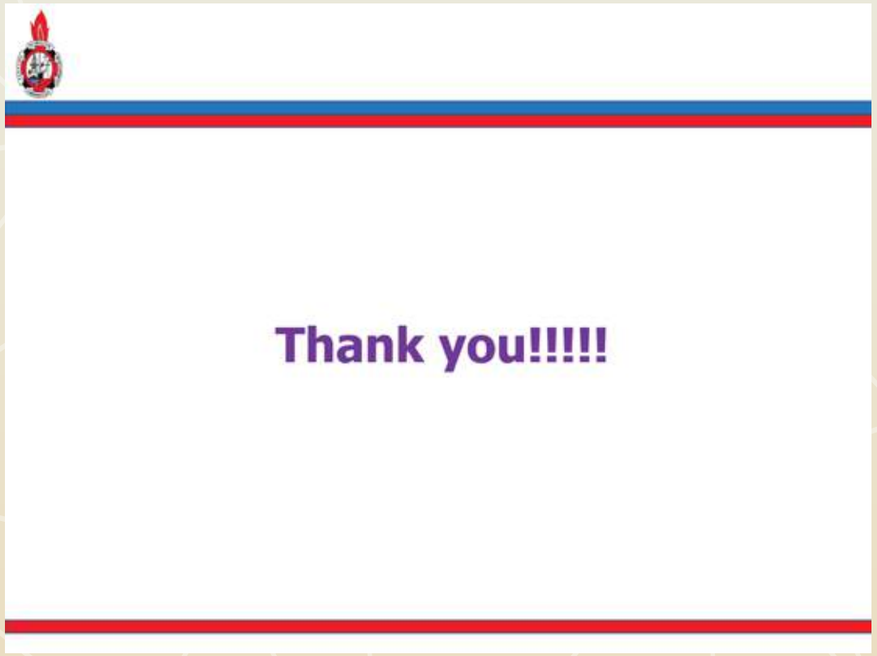
Palaeogeographic maps



IBRAHIM RUTTA

HIGH RESOLUTION SEQUENCE STRATIGRAPHIC ANALYSIS OF MIOCENE TO PLIOCENE DELTAIC SYSTEMS OF TANGA BASIN





JOHANES KAKOKI

PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

JOHANES KAKOKI

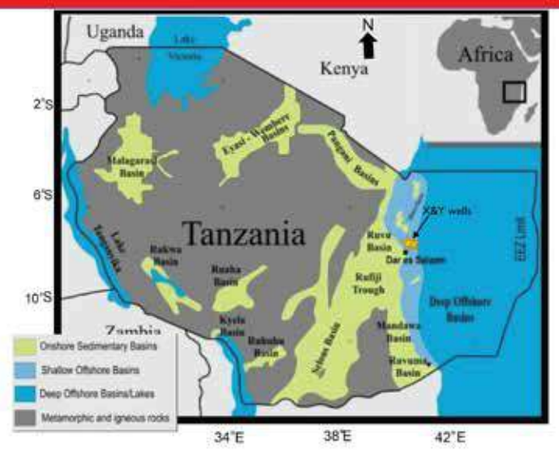
PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Objectives

This study aimed at using palynoflora to assess:

- Chronostratigraphy.
- Palaeoenvironment.
- Sedimentation rate.
- Thermal maturity.

The Study Area



Wells X and Y are:

- Located in the Tanzanian shallow offshore
- 19 km from the shoreline

JOHANES KAKOKI

PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Regional Stratigraphy & Tectonic History

Three major tectonic events:

1. **Permo-Triassic rifting stage.**

2. **The Mesozoic break-up of Gondwana.**
   - Opened the Somali Basin.
   - The movement of Madagascar from the East African coast started.

3. **The Cenozoic East African rift systems (EARS).**

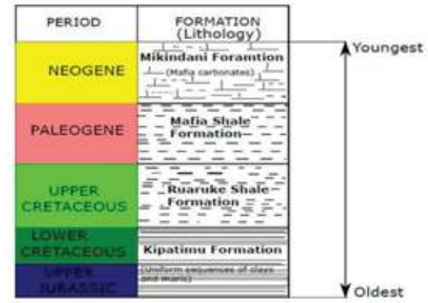
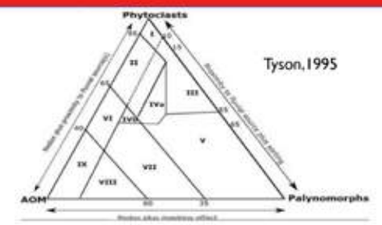


Figure 2: Regional Stratigraphy

(After Kent et (1971), Mpanda (1997) & Mkuu (2018).

Methodology

- Total No. of samples: 30 cuttings.
- Palynomorphs count per sample: 150
- Palynofacies count per sample: 100
- Age defining fossil group: Dinocysts
- Zonation scheme: Williams et al. (2004).



Tyson, 1995

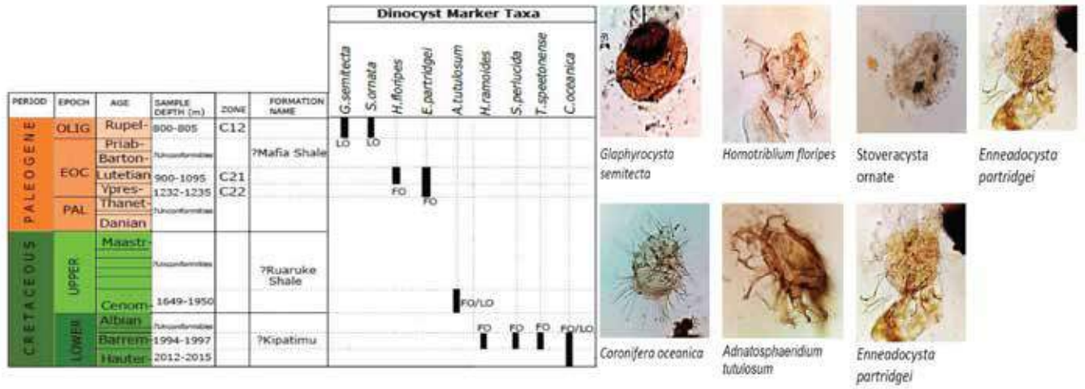
NAME OF SPORE COLOUR	SCI	COLOUR	THERMAL MATURITY
Pale yellow	1		
Pale yellow-lemon yellow	2		Immature
Lemon yellow	3		
Golden yellow	4		Meture Main phase of liquid hydrocarbon generation
Yellow orange	5		
Orange	6		
Orange brown	7		
Dark brown	8		Over mature Dry gas or Barren
Dark brown-black	9		
Black	10		

Traverse, 2008

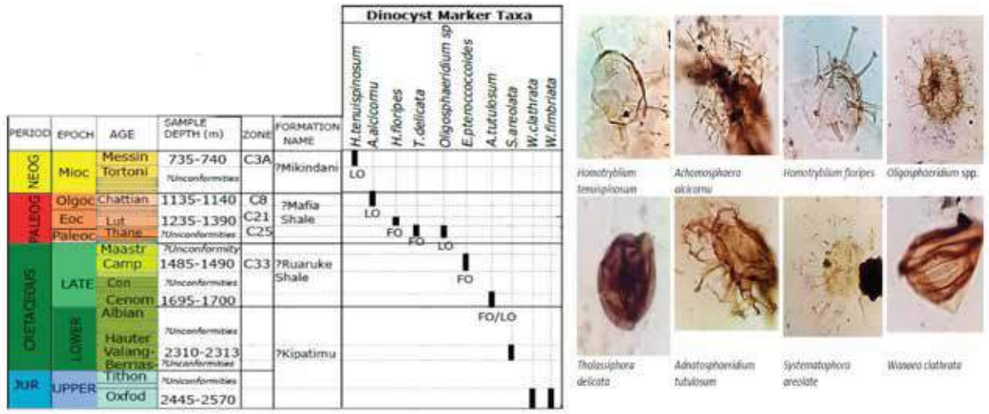
JOHANES KAKOKI

PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Age determination in well X



Age determination in well Y



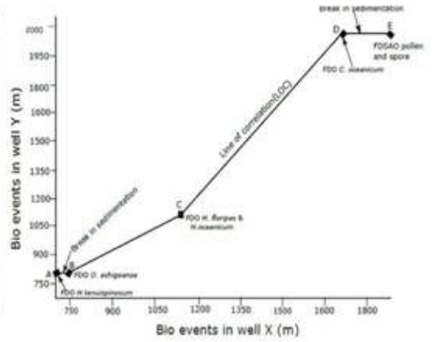
JOHANES KAKOKI

PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Correlation of bio events

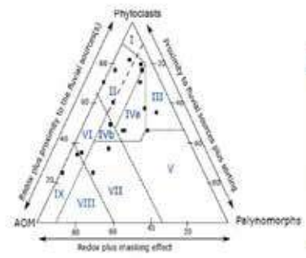
BIO EVENT	DEPTH IN WELL X (m)	DEPTH IN WELL Y (m)
FDO *Homotryblium tenuispinosum*	704	805
FDO *Operculodinium echigoense*	740	805
FDO *Homotryblium floripes*	1140	1095
FDO *Homotryblium oceanicum*	1140	1095
FDO *Coronifera oceanica*	1700	2015
FDSAO pollen and spore	1875	2015

Correlation: Six common bio-events in X and Y wells

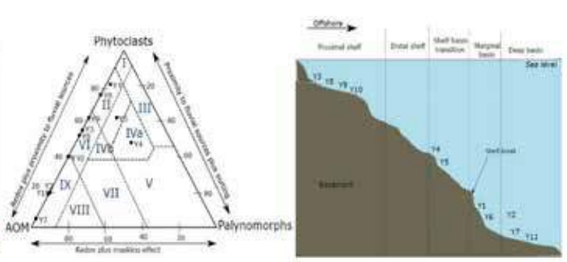


Paleoenvironments

Paleoenvironments based on palynofacies-Well X



Paleoenvironments based on palynofacies –Well Y



JOHANES KAKOKI

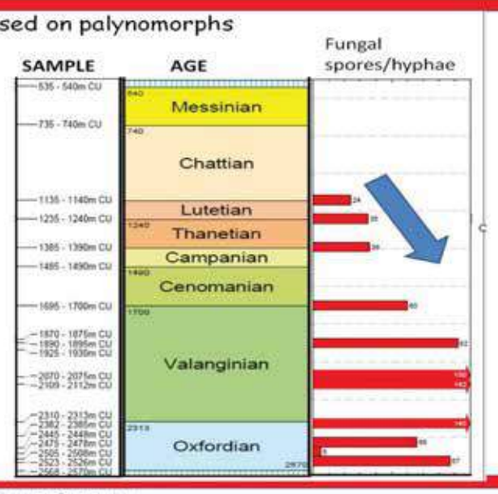
PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Paleoenvironments

Palaeoenvironments: Based on palynomorphs

- ***Apectodinium homomorphum***: *Hot climate signal.*

- ***Pediastram* algae genus**: Fresh water input signal.



Thermal maturity

Thermal maturity for well X

Sample ID	Depth interval (m)	Spore color & (SCI Value)	Spore image	Thermal maturity
X13	2310-2313	Orange brown (SCI 7)		Mature
X14	2382-2385	Orange brown(SCI 7)		Mature
X15	2445-2448	Orange brown (SCI 7)		Mature
X16	2475-2478	Dark brown-black(SCI 9)		Over mature

Spore color chart (Traverse, 2008)

NAME OF SPORE COLOUR	SCI	COLOUR	THERMAL MATURITY
Pale yellow	1		Immature
Pale yellow-lemon yellow	2		
Lemon yellow	3		
Golden yellow	4		Mature Main phase of liquid hydrocarbon generation
Yellow orange	5		
Orange	6		
Orange brown	7		
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Black	10		

ANNEX | EXPLORATION

JOHANES KAKOKI

PALYNOLOGICAL INVESTIGATION OF THE UPPER JURASSIC TO CENOZOIC SEDIMENTS FROM OFFSHORE, SOUTHERN TANZANIA

Summary

- **Well X age**: Oxfordian –Messinian
- **Well Y age**: Hauterivian-Rupelian.
- **Palaeoenvironments**: Proximal shelf-deep marine, oxic, dysoxic-anoxic ,type III and IV gas-prone kerogen.
- **Correlation**: Changing sedimentation rates & condensed sections.
- **Thermal maturity**: Mature to Over-mature.

Thank You Ahsante sana

JOSHUA ATUTA

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT

By
Joshua Atuta

EAPCE'25

OUTLINE

1. Overview and objectives
2. Methodology
3. Results
4. Conclusion
5. Business Opportunity

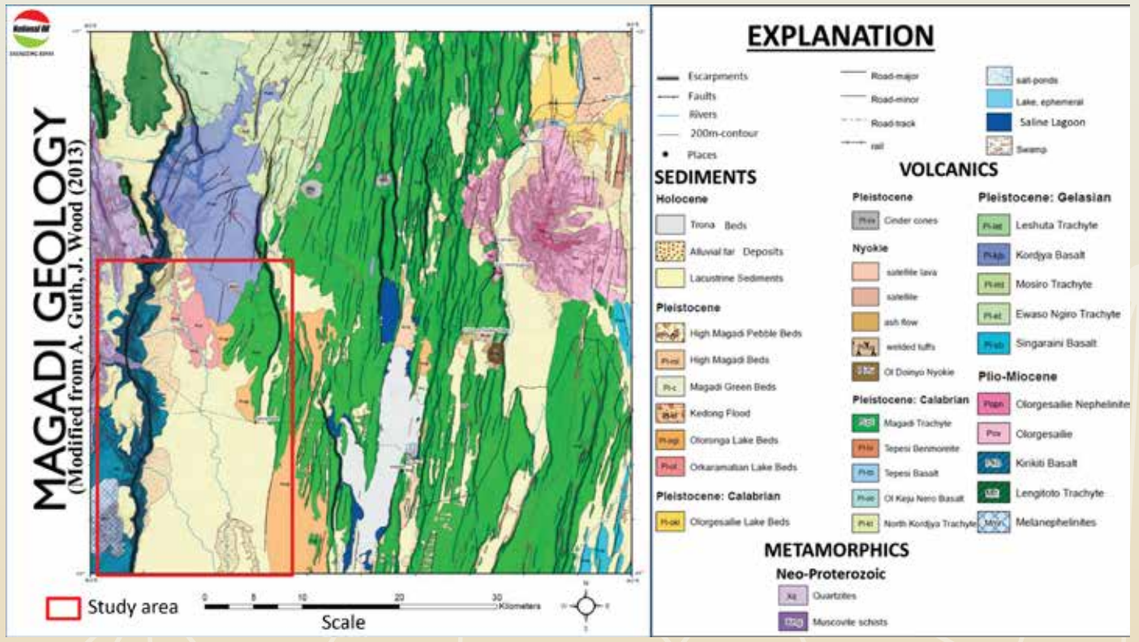
ANNEX | EXPLORATION

JOSHUA ATUTA

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT

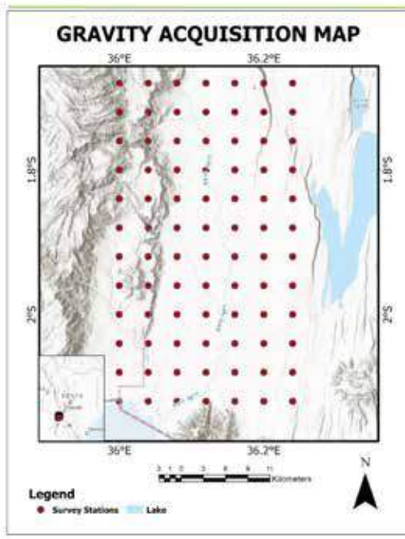
OVERVIEW AND OBJECTIVE

- Qualitative and quantitative gravity data interpretation require Simple Bouguer gravity anomaly to be disintegrated to isolate gravity effects of smaller, localized mass distributions (residual) and widespread and deep-seated mass distributions (regional).
- Because of non-uniqueness and subjective nature of the schemes, various Geosoft Oasis Montaj Schemes are used to calculate regional and residual anomalies in Magadi Basin (less effective seismic survey area).
- The Volcano-Tectonic and Sedimentation process of Kenyan rift which encompasses the Magadi basin are responsible for geomorphic and geologic evolution of the area

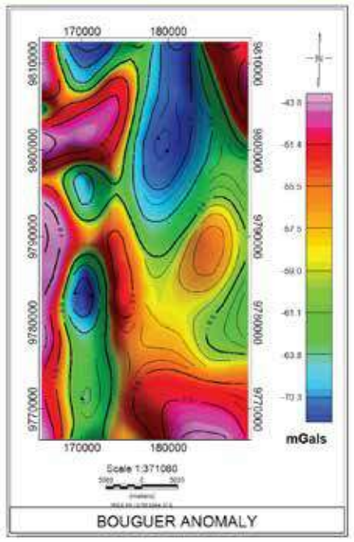


JOSHUA ATUTA

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT



Acquisition interval =3000m



METHODOLOGY

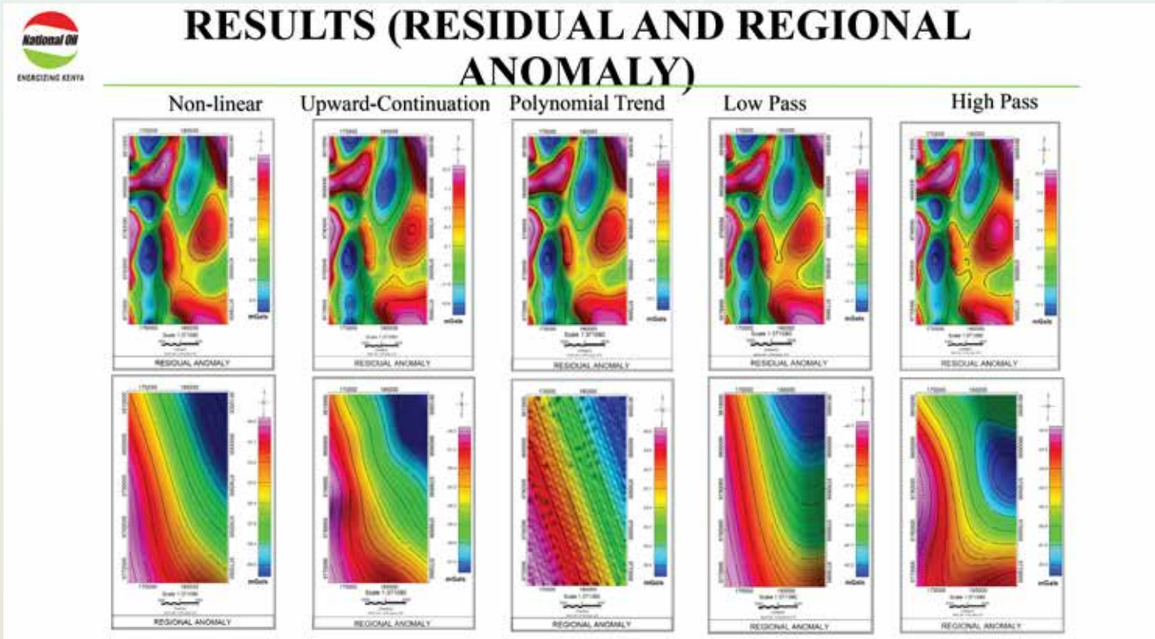
- Since none of the schemes can be demonstrated to be superior to the other, comparisons have been made to establish the best suited scheme that represent the residual anomaly of the area under study for.

- The following geosoft oasis montaj schemes are applied on Bouguer Anomaly grid of the Magadi area to approximate residual and regional anomaly.

1. Non-Linear (Gaussian) filter
2. Polynomial Trend
3. Upward-Continuation
4. Low-pass filter
5. High-pass filter

JOSHUA ATUTA

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT



CONCLUSION

- Bouguer gravity anomaly require to be disintegrated into its residual and regional geologic effects sources for qualitative gravity data interpretation.

- Non-linear filtering scheme is reliable for gravity data decomposition because it is easy to determine its cut-off length by virtual inspection of the data.

- These schemes are essentially non-unique and subjective, hence geophysicists are required to apply various schemes and make decision on the best for the area under study.

JOSHUA ATUTA

SIMPLE BOUGUER GRAVITY ANOMALY DISINTEGRATION: REFINING SUBSURFACE EXPLORATION FOR PETROLEUM IN KENYA'S RIFT

BUSINESS OPPORTUNITY

- **Enhanced Petroleum Exploration Success Rates:** Reducing uncertainties in reservoir identification.
- **Consulting and Technology Services:** National Oil Corporation of Kenya specializing in geophysical data processing and interpretation can provide valuable services to interested oil and gas companies.
- **Expansion into Underexplored Basins:** Improved gravity-based exploration can drive interest in regions previously overlooked due to less effective seismic survey.

National Oil

THANK YOU

KAWI Complex, Popo Lane, Off Red Cross Road, South C, Nairobi Kenya.
P.O. Box 58567, 00100 Nairobi, Kenya
Telephone: +254-20-6952000 | Mobile: 0734-333000 / 0722 203 748 / 0726 610 102
Email: upstream@nockenya.co.ke | Website: www.nationaloil.co.ke

www.nationaloil.co.ke

INNOCENT MVAMBA

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

TANZANIA PETROLEUM DEVELOPMENT CORPORATION (TPDC)

Directorate of Exploration, Development and Production (DEDP)
A Palynological investigation of the Late Cretaceous sediments from Nangurukuru Formation of the southern coastal Tanzania.

Objectives of the Study

- Describes and identify all palynomorphs
- Biostratigraphic analysis of the strata- Relative age dating.
- Palynofacies analysis to determine palaeoenvironments
- Determine thermal maturity of the sediments by using palynomorphs

INNOCENT MVAMBA

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

MATERIAL AND METHODS

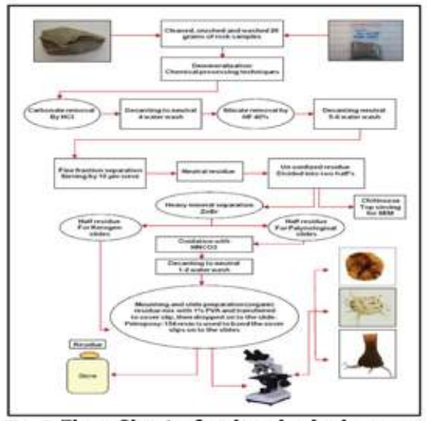


Fig. 3 Flow Chart of palynological process

- 35 core samples were selected from Tanzania Drilling Project (TDP), 21 & 24
- The 2007 Tanzania Drilling Project involved the drilling of shallow biostratigraphic boreholes in coastal southern Tanzania (Kilwa and Lindi area).

Stratigraphic Sequence of Kilwa Group

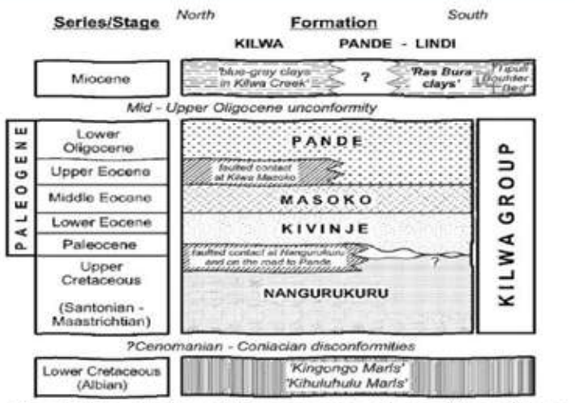


Fig 1. The stratigraphic sequence of the Kilwa Group (Nicholas et al, 2006)

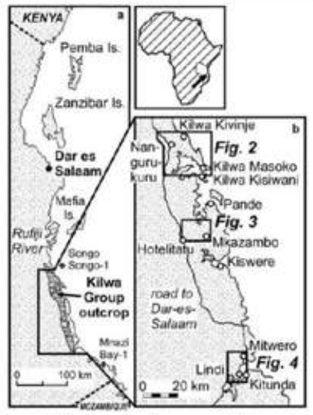


Fig 2 Geological map of the study area (Nicholas et al, 2006)

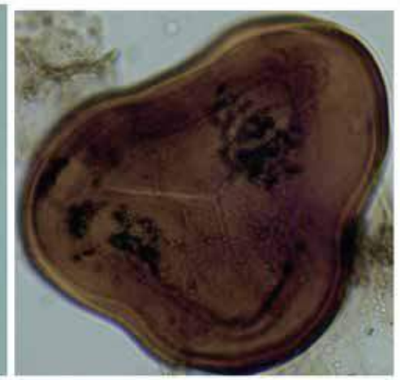
ANNEX | EXPLORATION

INNOCENT MVAMBA

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

RECOVERED PALYNOMORPHS IN TDP SITES 21& 24

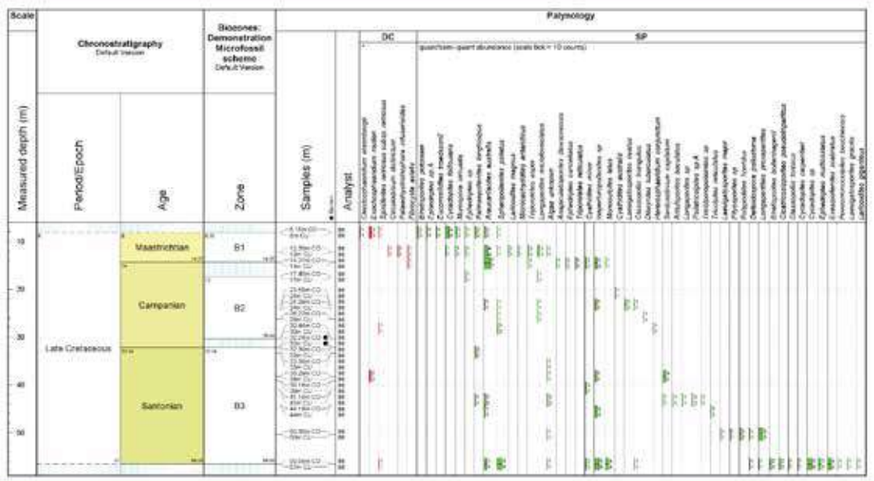
Spiniferites ramosus x1000



Cyathidites australis x1000

Classopollis sp x1000

PALYNOSTRATIGRAPHY OF TDP SITE 21



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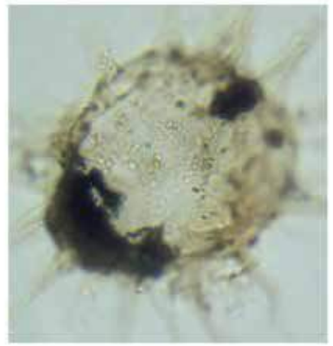
A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

Palynomorphs from TDP site 21

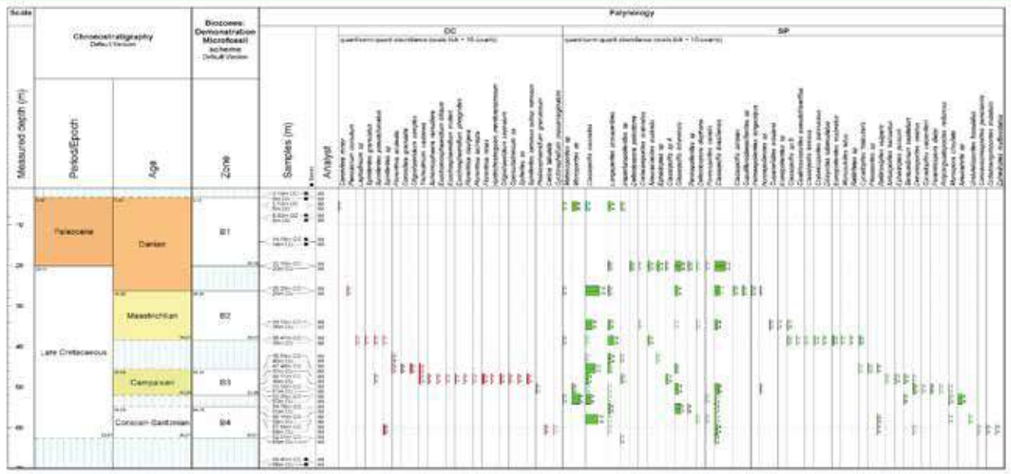
Ephedripites jansonii; x1000

Biretisporites boltenhagenii



Fibrocysta axialis x1000

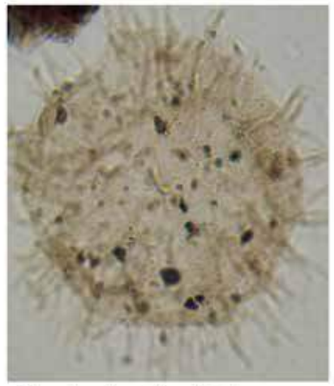
PALYNOSTRATIGRAPHY OF TDP SITE 24



INNOCENT MVAMBA

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

Palynomorphs from TDP site 24



Exochosphaeridium bifidum x1000

Classopollis brasiliensis x1000

PALYNOFACIES ANALYSIS

- Combaz(1964) defined the term 'palynofacies' as "all organic matter present in palynological assemblages
- Palynofacies analysis was based on counting up to 200 pieces of the organic matter (including palynomorphs) on the slides using transmitted light
- The formation shows similar trends of organic facies

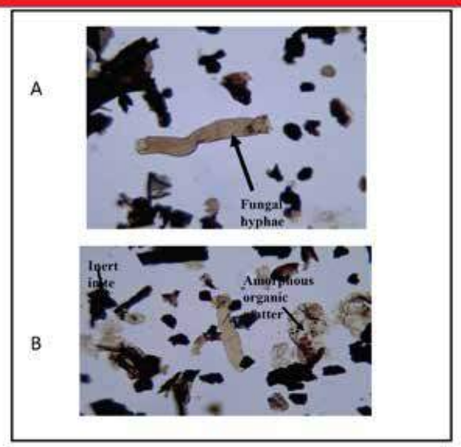
INNOCENT MVAMBA

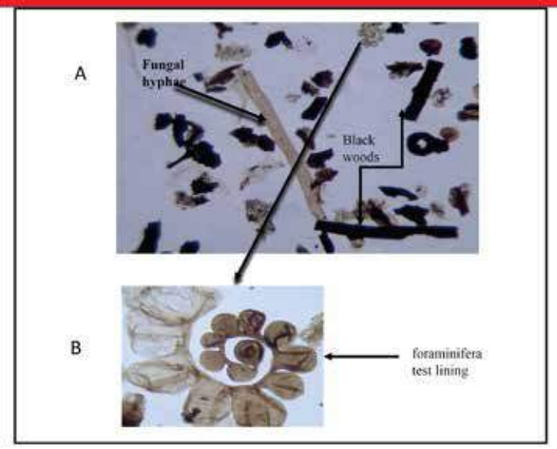
A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

PALYNOFACIES IN THIS FORMATION DIVIDED INTO;

- Inertinite (black wood which is angular and without internal structures);
- Unstructured organic matter (Amorphous Organic Matter);
- Plant debris (wood remains, tracheids other plant tissue materials, cuticle);
- Terrestrial palynomorphs (pollen/spores, fungal hyphae and fungal spores and fruitification)
- Marine palynomorphs (dinoflagellates cyst and foraminifera test linings).

PALYNOFACIES ANALYSIS CONT…



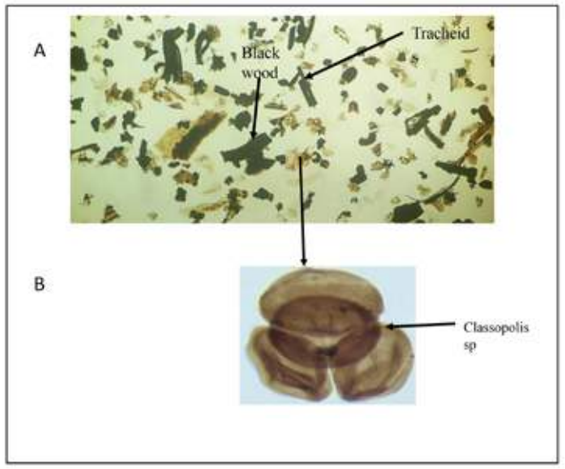


INNOCENT MVAMBA

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

PALAEOENVIRONMENTAL INTERPRETATION

- Vakhremeev (1981) considered that the high abundance of *Classopollis* spp represents deltaic-nearshore depositional environments
- Nangurukuru Formation, that shows high abundance of *Classopollis* spp throughout the formation, may indicate that these sediments were deposited in a deltaic-near shore depositional environment
- Well preserved plant tracheids and black wood suggests that the debris were concentrated at a river mouth and near shore environments before the sediments were deposited (Cross *et al,* 1966).
- Amorphous organic indicating marine anoxic condition.
- The presence foraminifera test lings indicate shallow open marine depositional environments (Tschudy 1969).



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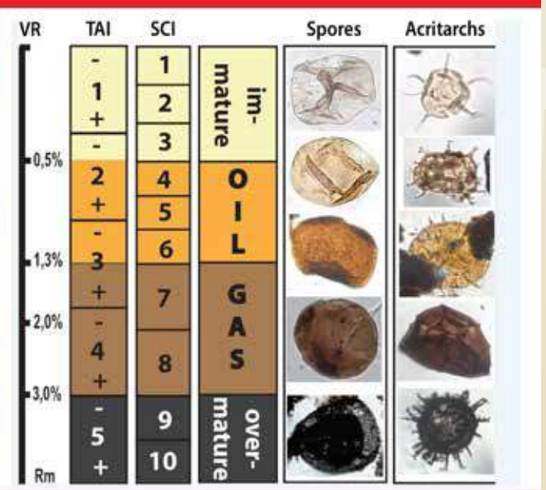


INNOCENT MVAMBA

A PALYNOLOGICAL INVESTIGATION OF THE LATE CRETACEOUS SEDIMENTS FROM NAGURUKURU FORMATION OF THE SOUTHERN COSTAL TANZANIA

CONCLUSION

- 112 palynomorphs species from marine and terrestrial environments were identified and described.
- Palynomorphs were used to erect biozonation.
- Based on the palynomorphs analyzed from TDP sites 21 and 24 the age of the sediments ranges from Coniacian- Maastrichtian(Late Cretaceous).
- The high diversity of terrestrial pollen and spores compared to that of marine dinoflagellate cysts and foraminifera test linings indicates...
- Deposition Environments is Deltaic- near shore to open marine environments

Thank You

AHSANTENI SANA!

Karibuni TPDC

MUSSA MATHEW NALOGWA

UNRAVELLING HYDROCARBON MICROSEEPAGE: EVIDENCE OF PETROLEUM SYSTEMS IN A SEMI-ARID RIFT SETTING

11TH EAST AFRICAN PETROLEUM CONFERENCE AND EXHIBITION 2025 (EAPCE'25)

05th – 07th March 2025

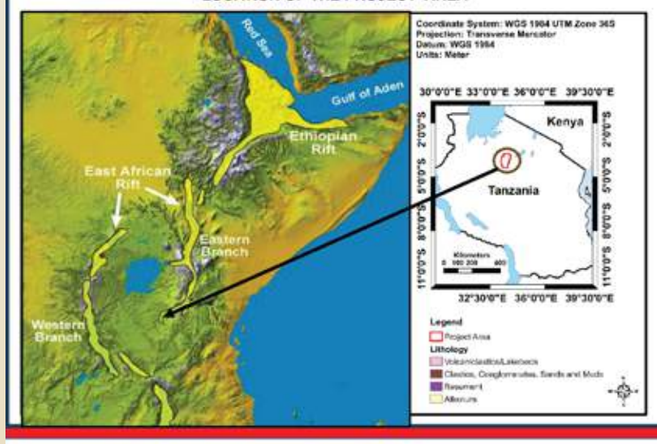
Unravelling Hydrocarbon Microseepage: Evidence of Petroleum Systems in a Semi-arid Rift Setting

Author: Mussa Mathew Nalogwa (Geophysicist)

Co-Author: Paul Faustine Matumbi

OBJECTIVE AND STUDY SETTING

LOCATION OF THE PROJECT AREA

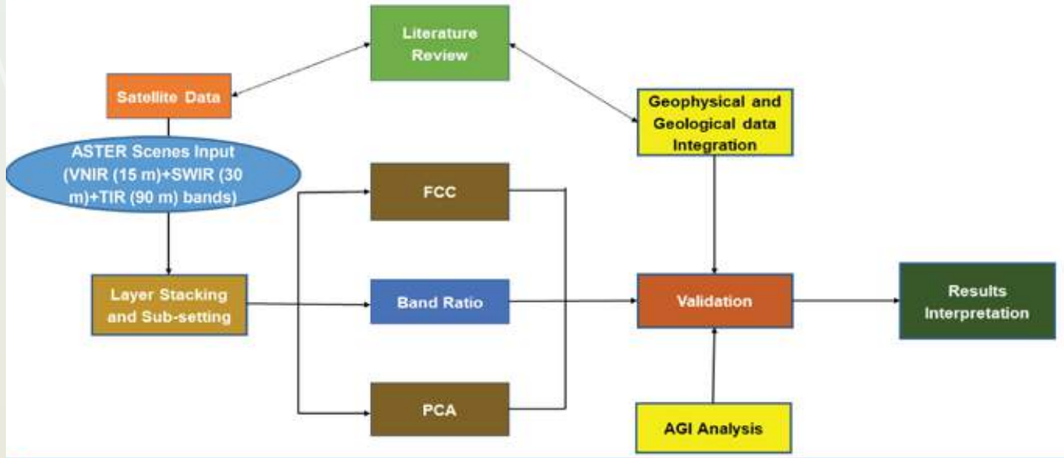


- **Archean**
  Basement (BIF, granites and gneisses).
- **Miocene:**
  Syn-rift clastic package
  (Conglomerate, sands, silts and muds).
- **Pleistocene**
  Post-rift package (Volcaniclastics)
- **Holocene**
  Sediment flats (silts, carbonates, sands, mud)

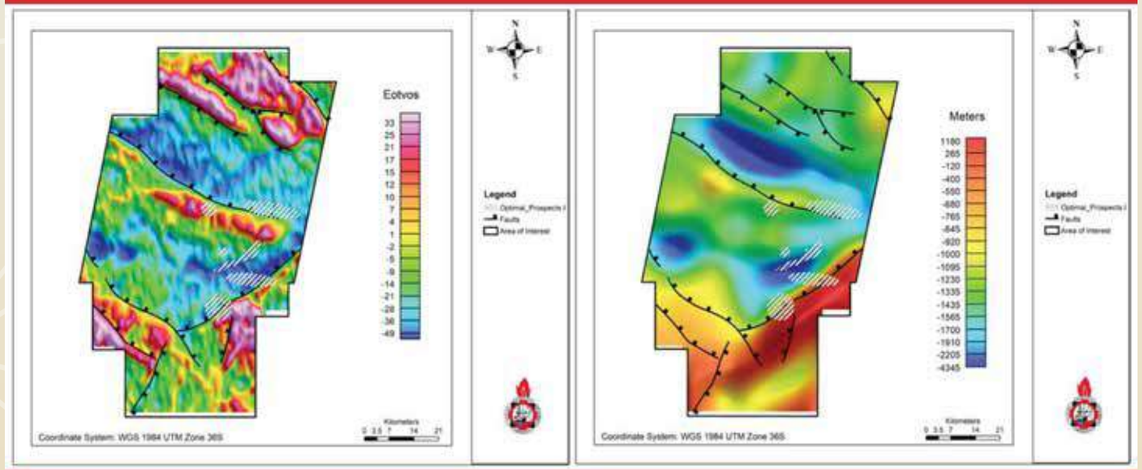
MUSSA MATHEW NALOGWA

UNRAVELLING HYDROCARBON MICROSEEPAGE: EVIDENCE OF PETROLEUM SYSTEMS IN A SEMI-ARID RIFT SETTING

METHODOLOGY



RESULTS AND DISCUSSION



MUSSA MATHEW NALOGWA

UNRAVELLING HYDROCARBON MICROSEEPAGE: EVIDENCE OF PETROLEUM SYSTEMS IN A SEMI-ARID RIFT SETTING

CONCLUSIONS

- The AOI demonstrated alterations in Ferrous, Kaolinite, and Carbonate minerals, suggesting the presence of hydrocarbon micro-seepages in the Basin.
- The hydrocarbon microseepages prospects were found near key structural features associated with hydrocarbon generation, such as major bounding faults and deeper basin areas.
- To validate the existence of petroleum system through hydrocarbon microseepages identified via ASTER-based remote sensing analysis, the AGI technique was utilized, uncovering thermogenic signatures within the designated Area of Interest (AOI).

POLICY IMPLICATION

- Tanzania's energy policy aims to ensure reliable, affordable, and sustainable energy for national development. The policy also aims to attract foreign investment in the energy sector, create jobs, increase government revenue, and stimulate economic growth.
- Eventually, if the discovery is made, the project will significantly contribute to achieving the stated objectives by enhancing Tanzania's domestic oil and gas production, decreasing reliance on imported energy, and strengthening the country's energy security.

MUSSA MATHEW NALOGWA

UNRAVELLING HYDROCARBON MICROSEEPAGE: EVIDENCE OF PETROLEUM SYSTEMS IN A SEMI-ARID RIFT SETTING

BUSINESS OPPORTUNITY

- Exploration and production companies may conduct activities like seismic surveying, well drilling, and managing oil and gas fields.
- Engineering and construction firms design, build, and maintain energy infrastructure, including pipelines, refineries, and other facilities.
- Service providers such as logistics, catering, and security firms may support exploration and production companies.
- Technology firms can find opportunities in Tanzania's energy market, as the country modernises its infrastructure.

RONALD KAGGWA

INTEGRATED PETROPHYSICAL ANALYSIS AND RESERVOIR CHARACTERIZATION

UNOC
UGANDA NATIONAL OIL COMPANY

INTEGRATED PETROPHYSICAL ANALYSIS AND RESERVOIR CHARACTERIZATION

KASURUBAN CONTRACT AREA (KSCA)

Ronald Kaggwa

East African Petroleum Conference (EAPC,25)

4TH – 07TH MARCH 2025

UNOC

Objectives of the Study

The Kasuruban Contract area (KSCA) covers an area of approximately 1,285 km^2. It is located in the northern Lake Albert sub-basin, south of the Tilenga Field Development Area and northeast of the Ngassa exploration license

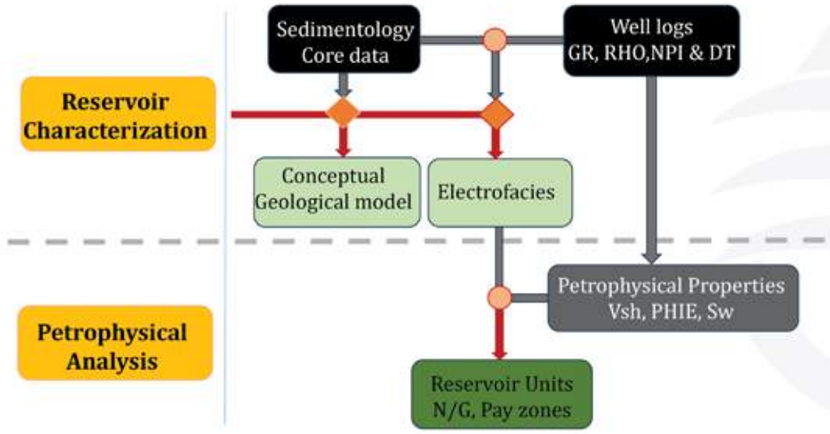
- **Major objective:** To refine the petroleum potential of the KSCA
  - Reservoir characterization to determine the sedimentology, facies and depositional environment
  - Petrophysical interpretation to determine the reservoir petrophysical parameters.

2

RONALD KAGGWA

INTEGRATED PETROPHYSICAL ANALYSIS AND RESERVOIR CHARACTERIZATION

Methodology



Results – Sedimentology & Geological Model

Core Description

Sedimentological description of Taitai-1A at a 1/50 scale

Facies: Gneisses, conglomerates, gravels, sands, silts and clays.

Environment: Alluvial fan and fan deltas.

Alluvial fan

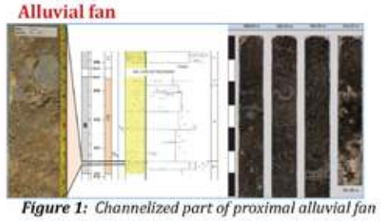


Figure 1: Channelized part of proximal alluvial fan

Fan Delta

Composed mostly of sandstones, fine to medium-grained, in general with a medium to good sorting, and locally bioturbated.

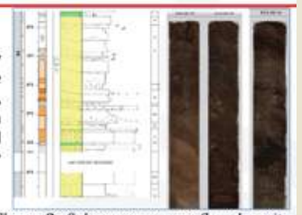


Figure 2: Subaqueaous mass flow deposits

Geological model

- A conceptual geological model in rift context
  - i. **A marginal supply**: Alluvial fan and Fan-delta
  - ii. **An axial supply:** Fluvial river systems, river deltas
  - iii. **A lake system** in depocentre area

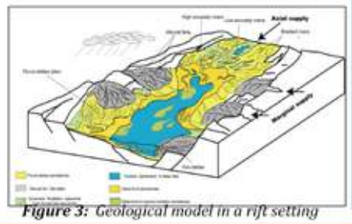


Figure 3: Geological model in a rift setting

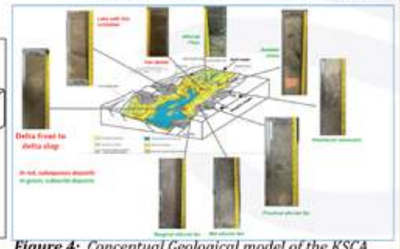


Figure 4: Conceptual Geological model of the KSCA

RONALD KAGGWA

INTEGRATED PETROPHYSICAL ANALYSIS AND RESERVOIR CHARACTERIZATION

Results – Electrofacies Analysis & Well correlation

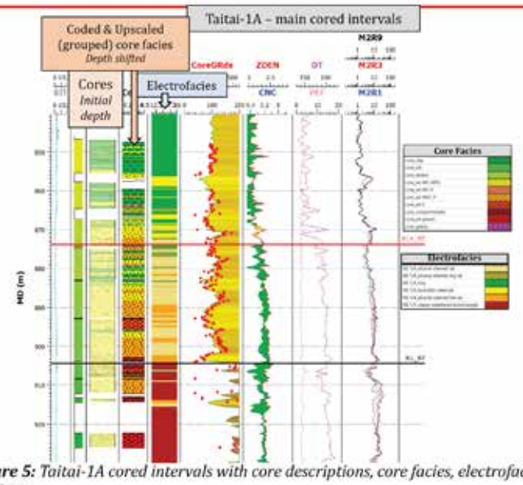


Figure 5: Taitai-1A cored intervals with core descriptions, core facies, electrofacies and logs

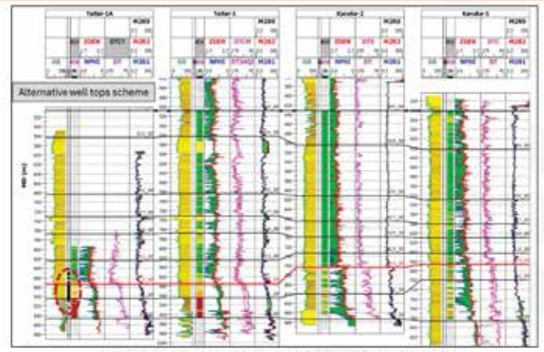


Figure 6: Marker scheme of the 4 wells in the KSCA

Electrofacies analysis

- Identification of the main stratigraphic units
- Redefining well tops and proposing new stratigraphic scheme

Results –Petrophysical Analysis

- Results based on the averages from the wells Taitai-1, Karuka-1, Karuka-2 and Taitai-1A

Cut-offs

- VCL <= 0.5
- PHIE >= 0.1
- Sw <= 0.6

Table 1: Summary of petrophysical properties

	Reservoir				Pay
	Net	N/G	Av Phi	Av Sw	Av Sw
H40	5.9	0.08	0.21	0.86	0.37
H35	13.3	0.11	0.22	0.75	0.12
H30	6.4	0.13	0.17	0.73	0.31
H27	8.7	0.26	0.16	0.43	0.34
H25	6.9	0.13	0.19	0.80	0.14
H15	6.7	0.17	0.20	0.66	0.43
H14	0.8	0.01	0.10	0.49	0.25
H1	4.5	0.06	0.13	0.42	0.22
H0	1.0	0.01	0.04	0.11	0.08

Net-to-Gross increase in the units associated to lake type deposits with generally good porosity

Figure 7: Petrophysical analysis

RONALD KAGGWA

INTEGRATED PETROPHYSICAL ANALYSIS AND RESERVOIR CHARACTERIZATION

SINDI M. GUMHA

ARCHITECTURE OF THE EYASI WEMBERE RIFT BASIN REVEALED FROM SEISMIC DATA

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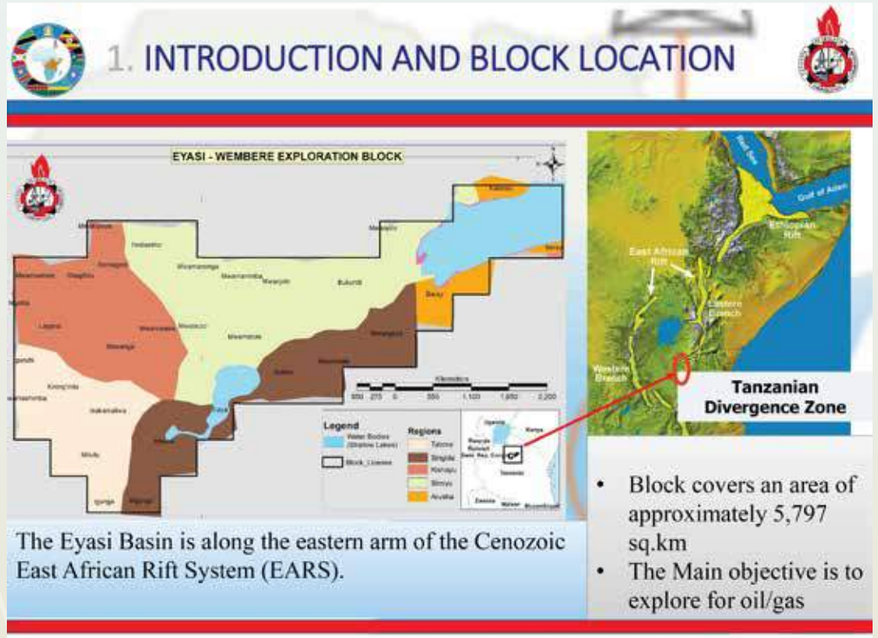

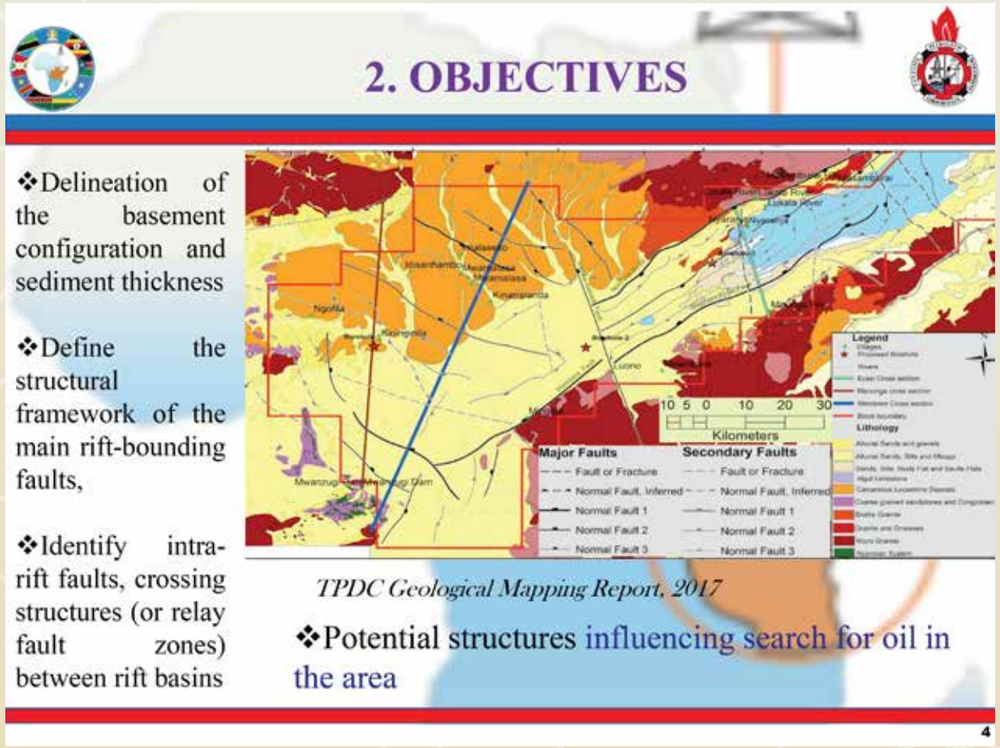

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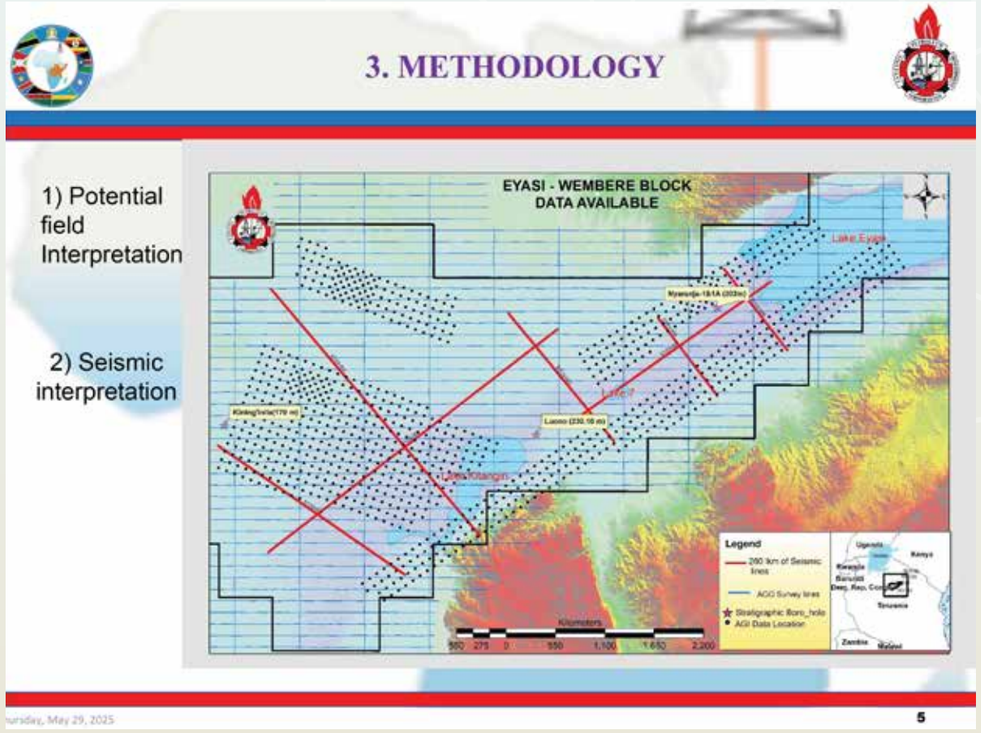

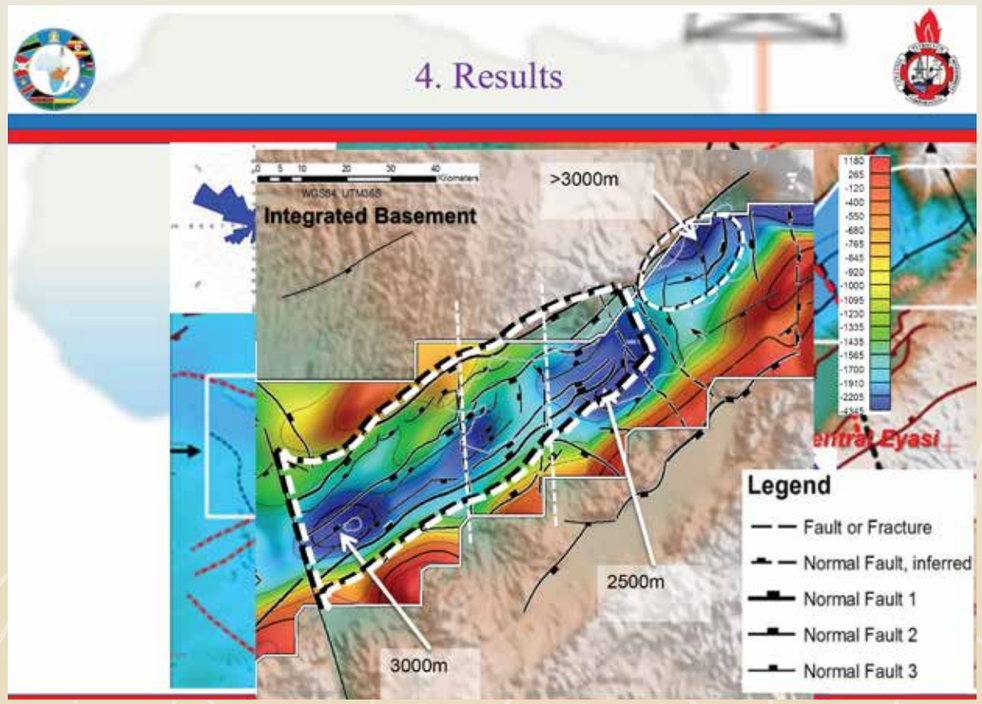

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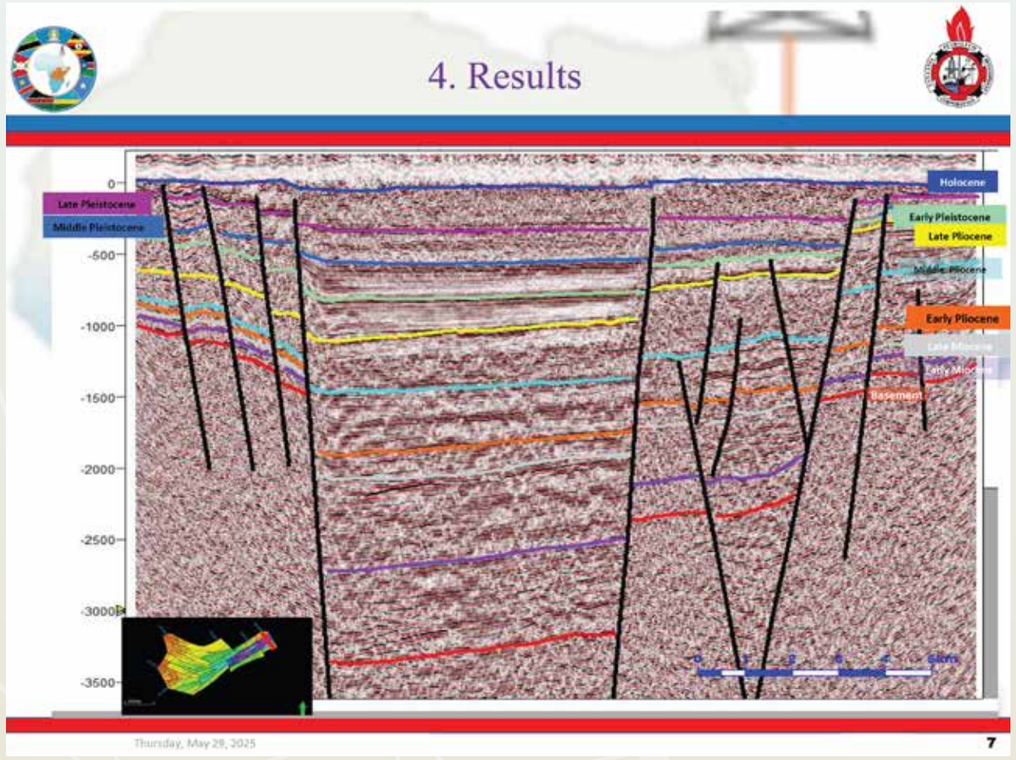

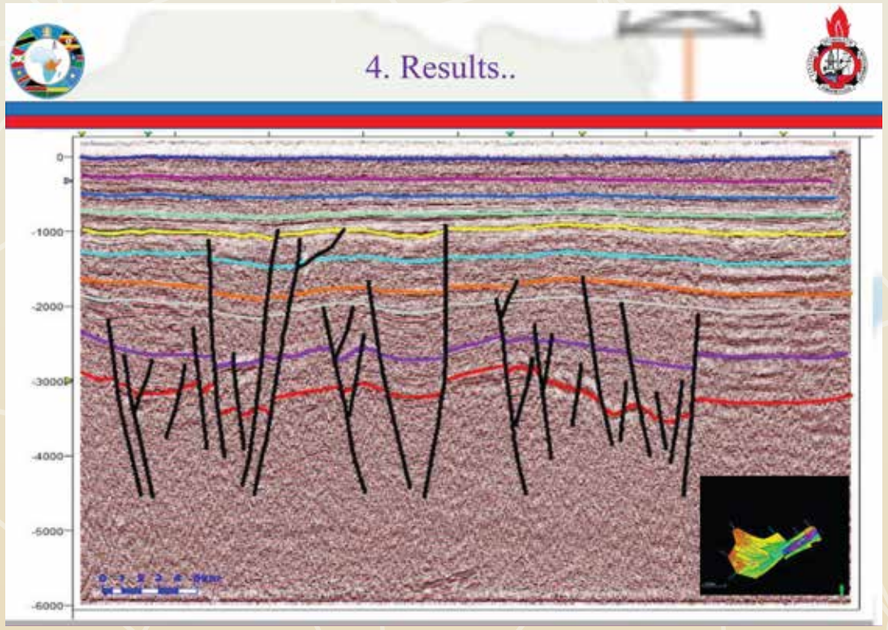

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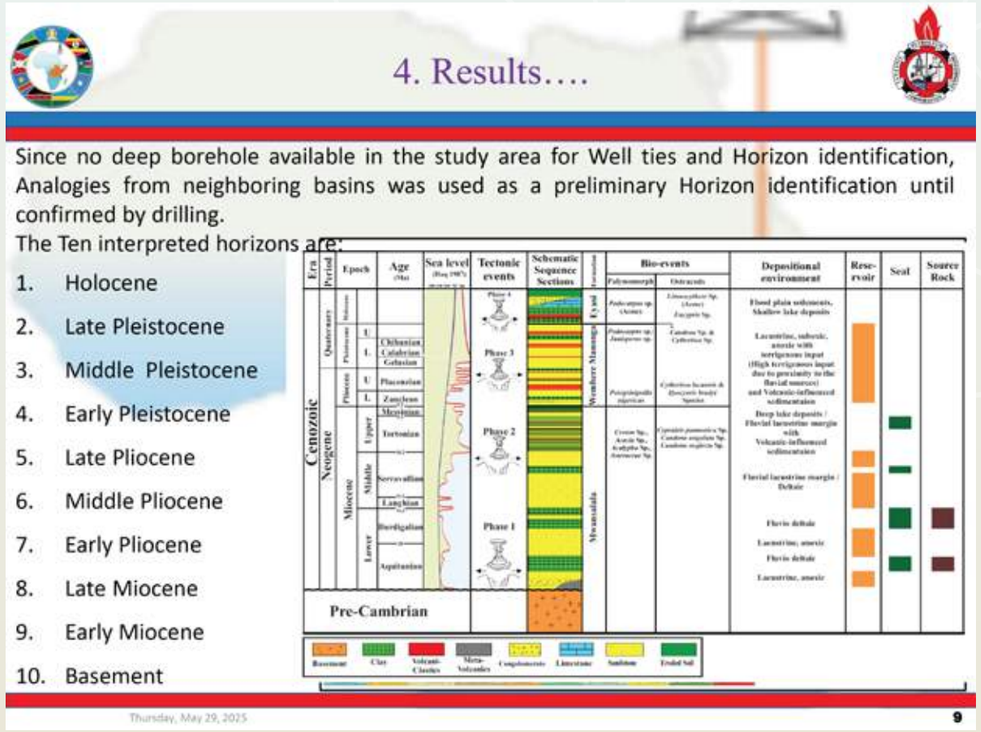

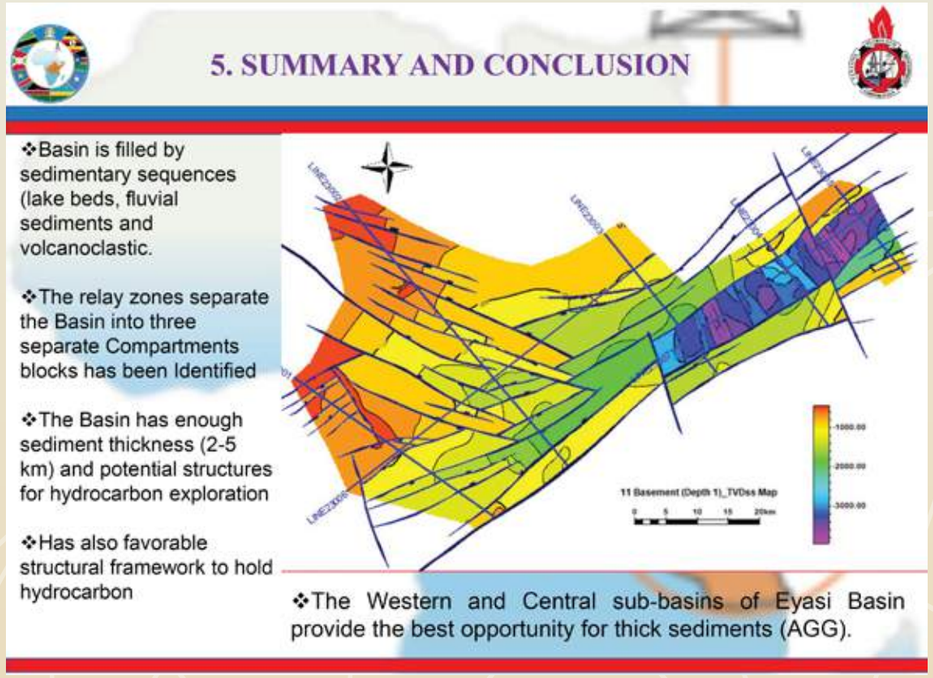

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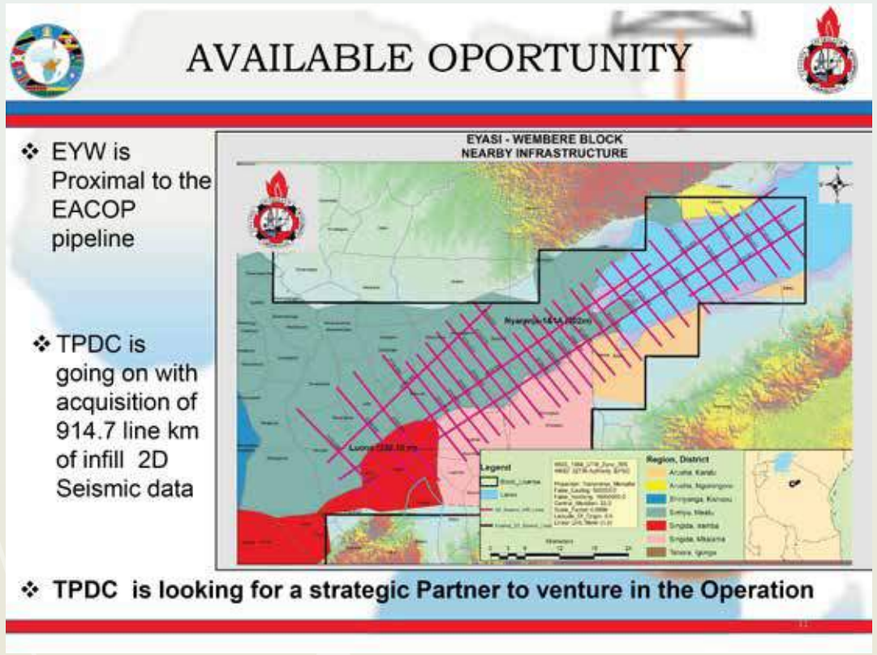
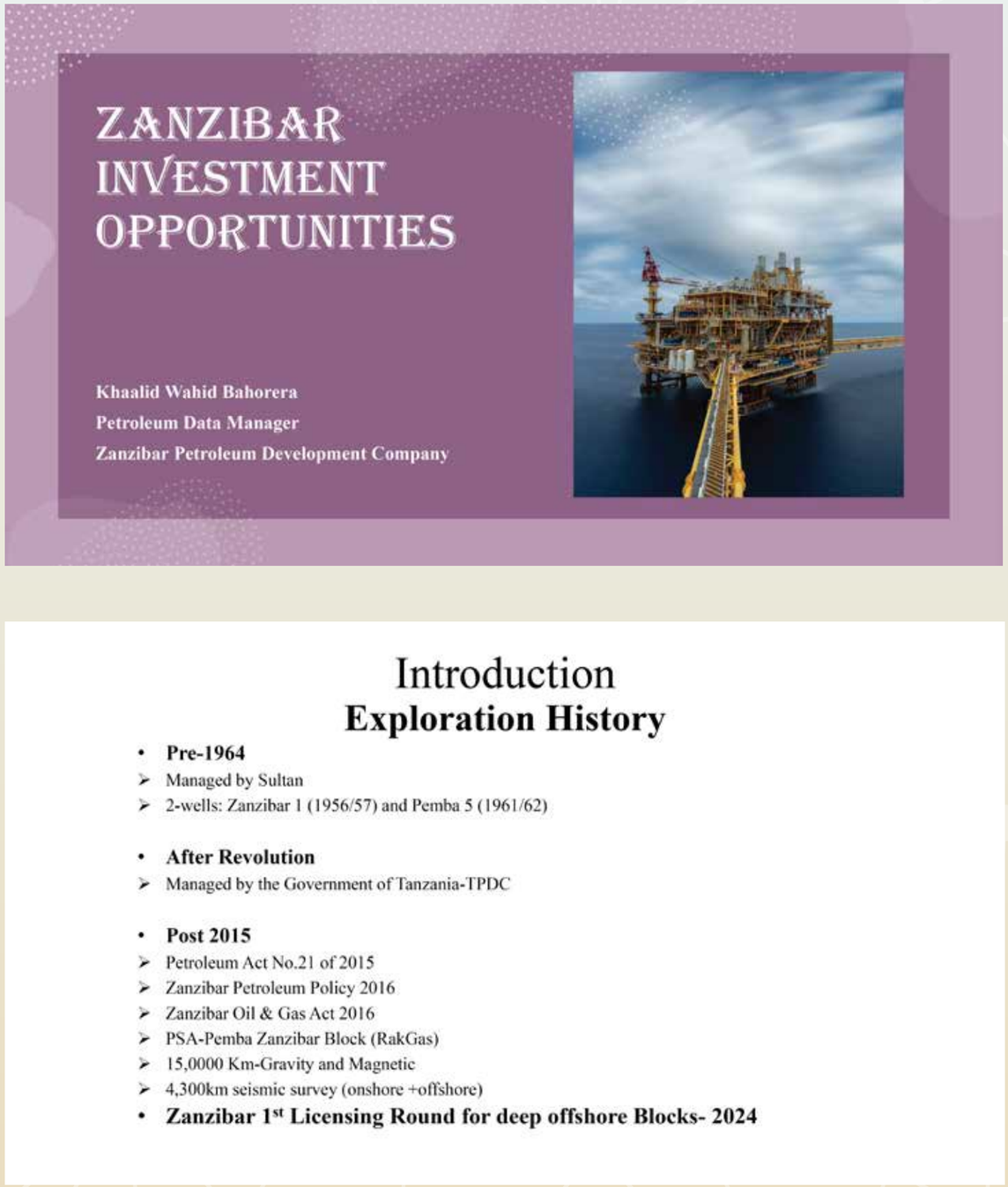


KHAALID WAHID BAHORERA

ZANZIBAR INVESTMENT OPPORTUNITIES



Introduction
Exploration History

- **Pre-1964**
  - Managed by Sultan
  - 2-wells: Zanzibar 1 (1956/57) and Pemba 5 (1961/62)
- **After Revolution**
  - Managed by the Government of Tanzania-TPDC
- **Post 2015**
  - Petroleum Act No.21 of 2015
  - Zanzibar Petroleum Policy 2016
  - Zanzibar Oil & Gas Act 2016
  - PSA-Pemba Zanzibar Block (RakGas)
  - 15,0000 Km-Gravity and Magnetic
  - 4,300km seismic survey (onshore +offshore)
- **Zanzibar 1st Licensing Round for deep offshore Blocks- 2024**

KHAALID WAHID BAHORERA
ZANZIBAR INVESTMENT OPPORTUNITIES

Why to Invest in Zanzibar

- Excellent Geological Promise
- Flexible Fiscal Terms
- Strong Political will to enhance investment.

Geological Information

- Zanzibar sub-basin is located between 4°41' and 6°50* S and between 38°50* and 45° E
- Large geographical area of approximately 120,000 km
- The sub-basin is bounded north by the Lamu Basin
- Mafia sub-basin to the south
- The Indian Ocean to the east &
- The Tanzanian coast to the west.

Conjugate Analogues

- The Lamu Basin which has discoveries shares the similar geological history with the area.
- The Songo Songo and Mnazi Bay gas fields in Southern Tanzania are part of a tectonic belt that includes Mafia, Unguja and Pemba (Zanzibar)
- The cretaceous sands in Mnazi Bay known for good Porosity and Permeability
- Additionally, to the South, Mozambique's Ruvuma Basin which holds 80 TCF of Natural Gas has Geological Similarities to the AOI
- Play in the Zanzibar Region resembles with the recent oil discovery in Namibia and Discovery in Tanzania

ANNEX EXPLORATION

KHAALID WAHID BAHORERA
ZANZIBAR INVESTMENT OPPORTUNITIES

Data Coverage

- **2D Seismic Data**

✓Over 15,000 line km of high 2D seismic data is available (Onshore + Offshore)

- **Well Data**

✓2 Exploratory wells were drilled in the area

✓Both encountered hydrocarbons

Name	TD	Well Logs
Pemba 5	3886m into Late Cretaceous Formation	Gamma Ray Acoustic Log Resistivity SP Sonic Lithology
Zanzibar 1	4383 into a Late Cretaceous Formation	SP Resistivity Lithology

Additional Data

- **Gravity & Magnetic Data**

➢FTG 2017-2018

➢Marine Data 2018-2019

➢Reprocessed-2020

- **Geospatial DataBase**
- **Basin Modelling**
- **IHS Kingdom Project**
- **Other Reports**

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ZANZIBAR INVESTMENT OPPORTUNITIES

- The total Area Available for Oil and Gas operation in Zanzibar covers approximately 43,000km2,
- Divided into 10 Blocks with
- Offshore & Onshore opportunities

Application Procedures.

- Application can be submitted in person to the ZPRA offices Zura House 6the Floor, Nyerere Road Zanzibar.
- For more information, Please Welcome to the Ministry of Blue Economy Booth.

ANNEX EXPLORATION

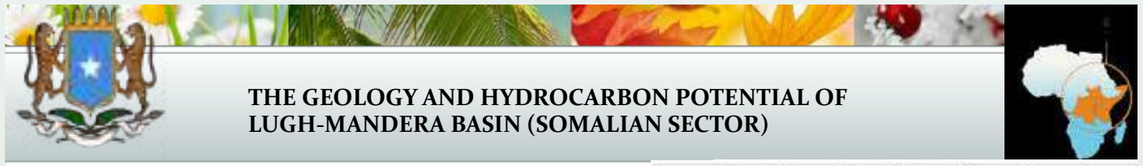
KHAALID WAHID BAHORERA

ZANZIBAR INVESTMENT OPPORTUNITIES

•AHSANTENI SANA

WARSAME ATTEYEH

THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)



CONTENTS:

WARSAME ATTEYEH

THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)

1- OBJECTIVES OF THE STUDY AREA

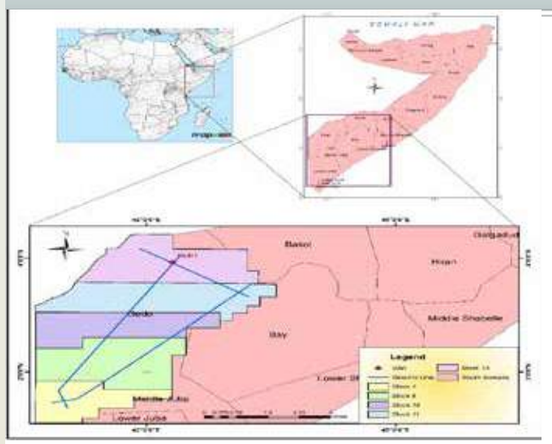


Figure 1.1: Shows location of Lugh-Mandera basin in South western Somalia.

Objectives:

I. To determine the succession of rock units and the types of proven petroleum systems within the basin compared to the neighboring Ogaden basin found in Ethiopia, through interpretation of the seismic sections and well log data.

II. To understand the aspects of structural style (wrench fault tectonics) and it's impact on hydrocarbon entrapment, and delineate the subsurface target horizon in the study area by using (depth maps, thickness maps, and the interpreted fourteen (14) seismic profiles).

III. To evaluate the hydrocarbon potential of the area by creating and analysing burial curves of the source rock intervals of the basin by calculating the TTI values. This enabled to evaluate the source rock potential of the area and estimate the timing of expulsion-migration-entrapment of generated Hcs.

2- REGIONAL GEOLOGY

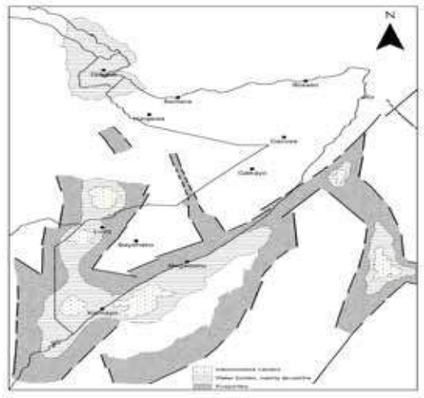


Figure 2.1: Modified Karoo Rift System in East Africa, Madagascar, Socotra, and India (after Bosellini, 1989),

- The general tectonic setting has been one of extension, first the Permo-Triassic karroo rifting, secondly the Jurassic separation of Madagascar and India from Africa along the Indian Ocean coast, and finally the formation of EARS during Oligocene (boseillini, 1992, hunegnaw et al., 1998).
- Basins that have developed as part of a triple-junction rift system during Late Paleozoic-Mesozoic are the Mandera- Lugh Deep, the Calub saddle of the Ogaden Basin, and the Blue Nile rift to the northwest.

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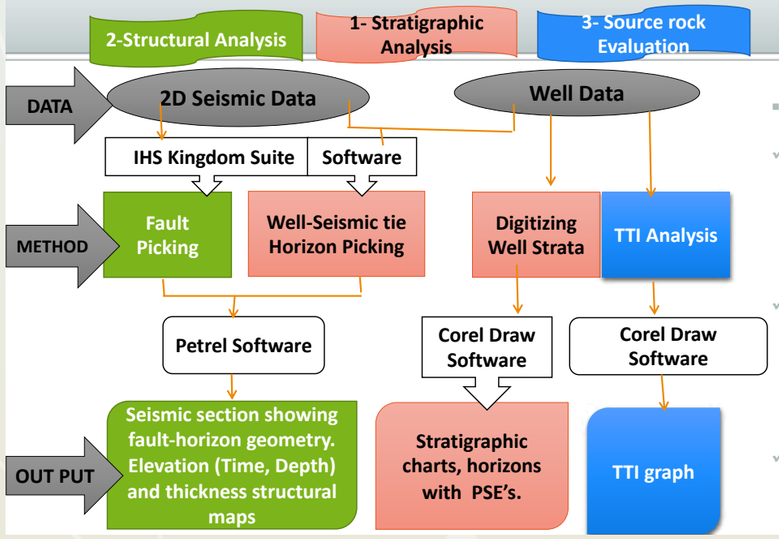
THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)

3- Materials and Methods



Data base (from CGG)

- Onshore area SW Somalia.

✓ Primary well data base
- Hol-1 well data
- Additional well data from reports and articles.

✓ Seismic data base
- 14 profiles onshore 2D surveys from 1972-1973.
- Total distance of about 605 km

✓ Articles / Reports
- published and confidential reports

4.1- Stratigraphic Summary for Hol-1 Well

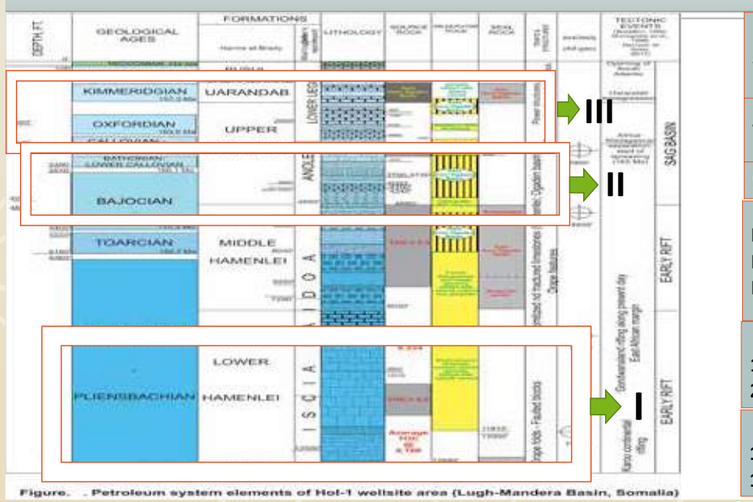


Figure. _ Petroleum system elements of Hol-1 wellsite area (Lugh-Mandera Basin, Somalia)

Age: Cretaceous/ Jurassic

Tectonic Evolution: Extensional Rift

Size: 500 kms by 300 kms

Petroleum Systems:
I. Adigrat-Lower Hamanlai PS .
II. Middle-Upper Hamanlai PS.
III. Uarandab-Upper Hamanlai PS

Proven Play types:
1) Structural traps
2) Stratigraphic traps

Expected Play type:
1) Hydrodynamic trap (Benvenuti et al., 1993)

ANNEX | EXPLORATION

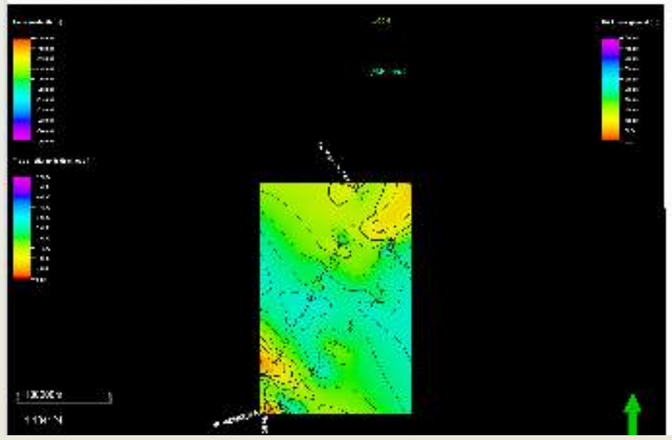
WARSAME ATTEYEH

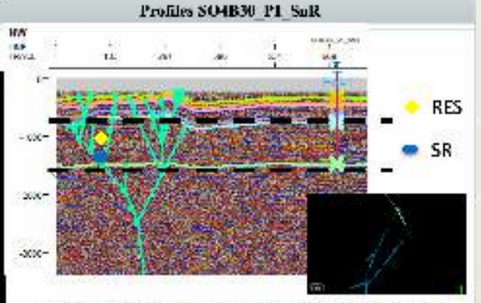
THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)

Thickness Maps

I. Adigrat-Lower Hamenlei PS

Figure 4.7 Isopach Thicknesses Maps between Pliensbachian –Hettangian and Toarcian Base Surfaces



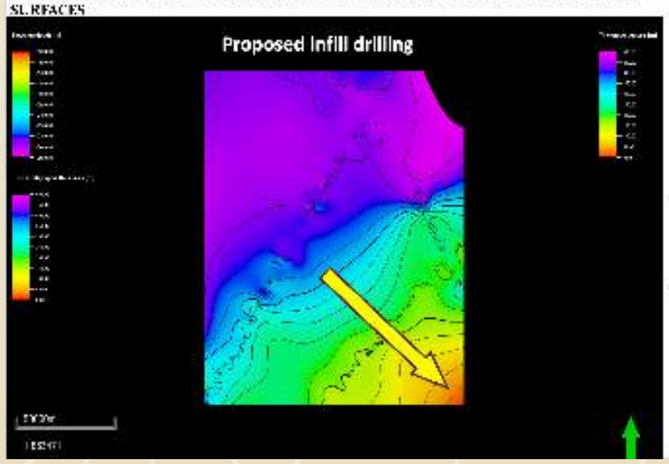


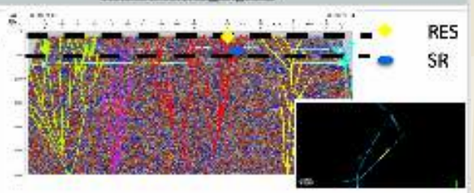
- Thicknesses are within the 10-250 m range.
- Two consistent deformed structures occur in the south-western and north-eastern corners of the study area.
- Vertical closure of SW high is 120 meters, while the one in the north-east has a less closure of only about 70 meters.

II. Middle-Upper Hamenlei PS

Profile SO4B25_P4_SnR

Figure 4.8 Isopach Thickness Map between Toarcian and Bajocian base surfaces





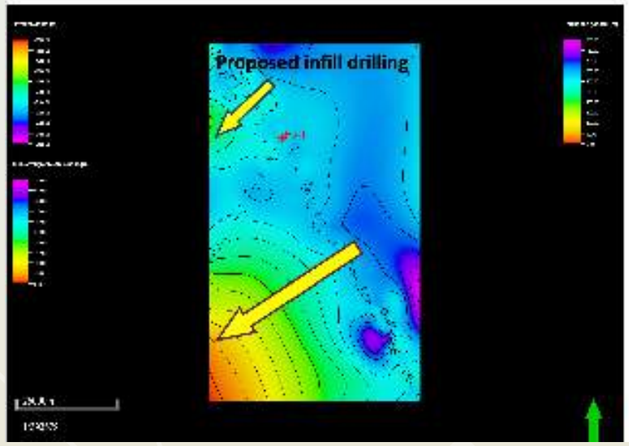
- Thicknesses (isopach map) range between 20 (south-east) to approximately 450 (at the north) meters.
- Potential trapping mechanisms of this section are located at the south-eastern part of the survey area (towards the Bur Acaba high) where an approximately 50 sq. km structure with an average 200 meter vertical closure is developed. This offers an additional infill drilling location.

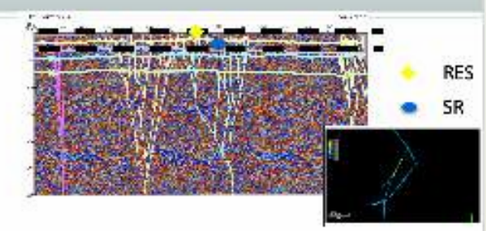
WARSAME ATTEYEH

THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)

4.2- III. Uarandab (Anole)-Upper Hamanlai PS

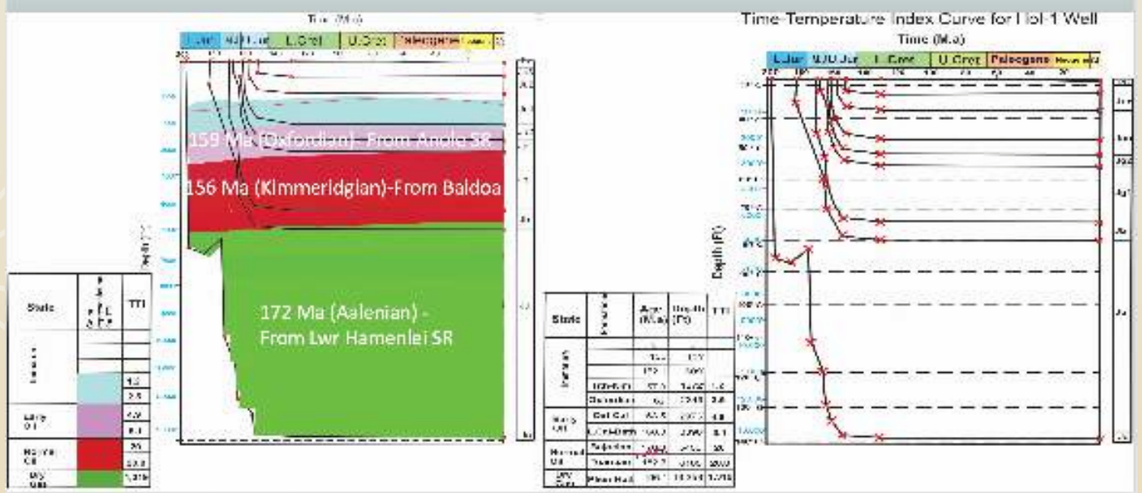
Goloda Reservoir rock





- thickness maps show that the thicknesses are increased in the north and eastern parts of the survey area.
- the maps demonstrated several highs, it is largely possible, that the hydrocarbons might have been redistributed and accumulated towards the northern-western and south-western parts of the study area. At least two closed structures (anticlinal crests/domes?) have been mapped to the north-west and south-west of the survey area.

4.3. Time-temperature index (TTI) modeling for HOL-1 well



WARSAME ATTEYEH

THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)

5- CONCLUSIONS

I. The Lugh-Mandera basin has thick Lower and Middle Jurassic strata and thinner Upper Jurassic and Early Cretaceous layers. The petroleum system of the Lugh-Mandera basin is similar to the ones developed in the neighboring Ogaden basin of Ethiopia.

ii. The existence of a wrench fault tectonics in the Lugh-Mandera basin, as described by earlier studies, has been verified structurally. The subsurface geological maps and the interpreted (14) seismic profiles confirms that wrench fault structures (Traps) could be favorable for the accumulation of hydrocarbons.

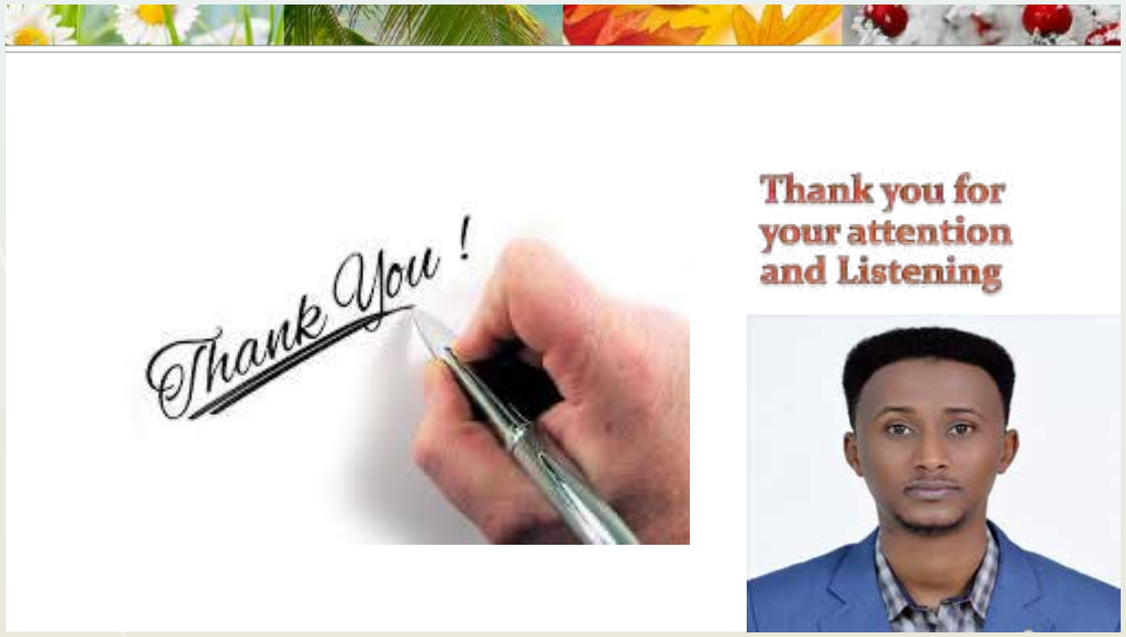
iii. The TTI Modeling results reveal that the source rocks that are situated at different levels, such as, the Lower Jurassic Pleinsbachian-Hettangian source rock, the Middle Jurassic Bajocian source rock, and the Upper Jurassic Uarandab shales has matured and produced both oil and gas.

6. BUSSINESS OPORTUNITY

- **Hydrocarbon Potential**: The Lugh Mandera basin has significant hydrocarbon potential, with thick Jurassic-Cretaceous formations that have source, reservoir, and sealing configurations. The basin is classified as a frontier exploration area, with only a few wells drilled so far1.
- **Geological Studies**: the geological and geophysical studies have shown promising results. Seismic profiles and well log data indicate the presence of viable hydrocarbon traps and positive flower structures. These findings suggest that the basin has the potential for significant oil and gas reserves.
- **Regulatory Framework**: The Somali government has been working on establishing a regulatory framework to attract and protect foreign investments in the oil and gas sector. This includes offering attractive terms and conditions for exploration and production activities.

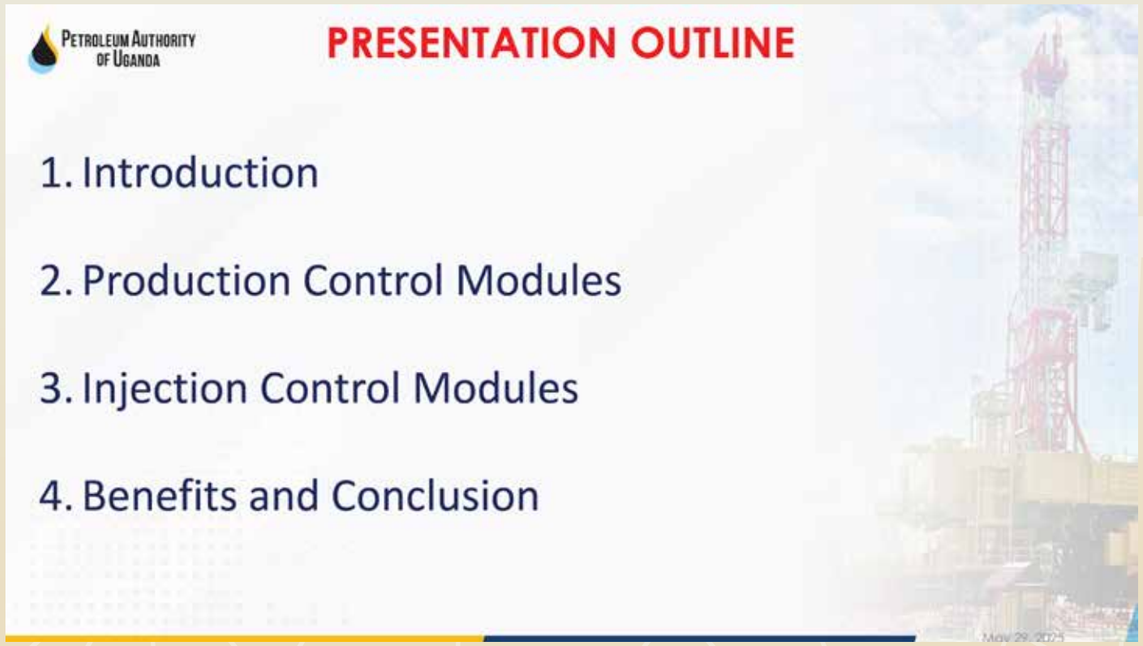
WARSAME ATTEYEH

THE GEOLOGY AND HYDROCARBON POTENTIAL OF LUGH-MANDERA BASIN (SOMALIA SECTOR)



ANGELA KAMPI

DEVELOPMENT OF DIGITAK OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICAL AND SOCIALLY SENSITIVE AREAS



ANGELA KAMPI

DEVELOPMENT OF DIGITAK OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICAL AND SOCIALLY SENSITIVE AREAS

1.0 INTRODUCTION (1/4)

The purpose of this session is to present the Digital Systems that are being developed for implementation in Uganda's Oil and Gas Projects.

The Presentation defines the minimum requirements that shall be considered for the design, manufacture, configuration, testing, installation and commissioning of the digital systems.

OVERVIEW

Uganda's oil and gas development projects are situated in an environmentally and socially sensitive region with several wellpads and Enabling Infrastructure located in

1. Communities
2. Murchison Falls National Park and Game Reserves – Uganda's largest National Park (app ~ 3,893 Km2)
3. Operations close to Lake Albert (Source of water for domestic use)

DEVELOPMENT STRATEGY

- 2 Upstream Development Projects
- Drilling approximately 451 wells
- Number of wellpads – 33
- Central Processing Facilities – 2
- Multiple facilities for treatment and re-injection of produced water
- Associated flowlines and pipeline systems

CHALLENGES INVOLVED

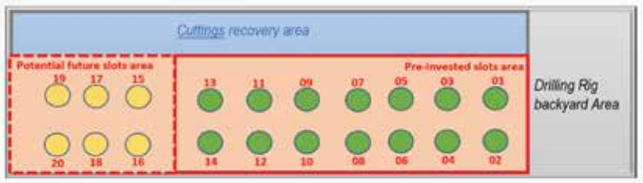
- Habitat disruption
- Tourism disruption
- Water pollution
- Community disruptions etc.

May 29, 2025

1.0 INTRODUCTION (2/4)

Some of the strategies that have been implemented to reduce footprint so far include;

- **The Wellpads strategy : -** Multiple wells are drilled on **one wellpad**



- **Facilities optimization and reduction;**
  1. Reduction of the number of wells from **486** to **451**
  2. Reduction of the number of wellpads from **44** to **33**
  3. Reduction of the flowlines network from **230km** to **180km**

- **Installation of ESPs : -** All oil production wells are equipped with ESPs from the onset of production

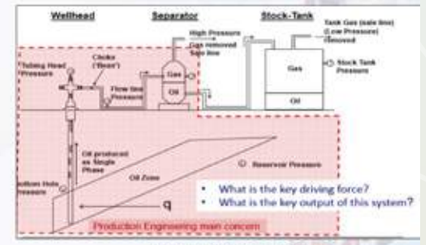
May 29, 2025

ANGELA KAMPI

DEVELOPMENT OF DIGITAK OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICAL AND SOCIALLY SENSITIVE AREAS

1.0 INTRODUCTION (3/4)

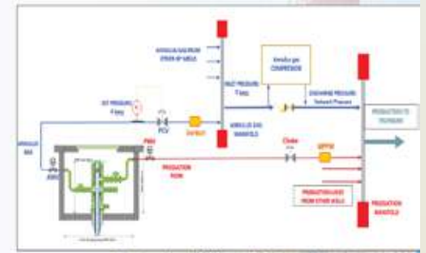
The Full Control of Wells system is a set of production / injection wells control algorithms / modules that will be used in Uganda's oil and gas projects to automatically or manually manage well activities such as individual well / multiwell / multifield start-up, load shedding, preservation and shut down operations according to the operator's commands.



Basic Production Process

The program therefore provides:

- ✓ Automatic start-up and ramp-up on remote unmanned facilities (wellpads) according to predefined strategy.
- ✓ Reduction in wear/damage to downhole equipment and wellbore formation interface due to improved control.
- ✓ Optimised production performance, bringing and keeping wells at their target potential.
- ✓ Wells stop sequence and load shedding according to the predefined and user-controlled strategies that are suited to each kind of process limitations.



Production Wellhead Schematic

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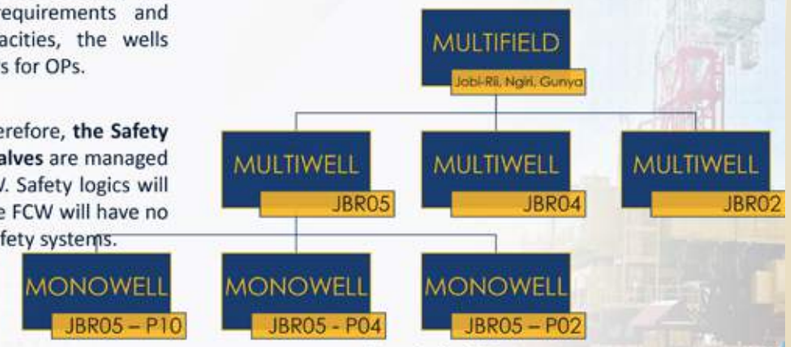
1.0 INTRODUCTION (4/4)

- ✓ The system shall ensure the transition of the well from a closed state to a stable production/injection state.
- ✓ It shall maintain an optimal oil flow rate (for OPs) or water injection (for WIs), while considering the process and flow assurance requirements and limitations, the installation capacities, the wells performance and the status of ESPs for OPs.
- ✓ The FCW is a control function, therefore, **the Safety logics** and the **associated safety valves** are managed by ESD, PSS and FGS and not FCW. Safety logics will always have priority over FCW. The FCW will have no action on the above-mentioned safety systems.
- ✓ The system contains a set of functions that are added to the PCS to aid the operation of the FCW modules that are categorized into 03 groups/levels for both OPs & WIs i.e.
  1. Monowells
  2. Multiwells
  3. Multifields



Hierarchy for Oil Producers

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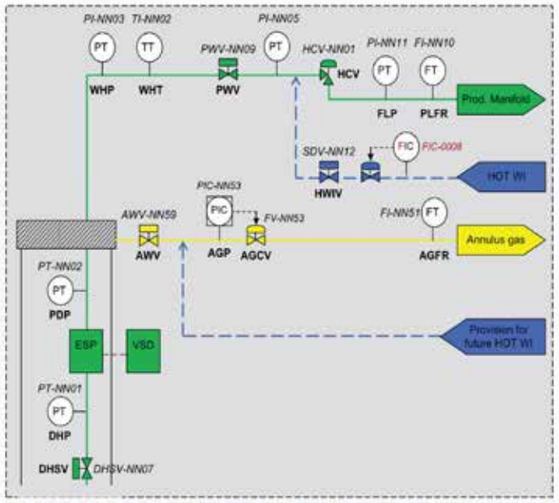
2.0 PRODUCTION OPERATIONS - WELL CONTROL



Production Process General diagram - Devices in interaction with the FCW - PMOCM

- The PMOCM algorithm is used to control an individual well according to specific optimization criteria during production.
- There is only **01 PMOCM** per well interacting with **06** devices & **08** sensors.
- Main functions are to;
  - ✓ Individually manage the startup, stabilization, preservation and shutdown operations of the associated production well.
  - ✓ Control operations such as PLFR, WHT, ESP suction pressure (DHP), fixed-VSD frequency etc., to onboard a well onto production and maintain it at its selected production target.
  - ✓ Monitor ESP running conditions to ensure that they are protected from damage.
  - ✓ Monitor and control Annulus gas rate and chemical injection.

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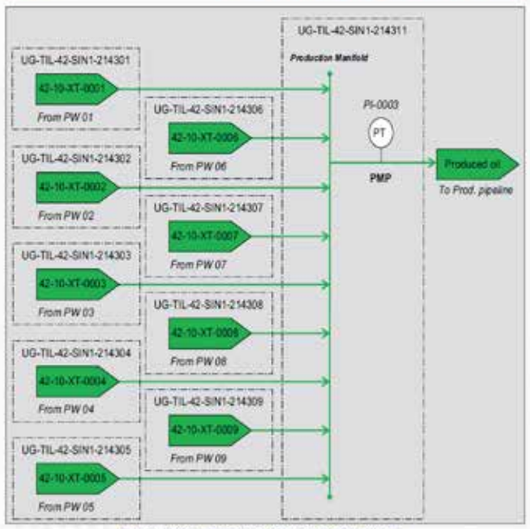
2.1 PRODUCTION OPERATIONS - MULTIWELL CONTROL



Production Process General diagram

- The PMUWCM system ensures the optimization of production from a set of Monowells producing towards the same production system, through active monitoring of process limitations of this production system.
- Process limitations are specific process constraints on treatment systems (oil separation, gas compression, etc.) which can lead to safety trip if production rate is not adjusted accordingly.
- There is only **01 PMUWCM** per wellpad interacting with **01** device & **01** sensor.
- Main functions of the PMUWCM are to:
  - ✓ Continuously monitor production capacities of each associated wellpad.
  - ✓ Manage actions of the associated PMOCM that are in MULTIWELL MODE, according to production capacities i.e., permission to start / shutdown, forbid to start / pause opening, load shedding etc.

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DEVELOPMENT OF DIGITAK OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICAL AND SOCIALLY SENSITIVE AREAS

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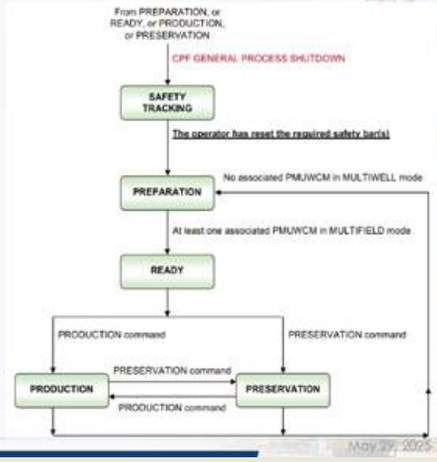
2.2 PRODUCTION OPERATIONS - MULTIFIELD CONTROL

- The PMUFCM module is used to optimize the production of a set of Multiwells producing towards the same Central Process system, by actively monitoring the defined process limitations of the central process system.
- There is only **01 PMUFCM** for the CPF. Interacting with several devices and sensors
- Main functions of the PMUFCM are to:
  - ✓ Continuously monitor the capacities of the following CPF facilities:
    - Gas compression system
    - Oil processing system
    - Produced water treatment system
  - ✓ Manage actions of associated Production Multiwell Control Modules (PMUWCM) that are in MULTIFIELD mode, according to the capacities of above facilities:
    - Permission to start.
    - Forbid to start / pause opening.
    - Load shedding.

The PMUFCM operates in three main modes: INACTIVE mode, MANUAL mode & AUTOMATIC mode.

The PMUFCM sequentially manages the following phases: PREPARATION, READY, PRODUCTION, and PRESERVATION.



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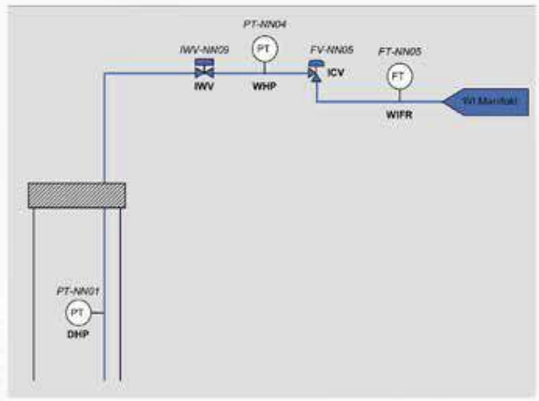
3.0 INJECTION OPEARTIONS - WELL CONTROL

- ❑ Manages start-up and injection at the **well level.**
- ❑ In Mono-well, the system will open/close IWV and Injection Choke depending on the various well conditions/scenarios.
- ❑ Safety logics will take precedence in all operations



Location	Measurement	FCW Tag	FCW Function
Downhole	Pressure	DHP	Reservoir wellbore protection injection target
Well head Upstream	Pressure	WHP	Reservoir wellbore protection injection target
WI flow-line	Flow rate	WIFR	Injection Target

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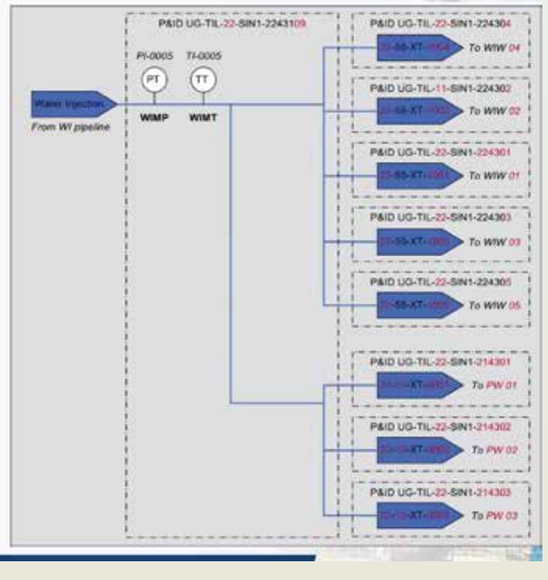
DEVELOPMENT OF DIGITAK OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICAL AND SOCIALLY SENSITIVE AREAS

3.1 INJECTION OPEARTIONS - MULTIWELL CONTROL

- The Water Injection Multiwell Control Module (WIMUWCM) ensures optimization of injection of a set of Monowells injecting from the same injection system, by active monitoring of defined process limitations of this injection system.
- The process limitations in this case are process constraints on treatment systems i.e., water injection treatment which can lead to safety trip if wells injection rate is not temporarily adjusted accordingly.
- The main functions of WIMUWCM are to:
  - ✓ Continuously monitor water injection capacities of each associated well pad.
  - ✓ Manage actions of associated Water Injection Monowell Control Modules that are in MULTIWELL mode, according to capacities of associated well pad.
- For every wellpad, only one Water Injection Multiwell Control Module will be installed with only one device i.e., Water Injection Manifold Shutdown Valve and two sensors measuring Temperature and Pressure at the Water Injection Manifold interacting with the FCW.



3.2 INJECTION OPEARTIONS - MULTIFIELD CONTROL

Water Injection equipment of the CPF are separated according to the location of well pads with respect to the CPF.

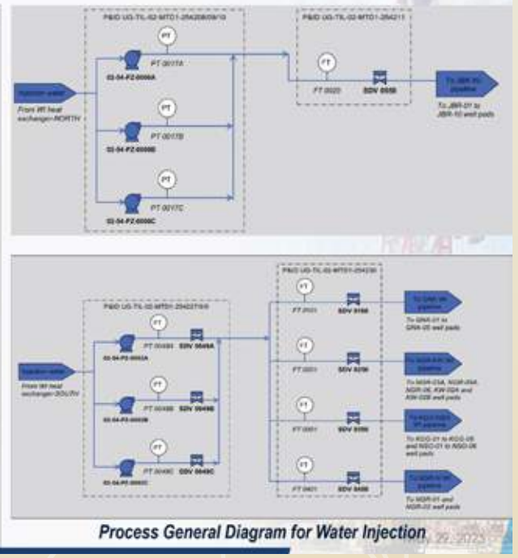
At the CPF, there is **one** WIMUFCM. This WIMUFCM will implement 2 sets of FCW logics matching with the segregation of CPF WI facilities, i.e,

- ✓ The 1st one relating to WI NORTH facilities
- ✓ The 2nd one relating to WI SOUTH facilities

The main functions of WIMUWCM are to:

- ✓ Continuously monitor Water Injection (WI) capacities of WI facilities.
- ✓ Manage actions of associated Water Injection Multiwell Control Modules (WIMUWCM) that are in MULTIFIELD mode, that is, permission to start, forbid to start/pause opening and load shedding, according to the capacities of associated WI facilities.

NOTE: The FCW **doesn't** perform any safety action but considers the safety logics performed by the Safety System (PSS, ESD, FGS).



Process General Diagram for Water Injection

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DEVELOPMENT OF DIGITAK OILFIELDS TO MINIMIZE THE OIL AND GAS OPERATIONAL FOOTPRINT IN ECOLOGICAL AND SOCIALLY SENSITIVE AREAS

4.0 BENEFITS AND CONCLUSION

BENEFITS

- ✓ **Improved Efficiency : -** Automation and digitalization streamlines operations, reducing on human errors thereby increasing productivity.
- ✓ **Enhanced Data Management : -** These advanced tools provide real-time insights, enabling better decision making.
- ✓ **Increased safety : -** Predictive maintenance and real-time monitoring reduces the risk of accidents and equipment failures hence minimizing production downtime.
- ✓ **Optimized production : -** Digital oilfields enable real-time optimization of production processes, leading to increased oil recovery and reduced costs.
- ✓ **Reduced costs : -** Digitalization and automation reduces on energy consumption and equipment maintenance costs.

Increased transparency and accountability : - They provide a transparent auditable record of operations, ensuring accountability and regulatory compliance.

CONCLUSION

- ✓ The intention is to incorporate a set of functions integrated into the PCS to perform automatic and recurrent actions to control production and injection operations on the wells.
- ✓ While enhancing production processes in terms of safety, reliability, efficiency, minimizing footprint and traffic in the environmentally sensitive region

Thank you

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+256 313 231 600 www.pau.go.ug ed@pau.go.ug

@PAU_Uganda Petroleum Authority of Uganda

Head Office: Petroleum House, Plot 21-29 Johnston Road, P.O.Box 833, Entebbe, Uganda

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SOURCE ROCK EVALUATION AND 1D BASIN MODELLING IN RUVUMA BASIN, SOUTH EASTERN TANZANIA

THE 11TH EAST AFRICAN PETROLEUM CONFERENCE & EXHEBITION 2025 (EAPCE'25)

JNICC – DAR ES SALAAM, TANZANIA

TITTLE: SOURCE ROCK EVALUATION AND 1D BASIN MODELLING IN RUVUMA BASIN, SE TANZANIA

AUTHOR: ANTIPASS JOSEPHAT TARIMO

INSTITUTION: UNIVERSITY OF DAR ES SALAAM

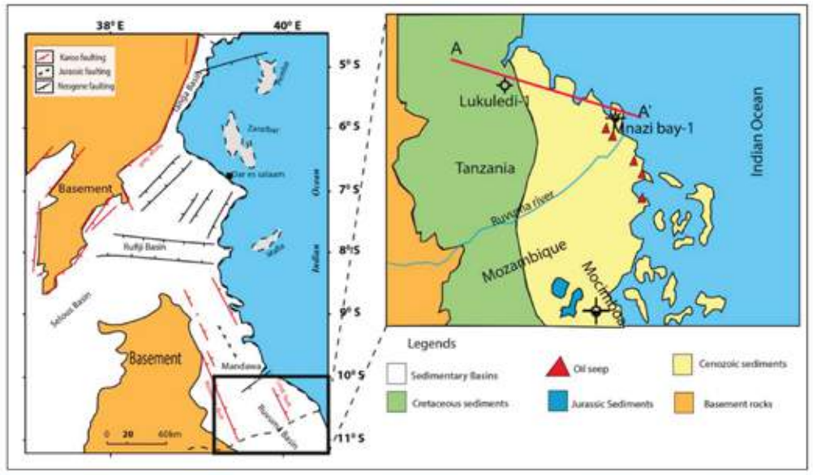
ANTIPASS JOSEPHAT TARIMO

SOURCE ROCK EVALUATION AND 1D BASIN MODELLING IN RUVUMA BASIN, SOUTH EASTERN TANZANIA

BACKGROUND

- Ruvuma Basin is located in the Southerneast of Tanzania.
- Ruvuma Basin is well known for its production and high prospectivity of **dry gas.**
- The source rock which produce this huge gas amount is not well know, also the burial history is not studied in this basin.

Location of Ruvuma Basin



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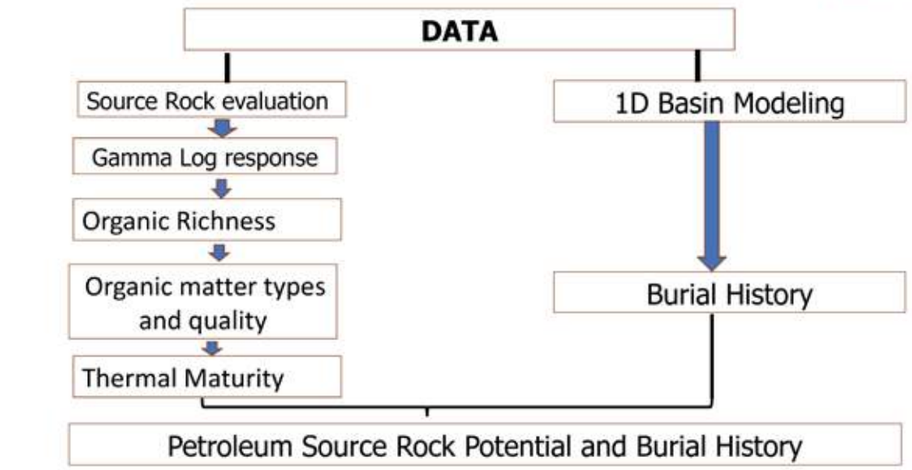
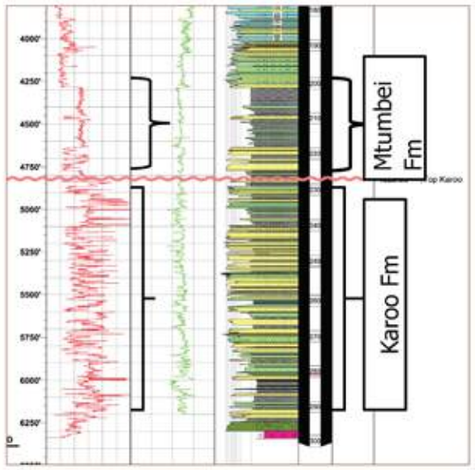
SUMMARY OF WORK FLOW



Gamma log response.

Interpretation of gamma log response (red) across stratigraphy in Well **X** lead to the selection of source rock intervals (figure 2)

- Formation with shale content tend to have high log response than those shale-free
- Source rock intervals likely to be Mtumbei Formation of Middle Jurassic and Karoo Formation of Upper Permian



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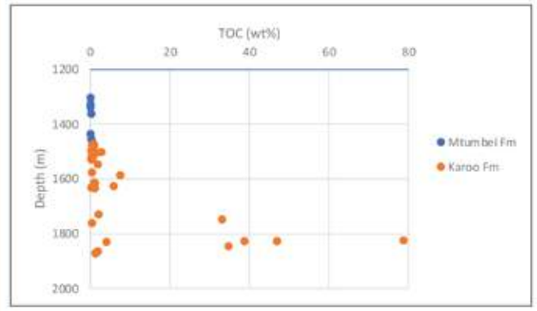
Organic richness

- Mtumbei Fm has TOC from 0.05 to 0.14 wt%, average 0.08 wt%
- Karoo Fm in its upper part TOC from 0.23 to 2.79 wt%, average 0.85 wt%
- Middle part TOC from 0.23 to 7.25 wt%, average 2.35 wt%
- Lowest part TOC from 0.4 to 78.74 wt%, average 24.08 wt%.



Variation of TOC with Depth across Mtumbei and Karoo formations'

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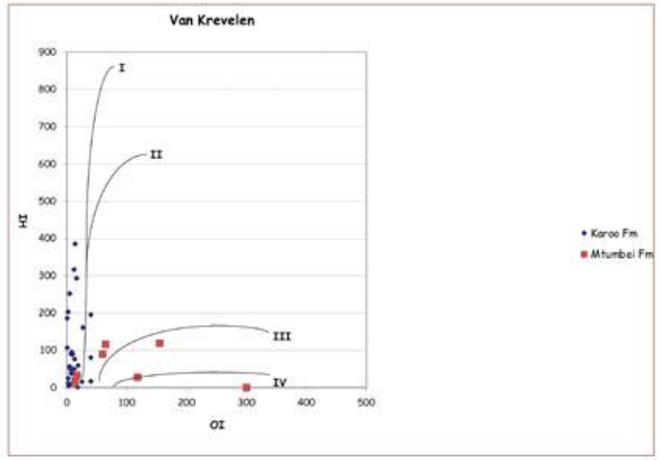
Organic matter Quality and types

The plot between HI vs OI indicating we have kerogen type II and III which is oil and gas prone upon maturation



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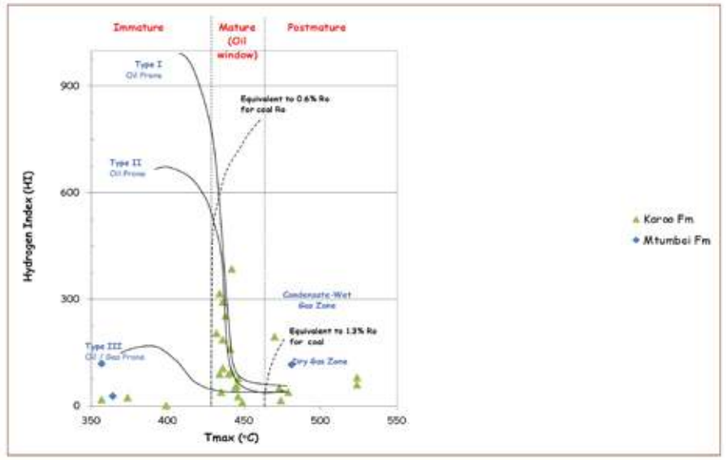
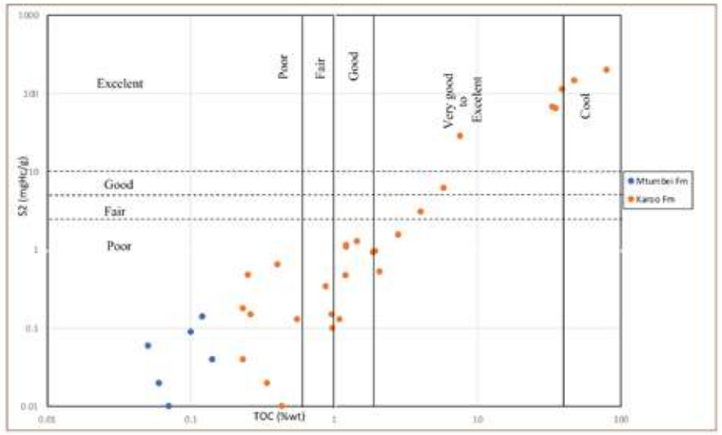
Reconstruction of thermal evolution history

Tmax range between 340°C – 522°C. This indicating we have immature, mature and post mature source rock.



Overall source rock potential

Poor in Mtumbei Formation and Good to excellent in Karoo Formation



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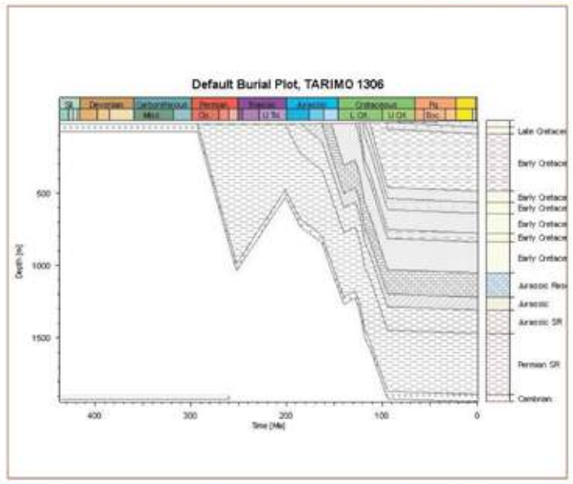
Burial History

In Ruvuma Basin there is major seventh episodes of alternating deposition and erosion took place since the oldest rock deposited in 293 Ma



CONCLUSION AND RECOMENDATIONS

- The discoveries gas in this basin indicates the good timing of the dry gas window.
- The timing of oil window is still poor or there is no enough information to locate oil accumulation in this basin.
- Ruvuma Basin experience different tectonic dynamics which account for the deposition and distribution of the petroleum elements.

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SOURCE ROCK EVALUATION AND 1D BASIN MODELLING IN RUVUMA BASIN, SOUTH EASTERN TANZANIA

The net to gross ratio of the source rock interval penetrated by Well **X** well is thin and not enough to produce that huge amount produced and prospected.

The source of heat which cause the wide variability of source rock maturation is hard to constrain.

I recommend further integrated studies such as performing oil to source correlation and geophysical studies to be carried out for better understanding of potentiality of this basin.

Thank You

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NTORYA GAS FIELD

ARA

ARA Petroleum Tanzania
Ntorya Gas Field

March 2025

www.arapetroleum.com

ARA Petroleum - A Nimble Operator

NO HARM TO PEOPLE
NO HARM TO THE ENVIRONMENT

- Established in Oman in 2014, quickly gained a reputation for becoming a nimble and fast acting O&G operator
- Recognized leader in QHSE
- Drilled over 100 wells, made several material or significant discoveries
- Production from just 700 bboe/d to nearly 20,000 bboe/d with a target of doubling that in the coming years.
- ARA Petroleum Tanzania was created to unlock Ntorya's gas potential

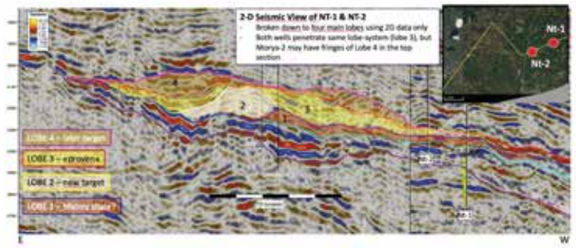
ARA PETROLEUM TANZANIA
NTORYA GAS FIELD

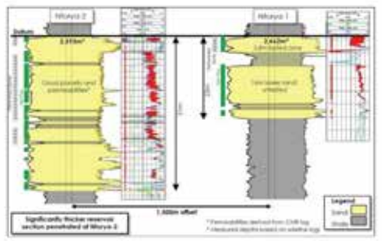
Unlocking Tanzania's Gas Potential

- Ntorya Gas Field: A world class discovery
- Onshore location allows for a relatively low cost and rapid development
- Potential to more than double Tanzania's current gas production.
- Ntorya gas will help increase the reach and reliability of Tanzanian electricity supplies
- And support key initiative such as Clean Cooking Initiatives.
- Later phases of development can provide gas for more power generation, industrial use or even export via pipeline or as LNG.

Ntorya Gas Field - History

- Legacy 2-D Siesmic dating back to 1980's
- Previous Operator shot 2-D seismic in 2005,2007,2014





- Likonde-1 drilled in 2010 (3,647m TD) - First HC lead
- Ntorya-1 drilled in 2012 (3,130m TD) –Discovery
- Ntorya-2 drilled in 2017 (2,795 m TD) - Confirmation

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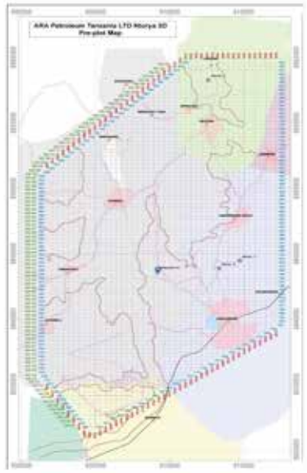
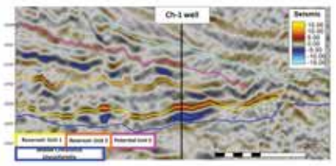
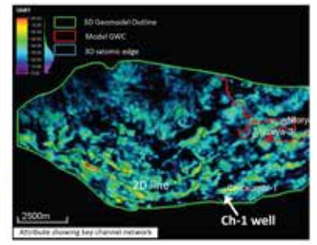
NTORYA GAS FIELD

Ntorya Gas Field - APT's 3D seismic programme

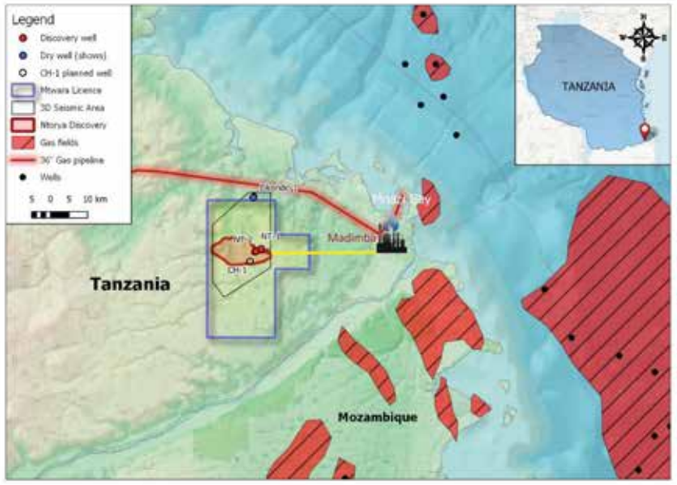


- Immediately after gaining operatorship, APT set about acquiring 3D seismic data over a over 338 km² area
- This was one of the largest 3D seismic surveys in East Africa
- Excellent quality seismic acquired safely over 11 months in 2022
- Data processing and interpretation done in 2023-24
- World Class asset with 3.45 Tcf GIIP
- Positioning of next well, CH-1, done using the seismic data





Ntorya Milestones



- GSA with TPDC signed in January 2024
- 25-year Development License issued in June 2024
- First gas in 2025 - pending pipeline to Madimba
- Significant exploration upside within block
- Working Interest:
  - APT: 75% (operator)
  - AEX: 25%

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NTORYA GAS FIELD

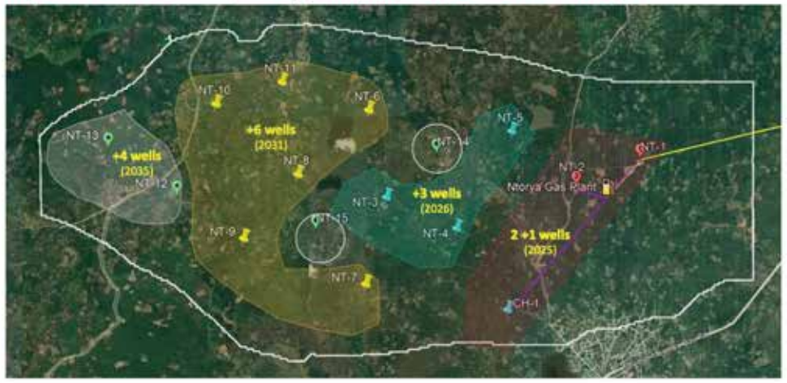
Ntorya production forecast

Base Case – First, Second and Third Phase Production

- An updated FDP was submitted to TPDC in January.
- Updates incorporate new information gained from 3D seismic
- 3 Stage production planned
- 2nd and 3rd stage production is subject to additional GSA/Off take agreements
- The field has potential to deliver 280 MMscf/d for 20 years+
- The FDP is subject to regulatory approvals and market factors e.g. offtakers, prices.

Ntorya Drilling Campaign

Proposed well locations, drilling campaigns & production start-ups



- Test Production Phase: 3 Wells
- Phase-I : Additional 3-5 Wells
- Phase-II & III: Additional 6- 10 wells

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NTORYA GAS FIELD

Downstream planning

- Tanzania needs more energy as its economy and industry grows.
- Domestic gas production provides an affordable source of energy that:
  - boosts economic development
  - lowers the use of polluting fuels such as diesel, coal and wood
  - directly benefits Tanzanians via government proceeds from the project
- As the Ntorya project progresses, APT will be looking for partners and buyers for the increasing volumes of gas.
- These can include
  - petrochemical plants
  - export pipelines
  - supply to LNG terminals.

Thank you

Erhan Saygi
General Manager

ARA Petroleum Tanzania (APT)
www.arapetroleum.co.tz
info@arapetroleum.co.tz

ASHOKA TIMOTHY

PREDICTION OF RESERVOIR PERMEABILITY USING PETROPHYSICAL ROCK TYPING AND MACHINE LEARNING IN TURACO WELLS, ALBERTINE GARBEN

EAPCE'25

PREDICTION OF RESERVOIR PERMEABILITY USING PETROPHYSICAL ROCK TYPING AND MACHINE LEARNING IN TURACO WELLS, ALBERTINE GRABEN.

ASHOKA TIMOTHY

Makerere University

Department of Geology and Petroleum Studies

11th EAPCE'25

4th-7th March 2025

Sponsored by UNOC UGANDA NATIONAL OIL COMPANY

PRESENTATION OUTLINE

OBJECTIVES

METHODOLOGY

RESULTS

CONCLUSION

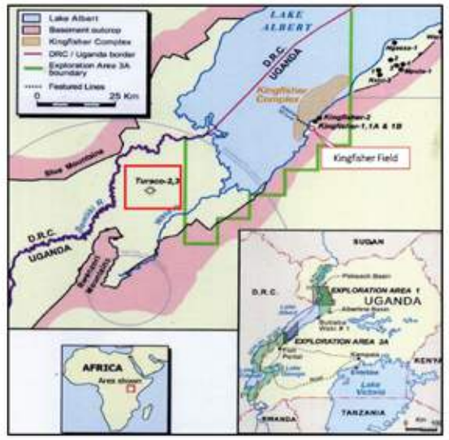
ASHOKA TIMOTHY

PREDICTION OF RESERVOIR PERMEABILITY USING PETROPHYSICAL ROCK TYPING AND MACHINE LEARNING IN TURACO WELLS, ALBERTINE GARBEN

1. OBJECTIVES OF THE STUDY

Main Objective:

To predict reservoir permeability in Turaco (uncored) wells.



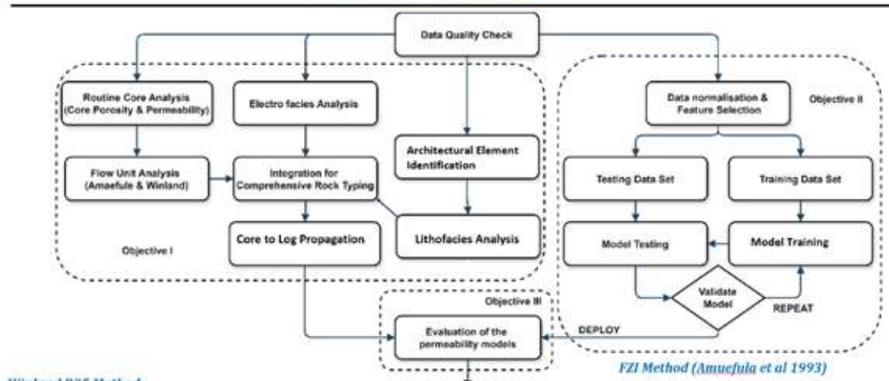
Specific Objectives

- ❑ Classify reservoir rocks into petrophysical rock types (PRTs).
- ❑ Develop and train machine learning models.
- ❑ Determine the applicability and accuracy of the permeability predictive models.

UNOC

1

2. METHODOLOGY



Winland R35 Method

Rock type classification based on pore-throat radius concept.

$$\log(R35) = 0.732 + 0.588\log(k) - 0.864\log(\phi) \quad \text{.....Eqn1}$$

Machine Learning Algorithms:

- Artificial Neural Network (ANN)
- Least Square Support Vector Machine (LSSVM)
- Multilayer extreme learning machine (MELM)

FZI Method (Amuefula et al 1993)

Rocks are grouped based on the Flow Zone Indicator (FZI).

$$RQI = 0.0314\sqrt{\frac{k}{\phi_e}} \quad \text{.....Eqn 2}$$

$$\phi_z = \left(\frac{\phi_e}{1-\phi_e}\right) \quad \text{.....Eqn 3}$$

$$FZI = \frac{RQI}{\phi_z} \quad \text{.....Eqn 4}$$

UNOC

2

ASHOKA TIMOTHY

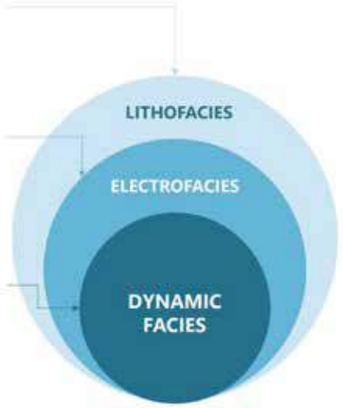
PREDICTION OF RESERVOIR PERMEABILITY USING PETROPHYSICAL ROCK TYPING AND MACHINE LEARNING IN TURACO WELLS, ALBERTINE GARBEN

2. METHODOLOGY

Lithofacies
Described on cores based on mineral association, grain size, sedimentological features.

Electrofacies
Group of samples with homogeneous log signature.

Dynamic Facies
Group of facies with homogeneous dynamic behaviour i.e Permeability, pore throat distribution, capillary pressure…



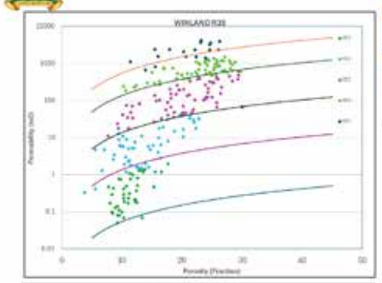
Training Fields
Smeaheia Field
Gullfaks Field
Volve Field
Troy Field

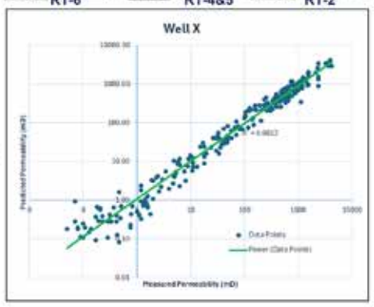
Test Field
Meruit Basin

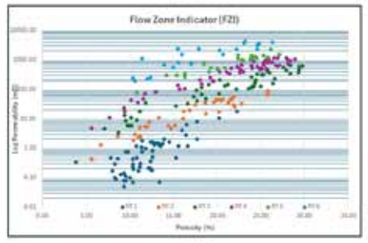
Deployment
Turaco Wells

Log Data
GR, DT, NEU, DEN,SP

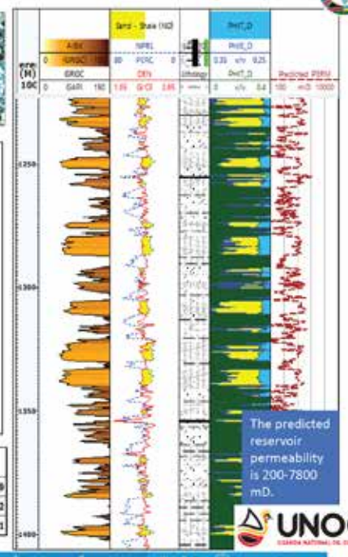
3. Results







Method	R2 Score	Time (Sec)	APD (%)	AAPD	SD
CNN	0.8581	7.37	4.33	1.14	0.0489
LSSVM	0.8713	1.19	1.85	1.56	0.0362
MELM	0.9012	9.73	1.73	2.34	0.0251



The predicted reservoir permeability is 200-7800 mD.

4. Conclusion & Recommendation

Conclusion;

- ❑ Advances in ML will potentially reduce operational uncertainties and improve the economic benefits of oil and gas.
- ❑ The MELM method proved to be the best predicting algorithm within fluvial and lacustrine sediments.
- ❑ Combining Machine Learning (ML) and Petrophysical rock typing (PRTs) improves reservoir permeability prediction accuracy and reliability.

Recommendation;

- ❑ Detailed sedimentological studies in the Albertine graben to better understand the sediment distribution.
- ❑ Train ML algorithms using basin-specific data sets.

THANKS FOR LISTENING.....

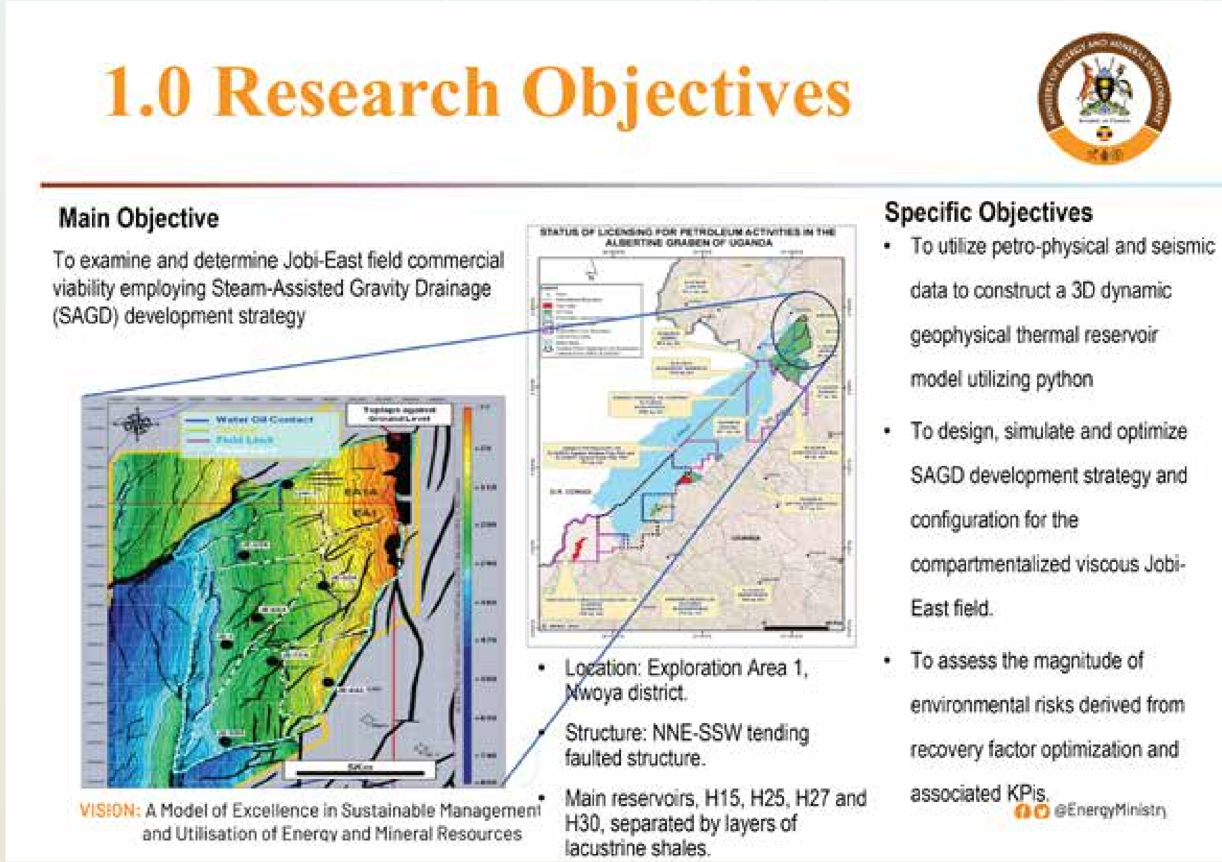
KASIRIVU KIGOGO WILSON

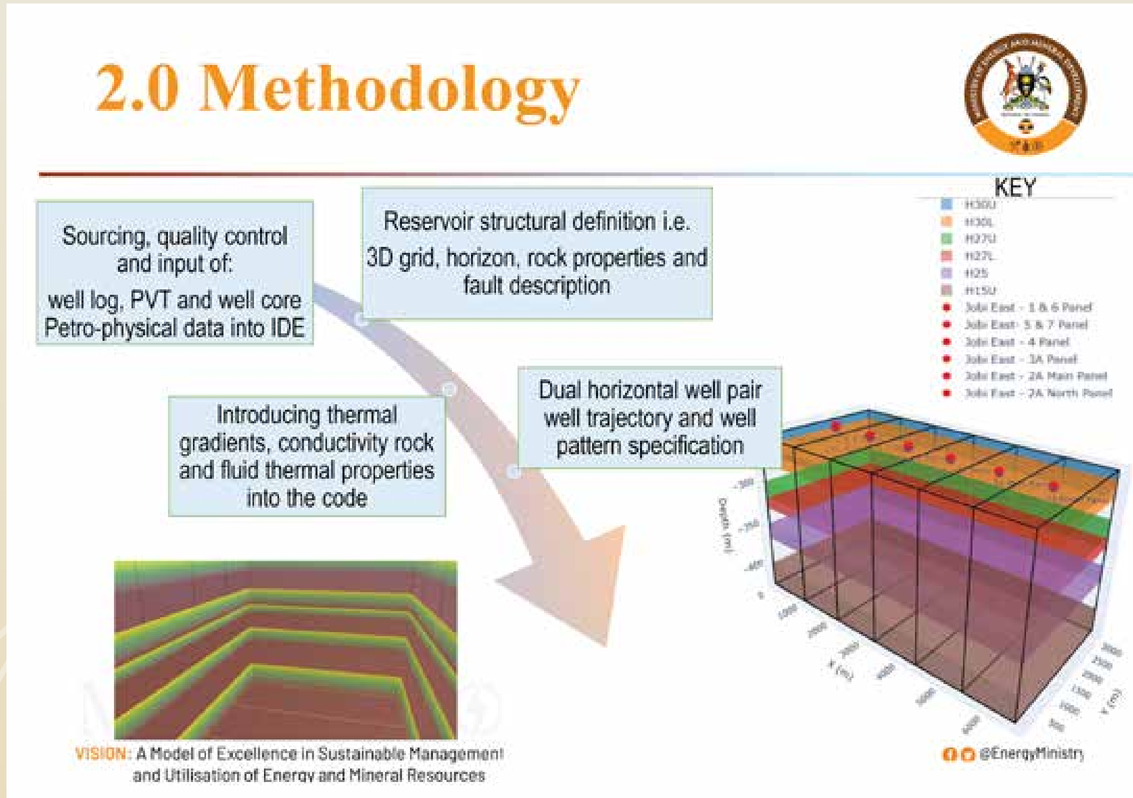
INTEGRATED RESERVOIR MANAGEMENT AND RECOVERY OPTIMIZATION FOR COMPARTMENTALIZED HIGHLY VISCOUS RESERVOIRS

ANNEX | FIELD DEVELOPMENT

KASIRIVU KIGOGO WILSON

INTEGRATED RESERVOIR MANAGEMENT AND RECOVERY OPTIMIZATION FOR COMPARTMENTALIZED HIGHLY VISCOUS RESERVOIRS





KASIRIVU KIGOGO WILSON

INTEGRATED RESERVOIR MANAGEMENT AND RECOVERY OPTIMIZATION FOR COMPARTMENTALIZED HIGHLY VISCOUS RESERVOIRS

2.0 Methodology (cont'd)

Create a custom empirical bottoms up flow and heat simulator utilizing butler's equations

History match by comparing production and injection test data with observed simulation results

Perform sensitivity analysis and documentation for the optimization parameters

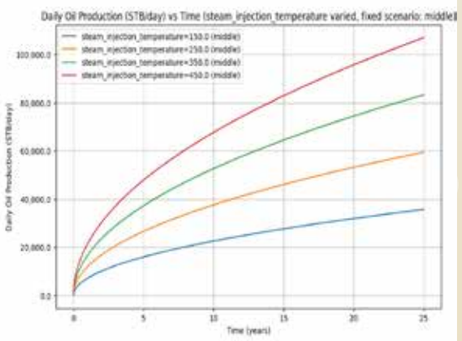
run an iterative variation of key optimization parameters in dynamic simulation over 25 years

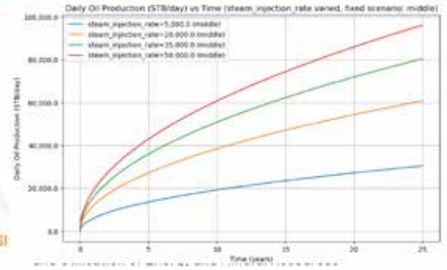
Visualized KPIs results output for the empirical simulation into line graphs, bar graphs, scatter plots etc.

3.0 Results and Discussion

Dynamic simulation results

METRIC	MIN	MAX
Recovery Factor (RF)	34	67
Daily Oil Production Rate (bopd)	32,000	64,000
Steam to Oil Ratio (S0R)	2,3	6.6
Cost per barrel ($)	47	59





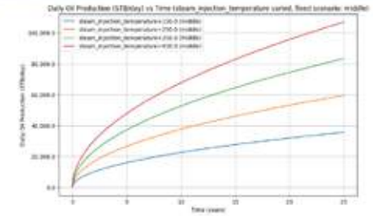
KASIRIVU KIGOGO WILSON

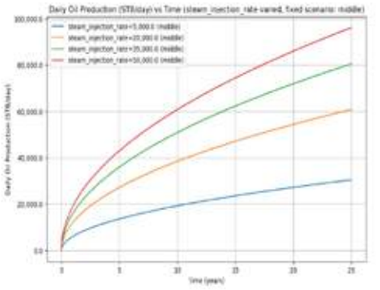
INTEGRATED RESERVOIR MANAGEMENT AND RECOVERY OPTIMIZATION FOR COMPARTMENTALIZED HIGHLY VISCOUS RESERVOIRS

Results and Discussion (Cont'd)

Field Development Optimization results

PARAMETER	MIN	MAX
Steam injection temp. (°C)	250	350
Steam injection rate (m^3/d)	22,000	47,000
Injector – Producer well spacing (m)	2.1	4.9
Horizontal Well drain length (m)	100	550
Lateral Well spacing (m)	100	550





4.0 Conclusion

Government
- Improved decision-making aiding Licensing
- Environmental Compliance

Business
- Application for field data for inhouse assessment
- Favorable ROI
- Addressed environmental risks

Academia
- Addition to industry thermal EOR literate knowledge body
- Opportunities for further research

KASIRIVU KIGOGO WILSON

INTEGRATED RESERVOIR MANAGEMENT AND RECOVERY OPTIMIZATION FOR COMPARTMENTALIZED HIGHLY VISCOUS RESERVOIRS

For more information, please contact;

Ministry of Energy and Mineral Development
GEOPHYSICIST TRAINEE

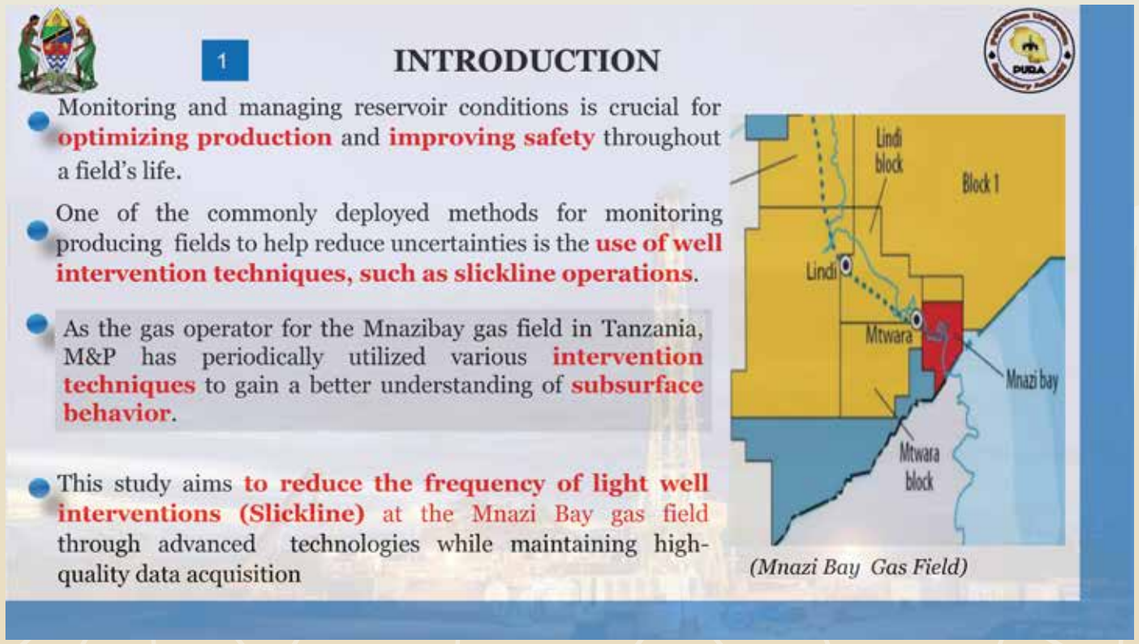
Tel: +256 743 529 745 / +256 755 15 8443
kasirivuwilson@gmail.com

VISION: A Model of Excellence in Sustainable Management and Utilisation of Energy and Mineral Resources

@EnergyMinistry

NDAU L. NDAU

ASSESSMENT OF SLICKLINE OPERATIONS IN GAS PRODUCING FIELDS: REDUCING LIGHT WELL INTERVENTION (LWI) FREQUENCY THROUGH ADVANCE TECHNOLOGIES



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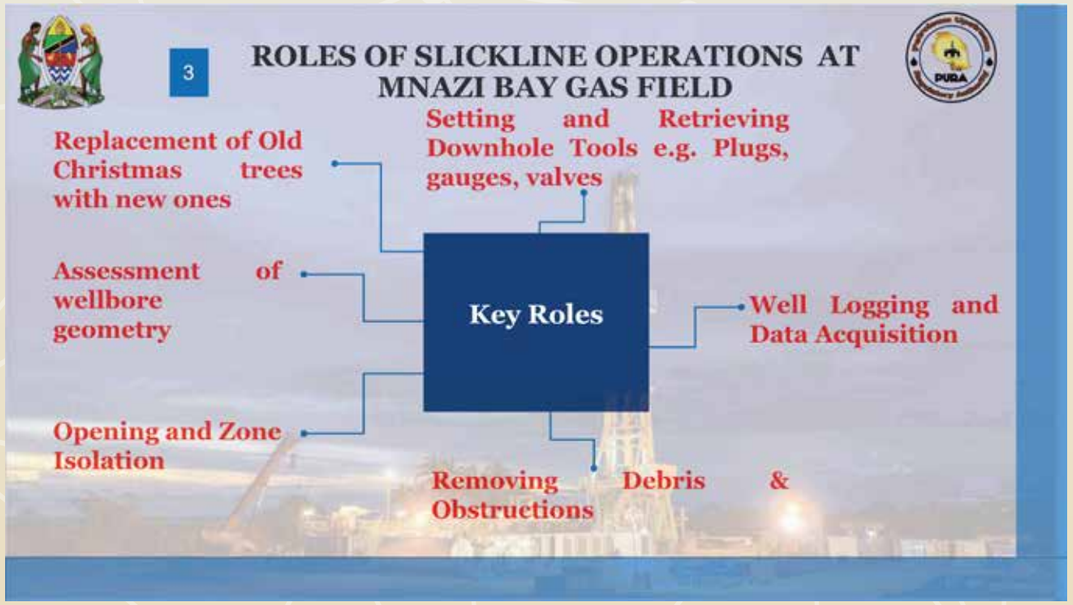

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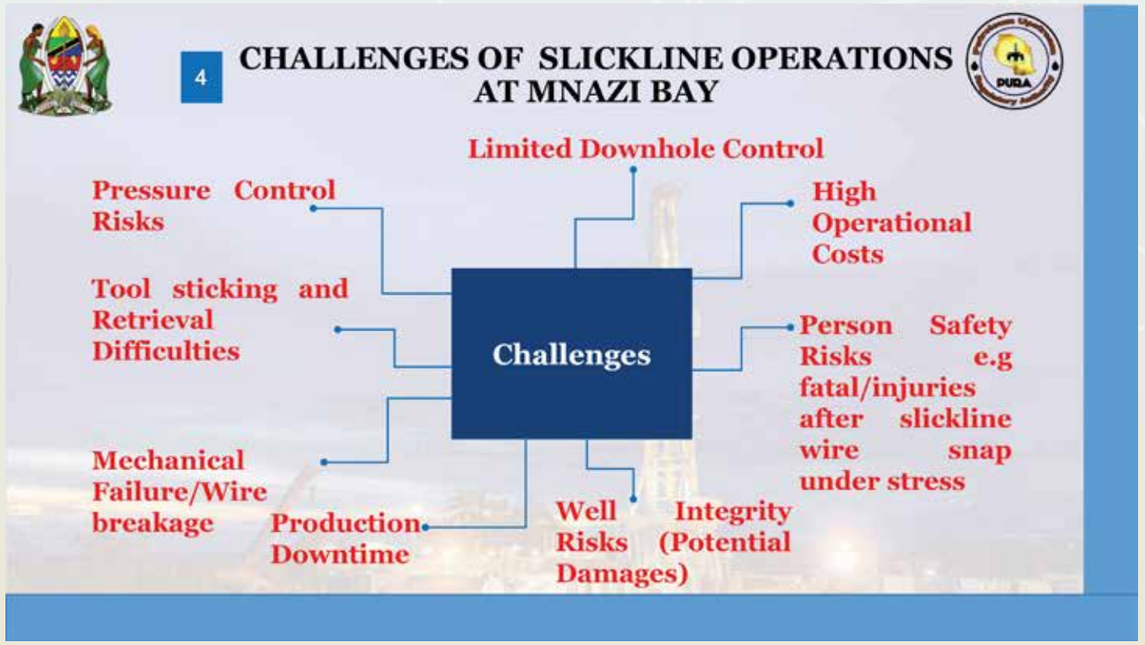
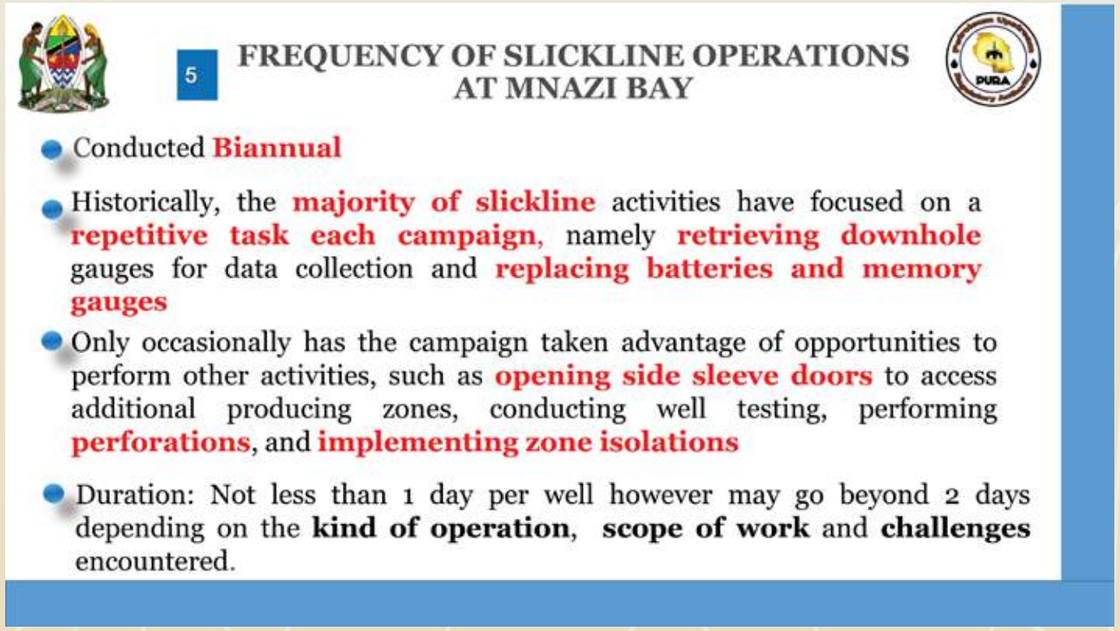




NDAU L. NDAU

ASSESSMENT OF SLICKLINE OPERATIONS IN GAS PRODUCING FIELDS: REDUCING LIGHT WELL INTERVENTION (LWI) FREQUENCY THROUGH ADVANCE TECHNOLOGIES

6

ADVANCED TECHNOLOGIES THAT CAN REDUCE THE FREQUENCY OF SLICKLINE OPERATIONS

- Cableless Telemetry System (CaTS EMX)
  - ❑ Uses a **battery powered**, **Electromagnetic Gauge**, that records **pressure** and **temperature** and transmits the readings wirelessly to surface.
  - ❑ Uses **metallic structure** of the well (casing or tubing) as a conduit to transmit electromagnetic (EM) signals to surface
  - ❑ Long **transmission distances** from downhole gauges at depths of over 12,500ft single hop
  - ❑ EM signal is not impacted by **mechanical barriers** or **cement plugs**
  - ❑ The system can be installed in both **new and existing** wells
  - ❑ Battery life up **to 10 years** (depending on well parameters & transmission schedule)
  - ❑ Real-time data acquisition **without production downtime**/intervention

7

ADVANCED TECHNOLOGIES THAT CAN REDUCE THE FREQUENCY OF SLICKLINE OPERATIONS

- Wireless Intelligent Monitoring and Optimization System (WIMO)
  - ❑ Measures **pressure, temperature**, and **flow rate** in real time without requiring physical data cables.
  - ❑ Designed to withstand **High Pressure** and **High Temperature** capabilities
  - ❑ **Permanent** downhole gauge replacement
  - ❑ **Intelligent** Completion Monitoring

NDAU L. NDAU

ASSESSMENT OF SLICKLINE OPERATIONS IN GAS PRODUCING FIELDS: REDUCING LIGHT WELL INTERVENTION (LWI) FREQUENCY THROUGH ADVANCE TECHNOLOGIES

8

ADVANCED TECHNOLOGIES THAT CAN REDUCE THE FREQUENCY OF SLICKLINE OPERATIONS

- Digital Oil Field Systems (DOF)
  - ❑ Utilize Digital Oil Field (DOF) technologies that develop algorithms to estimate downhole pressure and temperature.
  - ❑ DOF systems allow for real-time retrieval of shutdown reservoir pressure without manual calculation
  - ❑ Saves time and avoids tedious manual work
  - ❑ Improve data quality and make data available – better decisions
  - ❑ Automatic estimate shut-in pressure and daily liquid PI
  - ❑ Real time data acquisition without production downtime / intervention
  - ❑ Accuracy has been demonstrated to surpass traditional simulation models used by reservoir engineers, such as ECLIPSE simulations, which rely on shutdown gauge data for estimations

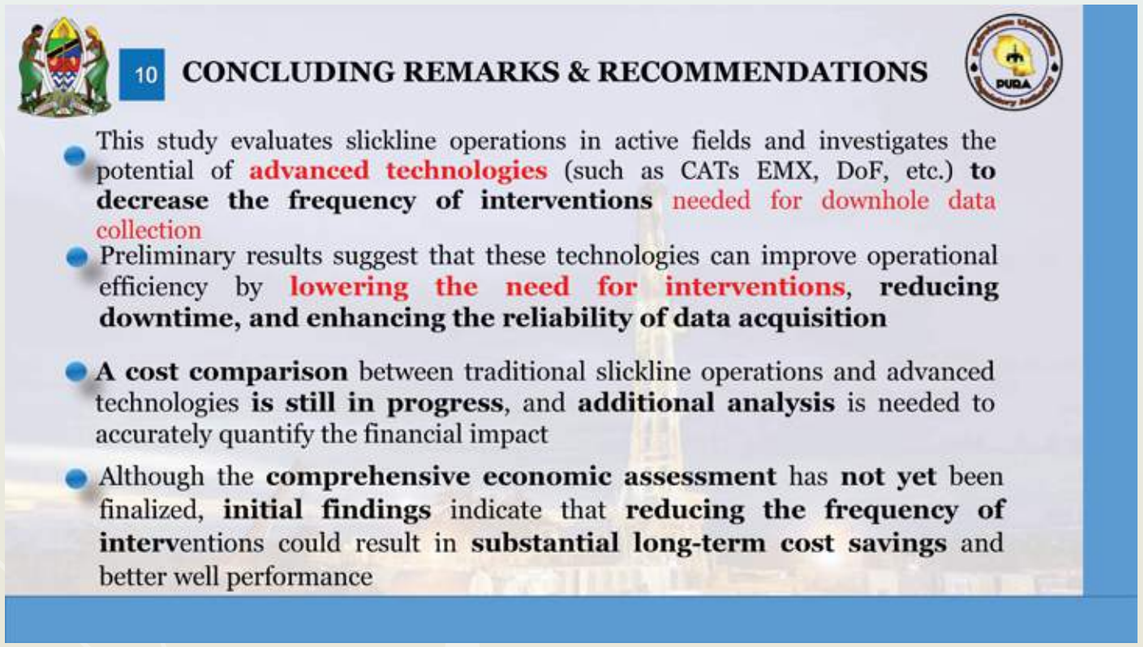
9

ANALYSIS

- Advanced technologies provide Real-time monitoring of downhole **pressure** and **temperature.**
- Minimized Intervention **Frequency**
- Reduced need for **onsite personnel**
- Reduced well **production downtime**
- A cost comparison between conventional slickline operations and advanced technologies is **still ongoing.**

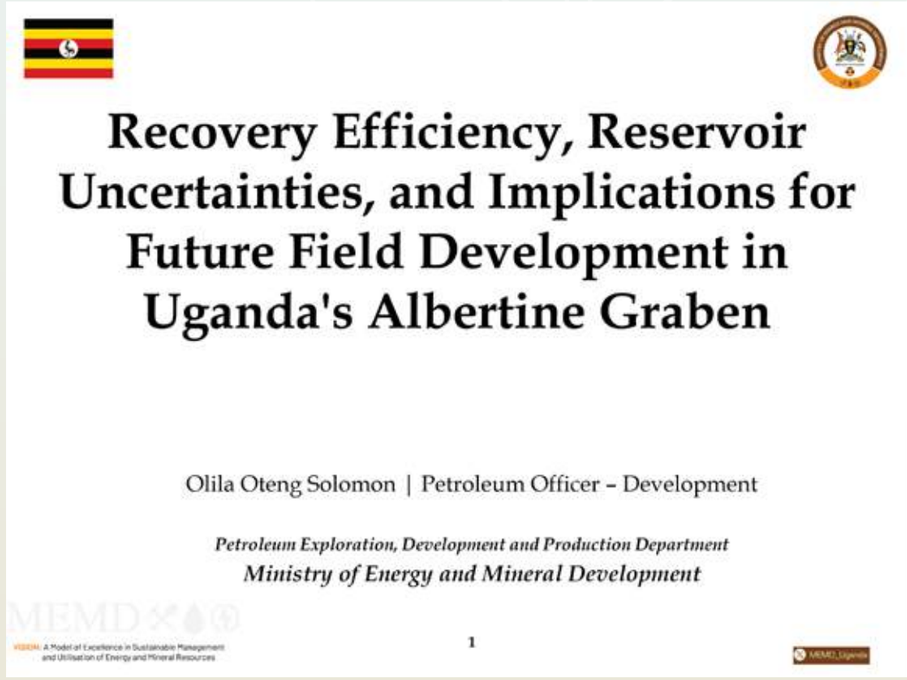
NDAU L. NDAU

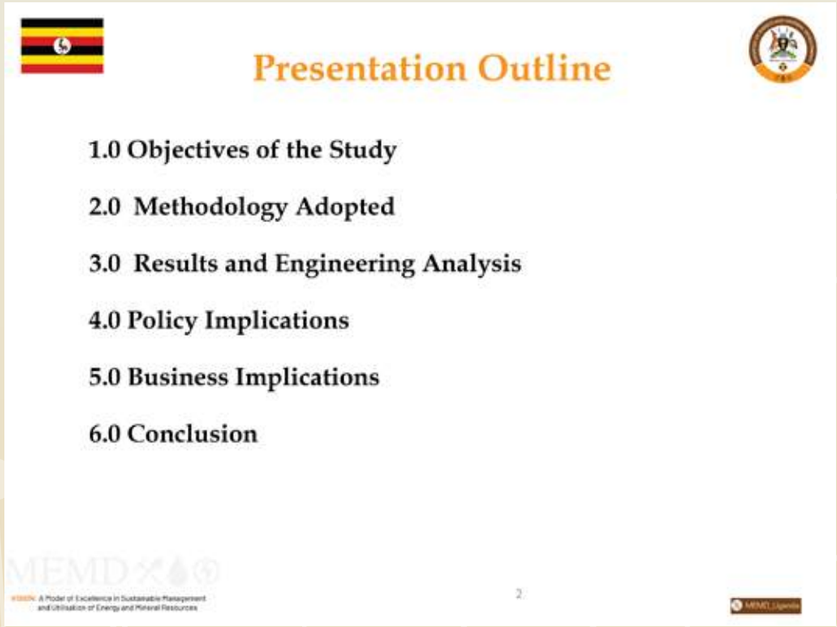
ASSESSMENT OF SLICKLINE OPERATIONS IN GAS PRODUCING FIELDS: REDUCING LIGHT WELL INTERVENTION (LWI) FREQUENCY THROUGH ADVANCE TECHNOLOGIES



OLILA OTENG SOLOMON

RECOVERY EFFICIENCY, RESERVOIR UNCERTAINTIES, AND IMPLICATIONS FOR FUTURE DEVELOPMENT IN UGANDA'S ALBERTINE GRABEN





OLILA OTENG SOLOMON

RECOVERY EFFICIENCY, RESERVOIR UNCERTAINTIES, AND IMPLICATIONS FOR FUTURE DEVELOPMENT IN UGANDA'S ALBERTINE GRABEN

1.0 Objective of the Study

1. Evaluate the dispersed waterflood development strategy.
2. Assess anticipated recovery performance under current injection strategies.
3. Identify engineering-driven optimizations.
4. Provide policy recommendations and business opportunities.

Based on Reservoir Simulation Results

Fields Under Study: Jobi-Rii (JR), Ngiri (NG), Gunya (GU),Kasamene-Wahrindi (KW) and Kigogole-Nsoga (KN)

2.0 Methodology Adopted (1)

- Reservoir performance analysis: RF vs. HCPVI.
- Comparative engineering framework analysis (Vaillant et al., TEPU strategy).
- Key Dimensionless Parameters:
  1. Mobility Ratio $M = \lambda_D / \lambda_d$
  2. Viscous-to-Gravity Ratio

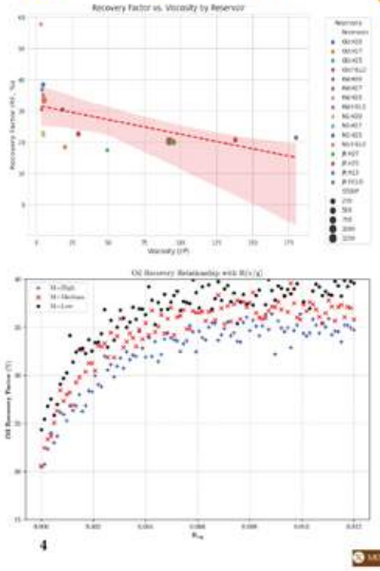
$$R_{v/g} = \left(\frac{\mu_o U}{k_v \Delta \rho g} \right) \frac{H}{L}$$

  3. HCPVI.

$$\text{HCPVI} = \frac{V_{inj}}{V_{hydrocarbon}}$$

  4. Recovery Injectivity Factor

$$\text{RIF} = \frac{\text{HCPVI}}{\text{Viscosity} \times \text{Well Spacing}}$$



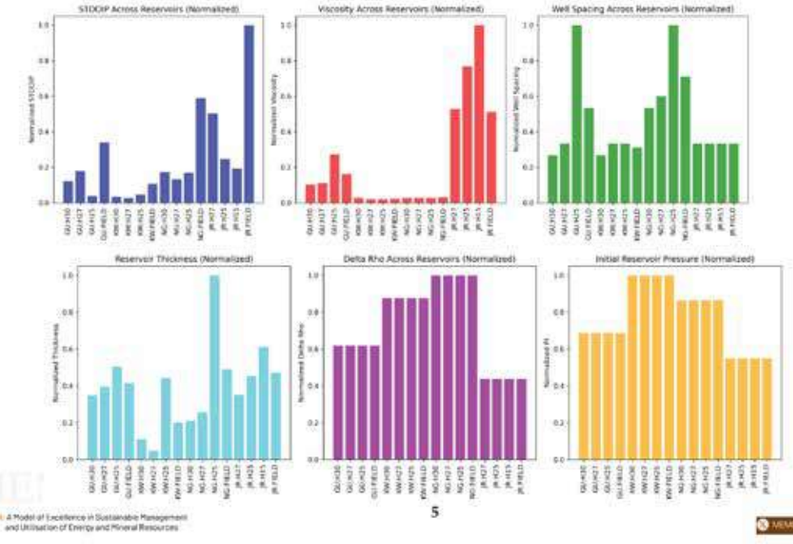
ANNEX | FIELD DEVELOPMENT

OLILA OTENG SOLOMON

RECOVERY EFFICIENCY, RESERVOIR UNCERTAINTIES, AND IMPLICATIONS FOR FUTURE DEVELOPMENT IN UGANDA'S ALBERTINE GRABEN

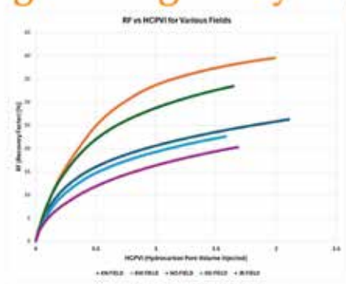
2.0 Methodology Adopted (2)

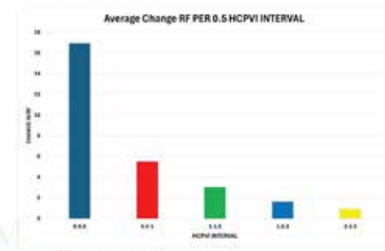
Reservoir Parameters Utilized



3.0 Results & Engineering Analysis

- Oil Viscosity-Driven Sweep Inefficiency: JR (High) vs. KW (Low).
- Injection Efficiency Decline Beyond 1.5 HCPVI.
- Gravity Segregation & Sweep Losses due to:
  1. Net reservoir distribution
  2. Reservoir heterogeneity's impact
  3. Vertical and lateral continuity
  4. Sweep efficiency in its mouth bar-dominated reservoir
- Well Spacing Optimization is Critical.
- Potential Recovery Improvement: 5-10% RF increase possible.





OLILA OTENG SOLOMON

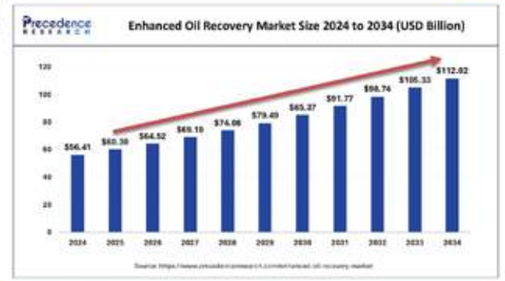
RECOVERY EFFICIENCY, RESERVOIR UNCERTAINTIES, AND IMPLICATIONS FOR FUTURE DEVELOPMENT IN UGANDA'S ALBERTINE GRABEN

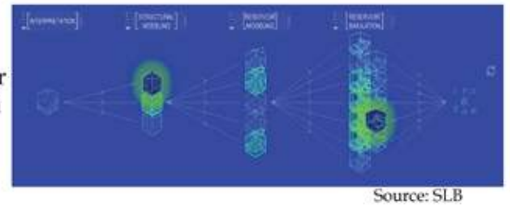
4.0 Policy Implications

- Encourage, incentivize and accelerate EOR policies (early polymer flooding in JR, GU).
- Promote development of independent research for improvement of recovery efficiency.
- Mandatory Reservoir Surveillance & Digital/ Intelligent field integration.
- **Projected Impact: 10-30% increase in recovery efficiency.**

5.0 Business Implications

- EOR Investment Potential ($50B+ increase in market by 2035, synonymous with subsurface storage, need for highly efficient production).
- Services for:
  - Statistical learning (AI) driven reservoir modeling and management.
  - Waterflood efficiency monitoring & smart completions.
- Returns on investment for in IOR/EOR on Ugandan fields.





Source: SLB

ANNEX | FIELD DEVELOPMENT

OLILA OTENG SOLOMON

RECOVERY EFFICIENCY, RESERVOIR UNCERTAINTIES, AND IMPLICATIONS FOR FUTURE DEVELOPMENT IN UGANDA'S ALBERTINE GRABEN

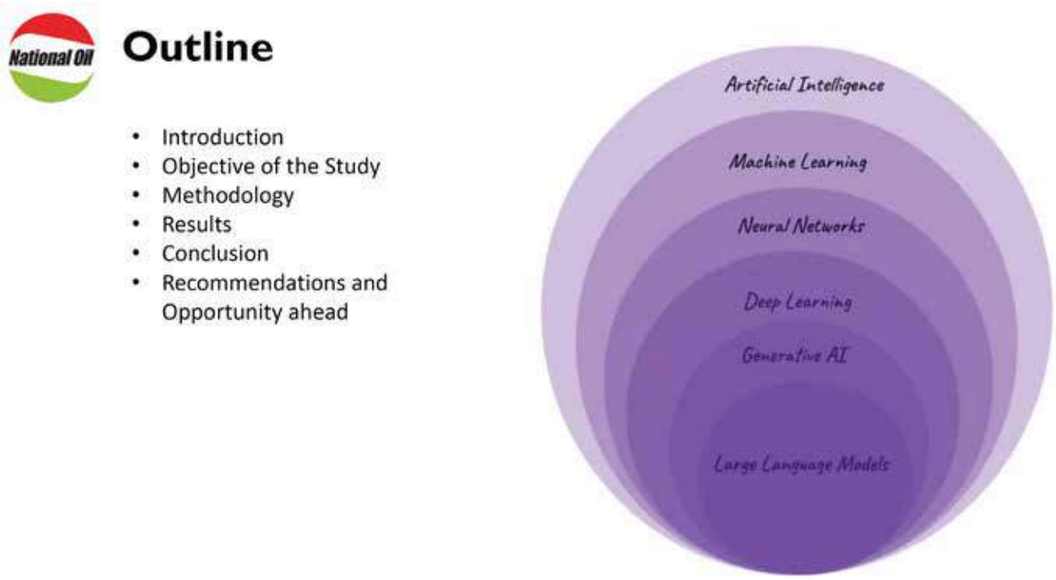
6.0 Conclusion & Thank You

- Uganda must continue to use best in class EOR/IOR for longevity of the role petroleum resources in the energy mix.
- Policy & private investments are critical to maximizing recovery efficiency for Sustainable Development
- **Uganda's oil fields are an opportunity to pioneer the next generation of engineering solutions for sustainability.**

Thank You! Questions?

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION



ANNEX | DATA MANAGEMENT

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Introduction

What is Artificial Intelligence (AI)?

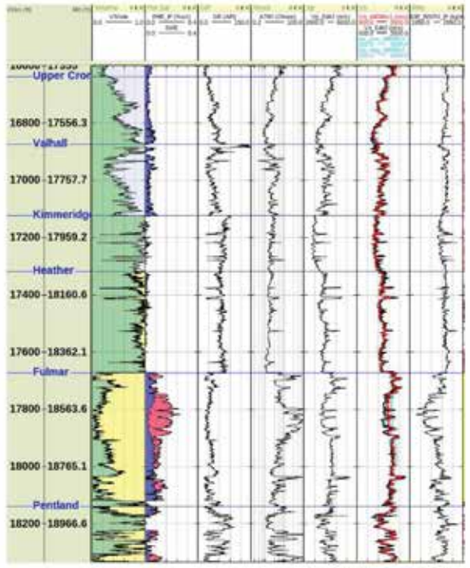
Simulation of human intelligence in machines. Includes natural language processing, computer vision, expert systems.

What is Machine Learning?

Subset of AI focusing on data-driven predictions and decisions.
Types: ***Supervised learning, unsupervised learning, reinforcement learning***

Objective of the Study

- Develop a machine learning model for predicting missing well logs.
- Improve data-driven decision-making in subsurface characterization.
- Enhance efficiency in well log analysis and reservoir evaluation.
- Evaluate the feasibility and effectiveness of Machine Learning in well log prediction.



Source: IkonScience

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Methodology

Data Preparation	Combined log data collected
Handling Missing Data	Replaced missing values (-999.25) and dropped NaNs
Feature Selection	Used well log parameters (GR, SP, ILD, SFLU) to predict DT
Model Selection	Applied Randon Forest Regressor with optimized parameters
Training & Validation	Split dataset (80/20), trained, and tested the model
Prediction & Evaluation	Predicted DT for 'Hothori-1' and evaluated performance (R^2, MAE).

Methodology

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```
-ASC  DEPTH          SP          SN          ILD
   2684.96320  -999.25000  -999.25000  -999.25000
   2685.13560  -999.25000  -999.25000  -999.25000
   2685.28800  -999.25000  -999.25000  -999.25000
   2685.44040  -999.25000  -999.25000  -999.25000
   2685.59280  -999.25000  -999.25000  -999.25000
   2685.74520  -999.25000  -999.25000  -999.25000
   2685.89760  -999.25000  -999.25000  -999.25000
   2686.05000  -999.25000  -999.25000  -999.25000
   2686.20240  -999.25000  -999.25000  -999.25000
   2686.35480     1.52319    12.29828    9.70432
   2686.50720     1.30184    12.03907    9.55378
   2686.65960     1.42505    11.78955    9.33420
   2686.81200     1.84913    11.58855    9.11235
   2686.96440     2.13365    11.46228    8.98120
   2687.11680     2.99730    11.91099    9.01487
```

	WELL NAME	DEPTH	GR	SP	ILD	DT	SFLU
0	Hothori-1	5390.0	21.75281	8.50452	-999.25	56.28024	6.36118
1	Hothori-1	5390.5	21.09875	9.16833	-999.25	55.71958	6.39468
2	Hothori-1	5391.0	21.91573	9.40501	-999.25	55.65586	6.39874
3	Hothori-1	5391.5	23.61090	9.25109	-999.25	56.21104	6.44979
4	Hothori-1	5392.0	25.58877	7.62641	-999.25	56.40633	6.48193

ANNEX | DATA MANAGEMENT

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Methodology

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Handling Missing Data	Replaced missing values (-999.25) and dropped NaNs
Feature Selection	Used well log parameters (GR, SP, ILD, SFLU) to predict DT
Model Selection	Applied Randon Forest Regressor with optimized parameters
Training & Validation	Split dataset (80/20), trained, and tested the model
Prediction & Evaluation	Predicted DT for 'Hothori-1' and evaluated performance (R^2, MAE).

	DEPTH	GR	SP	ILD	DT	SFLU
count	74468.000000	74373.000000	73985.000000	73984.000000	74410.000000	52195.000000
mean	4754.197222	52.313359	-29.845215	100.062306	68.151529	87.231345
std	3680.583492	24.457872	33.659402	380.779890	37.495798	201.535122
min	1.981200	6.195830	-116.641900	-999.250000	7.724060	-999.250000
25%	1882.863900	33.777190	-51.012040	2.097237	53.239815	4.298525
50%	3359.886600	47.747830	-29.924050	4.753695	70.618500	7.857090
75%	7107.625000	65.387980	-5.363040	15.659445	91.026040	60.778710
max	14408.000000	234.839230	77.101040	2125.689410	175.683260	2014.185110

```
training_wells = ['Elgal-2','Elgal-1', 'Endela-1']
test_well = ['Hothori-1']
```

Training wells data

	DEPTH	GR
count	34153.000000	34153.000000

Test well data

	DEPTH	GR
count	17663.000000	17663.000000

Methodology

Data Preparation	Combined log data collected
Handling Missing Data	Replaced missing values (-999.25) and dropped NaNs
Feature Selection	Used well log parameters (GR, SP, ILD, SFLU) to predict DT
Model Selection	Applied Randon Forest Regressor with optimized parameters
Training & Validation	Split dataset (80/20), trained, and tested the model
Prediction & Evaluation	Predicted DT for 'Hothori-1' and evaluated performance (R^2, MAE).

```
X =  train_data[['GR','SP','ILD','SFLU']]
y =  train_data['DT']
```

```
Hothori_X =  test_data[['GR','SP','ILD','SFLU']]
Hothori_X.head
test_data['Pred_DT'] = reg.predict(Hothori_X)
```

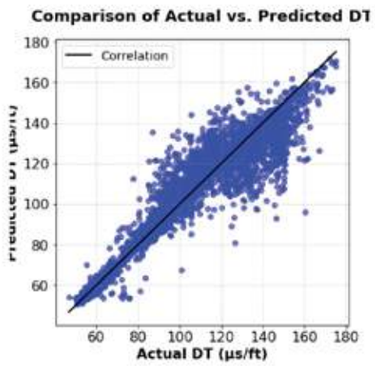
```
Hothori_X.head()
```

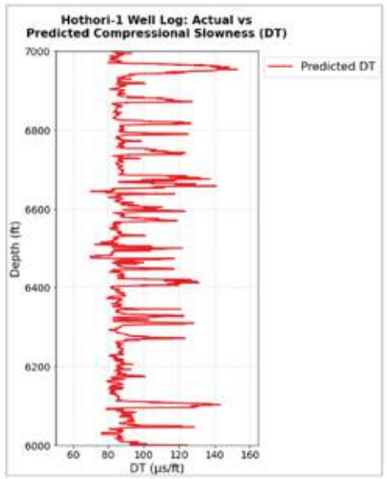
	GR	SP	ILD	SFLU
374	34.11968	-39.22084	2029.62453	1.92078
375	37.29178	-51.80053	1734.64851	3.91167
376	38.56425	-66.50855	917.41601	6.78847
377	39.53873	-59.13978	2.36123	8.57278
378	40.04981	-59.02562	3.72818	9.64443

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Results



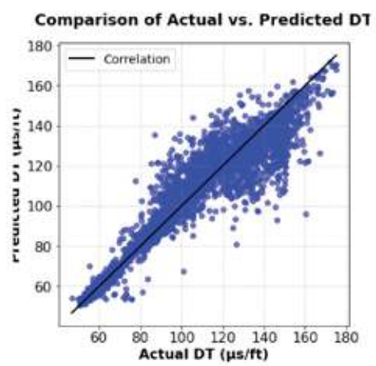


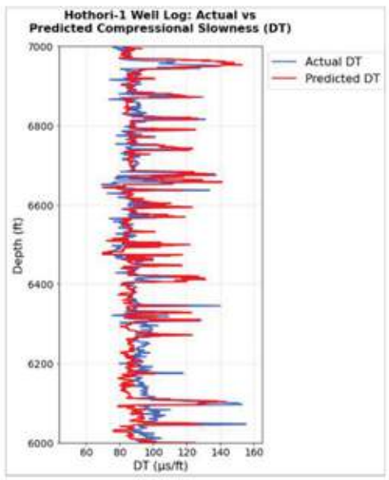
Model achieved high accuracy with R^2 score of 0.9541 and low Mean Absolute Error (MAE) of 3.55.

Predicted DT values closely matched actual well log data.

Successfully integrated missing well logs into the analysis.

Results





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KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Conclusion

1. Machine Learning enhances **well log prediction accuracy**.

2. **Random Forest** model efficiently **handles missing well log data**.

3. AI-driven methodologies **improve data management** in oil and gas exploration.

Saudi Aramco unveils industry's first generative AI model

At Saudi Arabia's annual tech conference, LEAP, Aramco announced its first artificial intelligence (AI) model to increase efficiency and decrease costs.

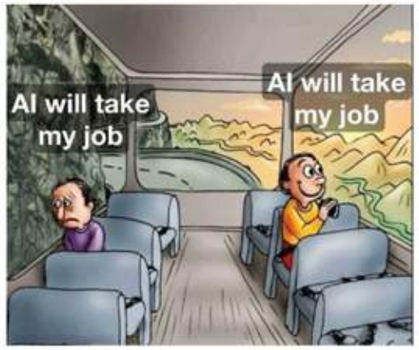
Home > Energy > Digitalisation > Data in equinor

Subsurface data and AI in Equinor

Binge watch online from 3,000 meters below ground? You can if you are a subsurface specialist turned data scientist.

Recommendations and Opportunity ahead

- Leverage ML-based well log prediction to **minimize exploration costs**.
- **Champion and Develop AI-driven solutions** for advanced analytics.
- Enhance efficiency and data integration to **attract investors** in energy technology.
- **Strengthen collaboration** between industry stakeholders and academia for innovation and knowledge exchange.



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MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Recommendations and Opportunity ahead

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The global market for AI applications in oil and gas value chains will be nearly USD 3 billion in 2024 and USD 5.2 billion in 2029, according to Mordor Intelligence.[1] Nearly half (47%) the oil and gas industry professionals surveyed for DNV's Transforming Through Uncertainty report say their organizations will use AI in operations in 2024 (Table 1).[2]

ANNEX | DATA MANAGEMENT

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

Recommendations and Opportunity ahead

- Leverage ML-based well log prediction to **minimize exploration costs**.
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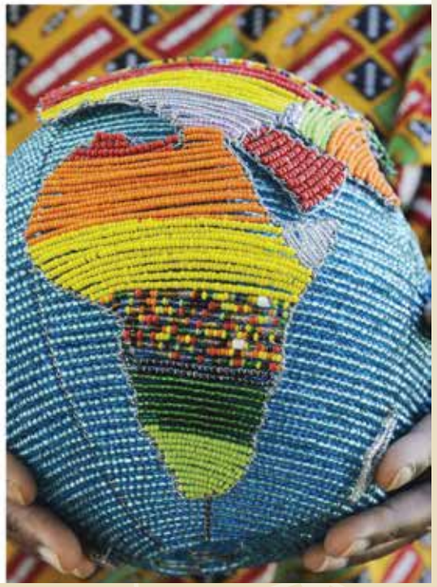


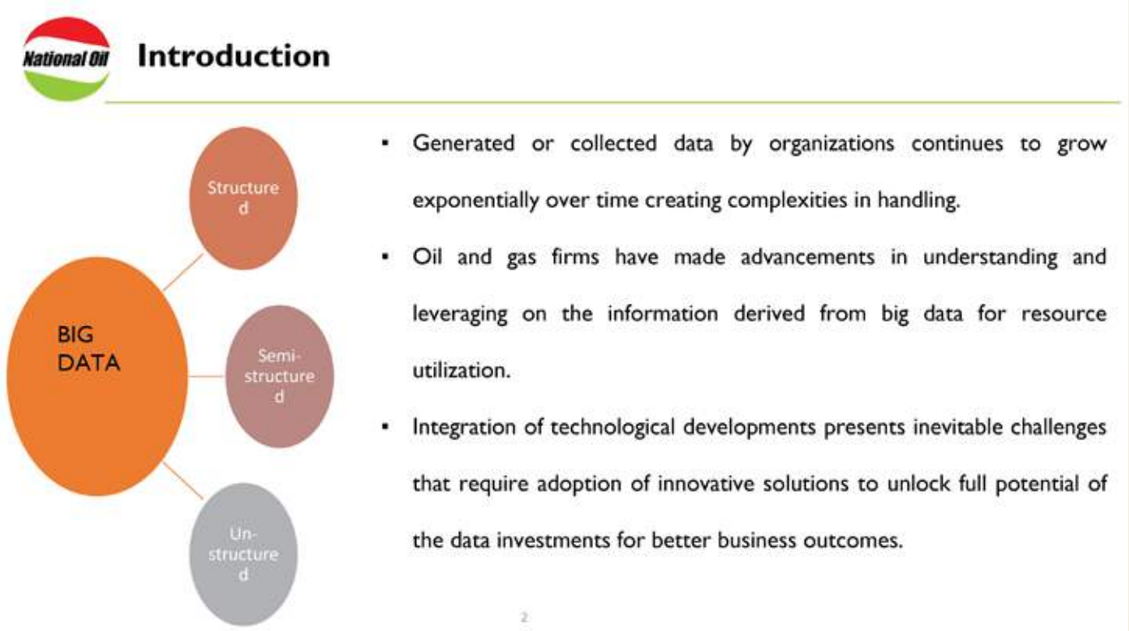
ANNEX | DATA MANAGEMENT

KATHLEEN ASENA

MACHINE LEARNING IN OIL AND GAS DATA MANAGEMENT: A CASE OF WELL LOG PREDICTION

E. KIMBURI

OPPORTUNITIES AND CHALLENGES OF BIG DATA IN THE OIL AND GAS INUSTRY IN KENYA



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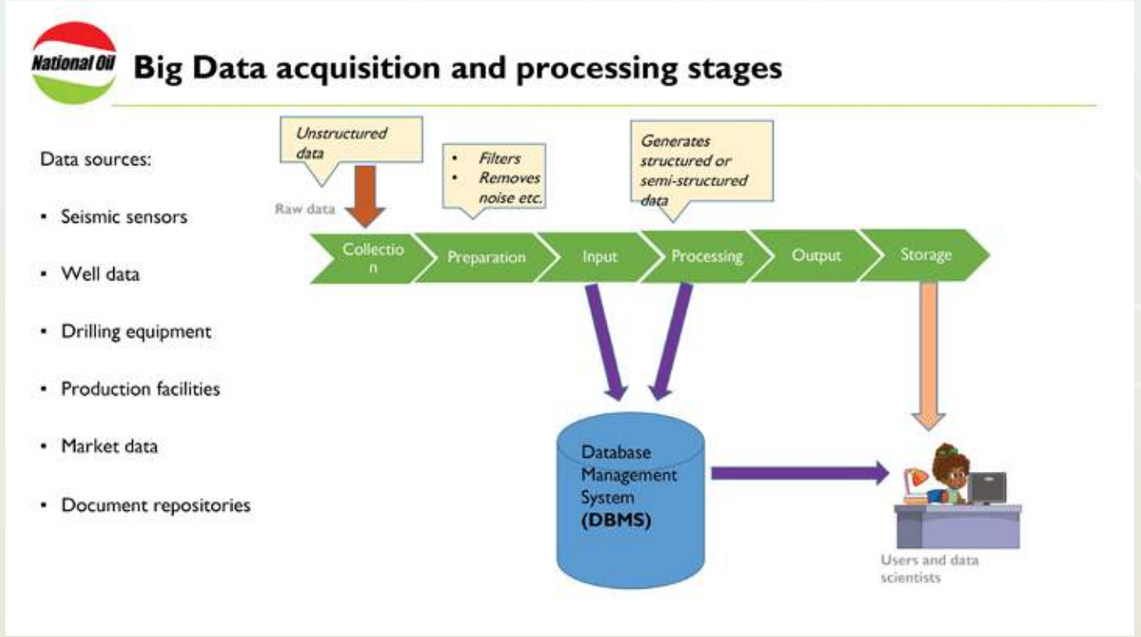
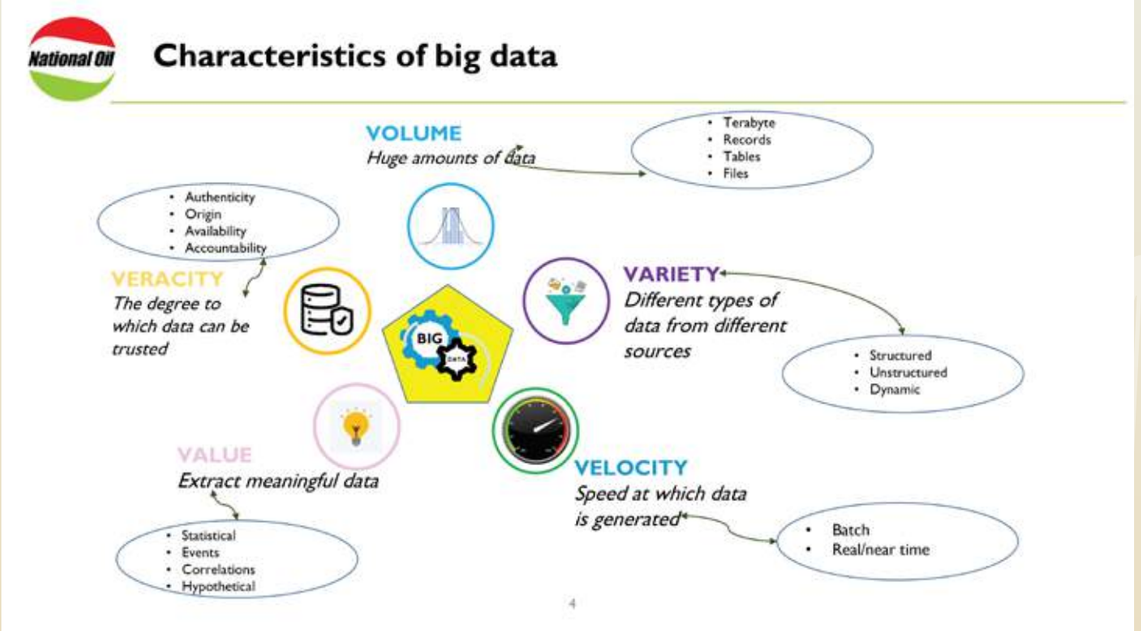
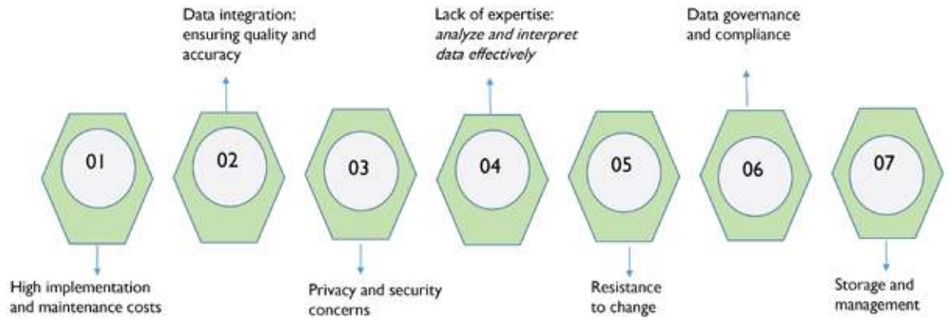




E. KIMBURI

OPPORTUNITIES AND CHALLENGES OF BIG DATA IN THE OIL AND GAS INUSTRY IN KENYA

Big data Challenges



5

Navigating complexities…

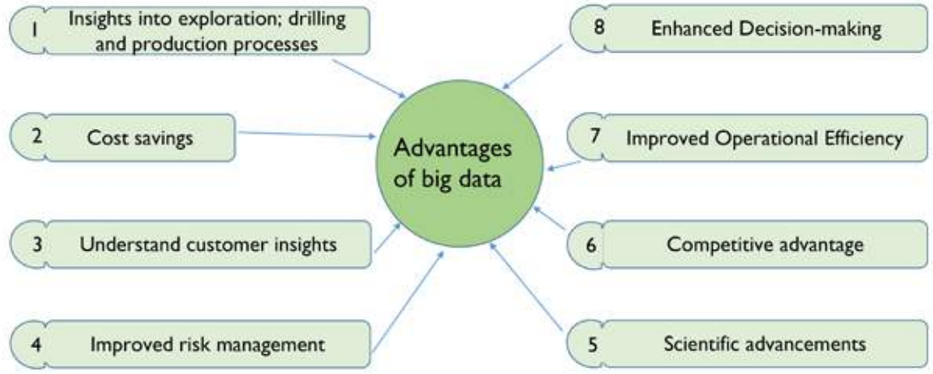
- ✓ *Cost:* The kind of data solution envisaged for the most ROI value should always be reviewed based on the scope of work.
- ✓ *Data integration:* It is good practice to use a combination of approaches like consolidation, propagation, federation and virtualization.
- ✓ *Privacy and security:* increase the security of your data, like: automate security updates, automate backups, install operating system updates, firewalls, etc.
- ✓ *Expertise:* Leverage on workforce training to instil the skills relevant with emerging technological advancements.
- ✓ *Change management:* Communication, timing. Employee Participation, Provide Training and Resources. . Implement the change incrementally, and use data to guide adoption.
- ✓ Robust *governance* frameworks and educate the employees/ users
- ✓ *Keeping up with growth of data:* Adopt a DBMS - relational database management system. inspection, cleaning, verifying and reporting.

Custodians of oil and gas data need to invest in big data and AI solutions..

E. KIMBURI

OPPORTUNITIES AND CHALLENGES OF BIG DATA IN THE OIL AND GAS INUSTRY IN KENYA

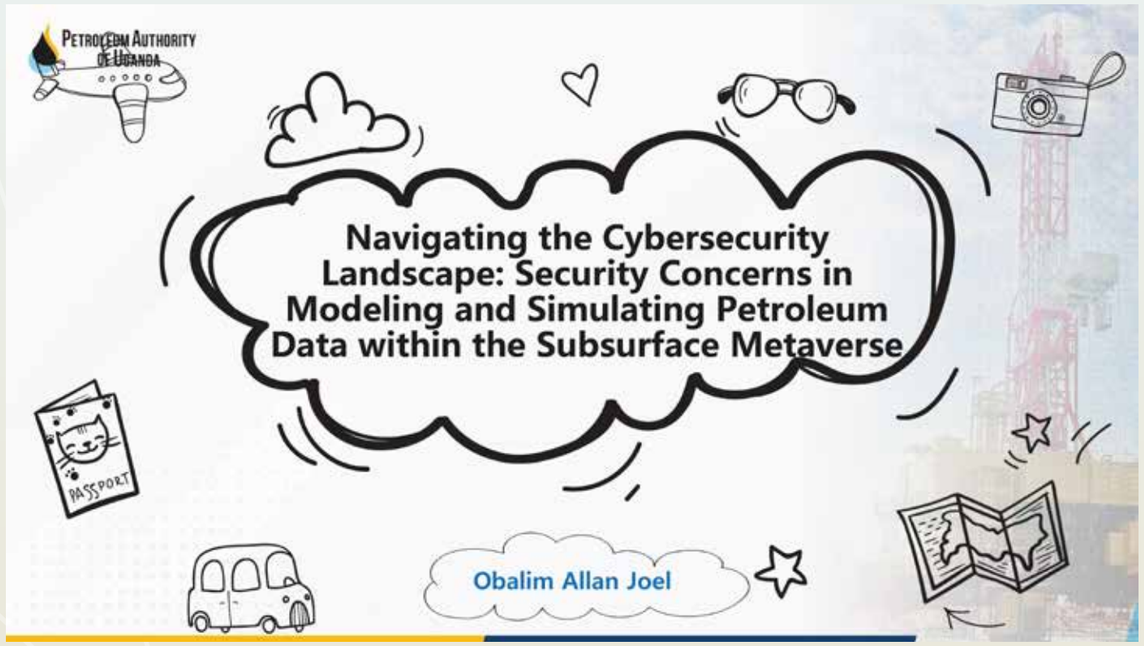
Opportunities derived from big data



8

OBALIMI ALLAN JOEL

NAVIGATING THE CYBERSECURITY LANDSCAPE: SECURITY CONCERNS IN MODELING AND SIMULATING PETROLEUM DATA WITHIN THE SUBSURFACE METAVERSE



ANNEX | DATA MANAGEMENT

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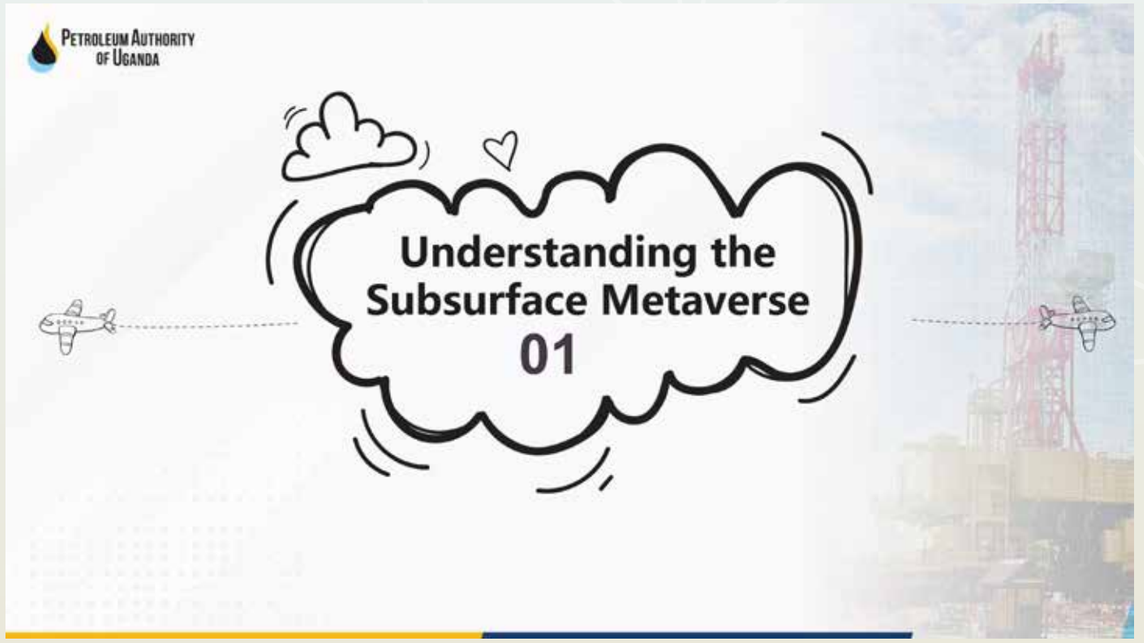

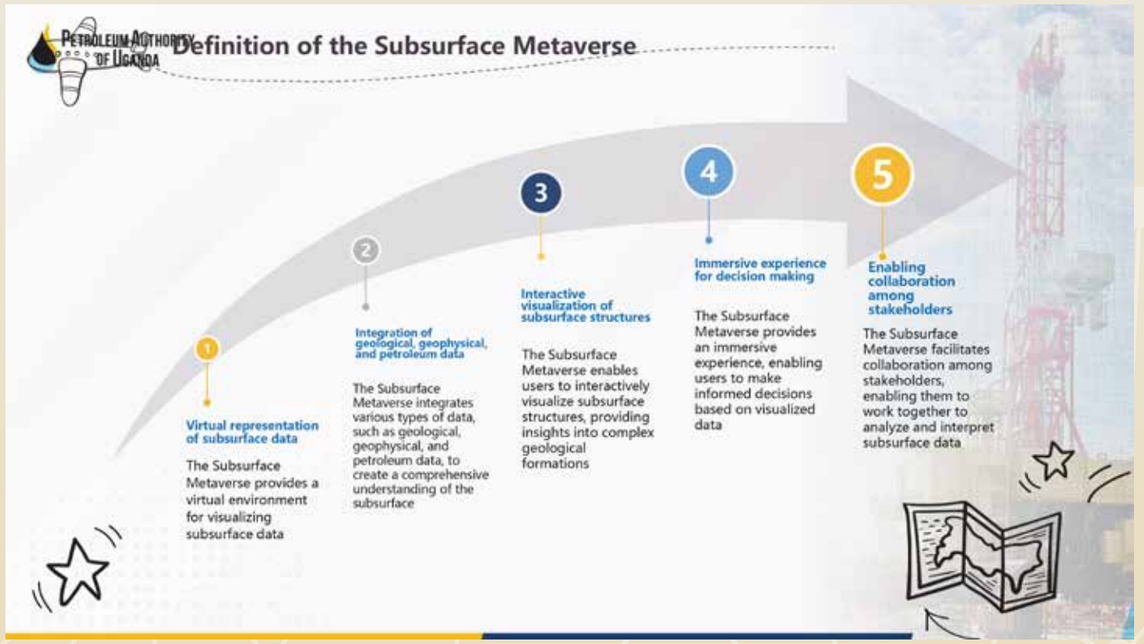

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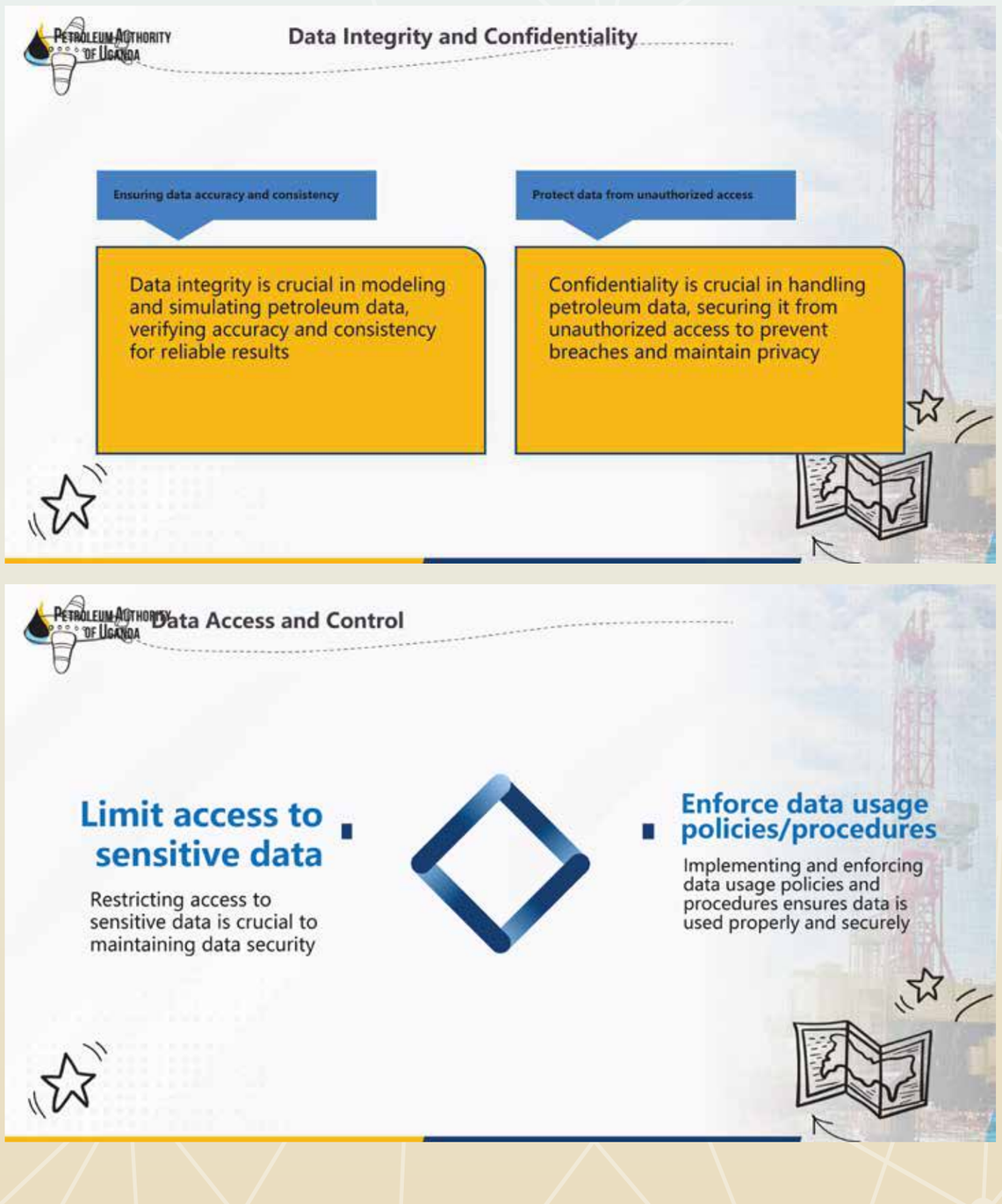

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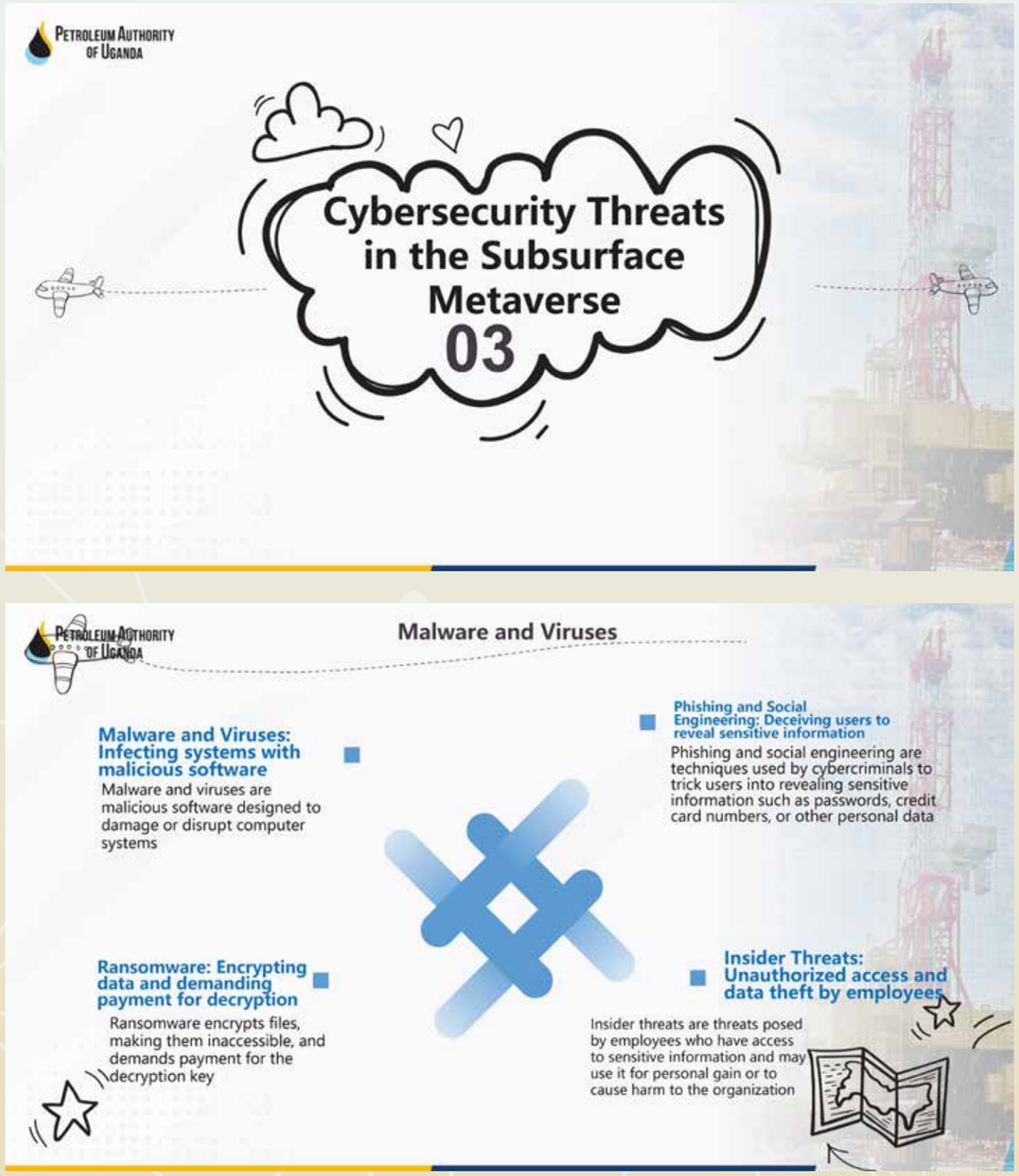

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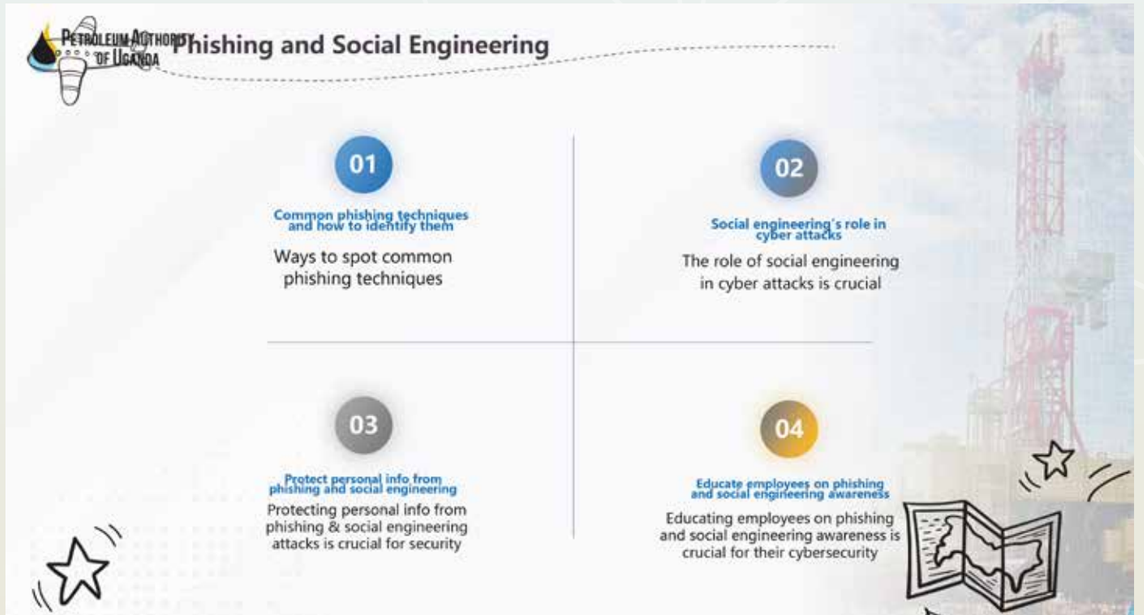

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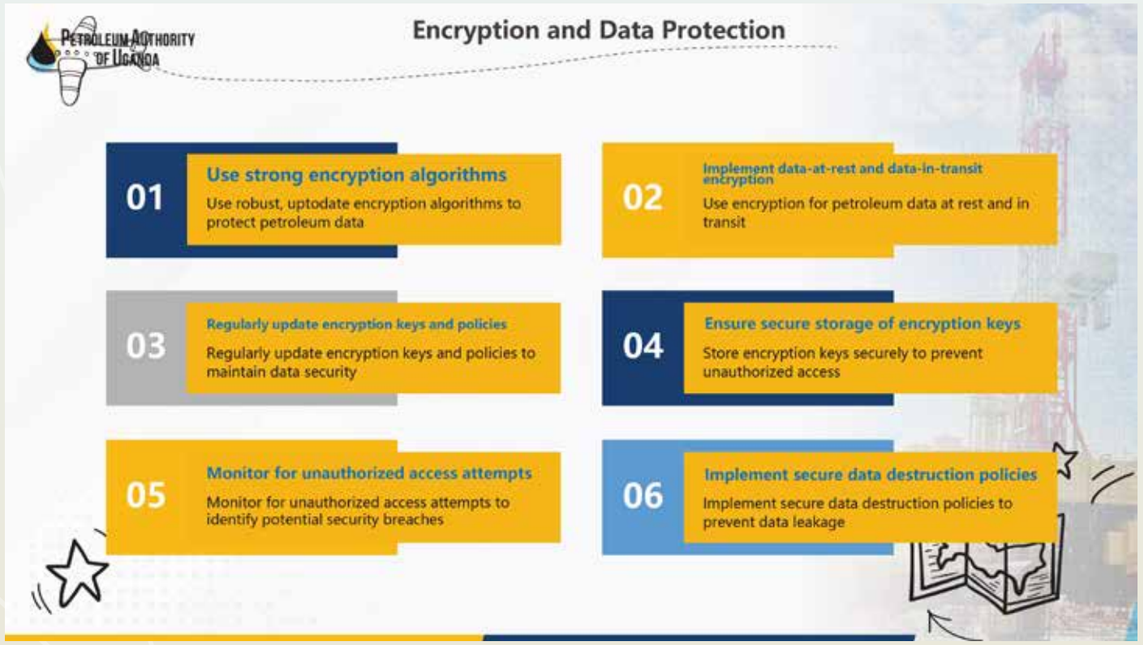

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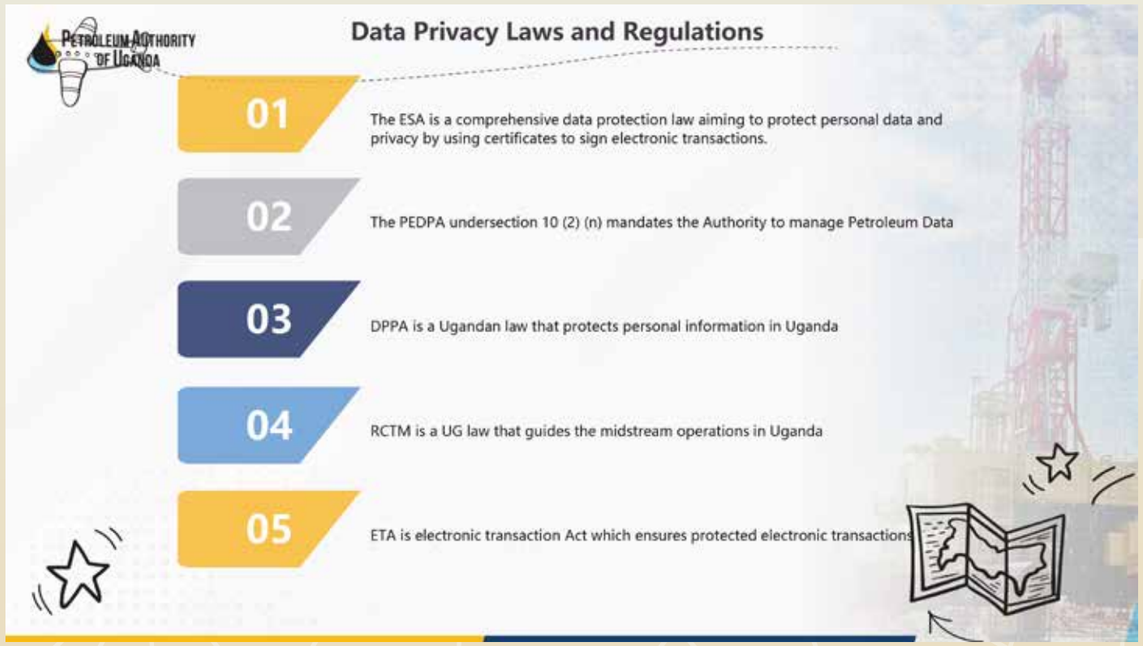

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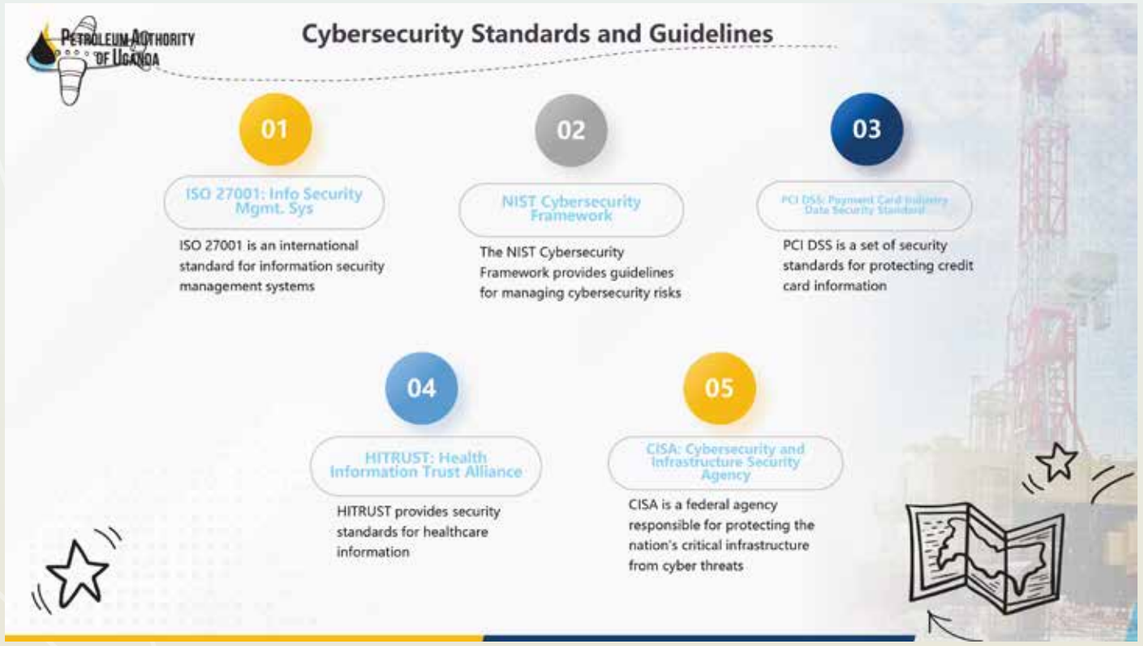

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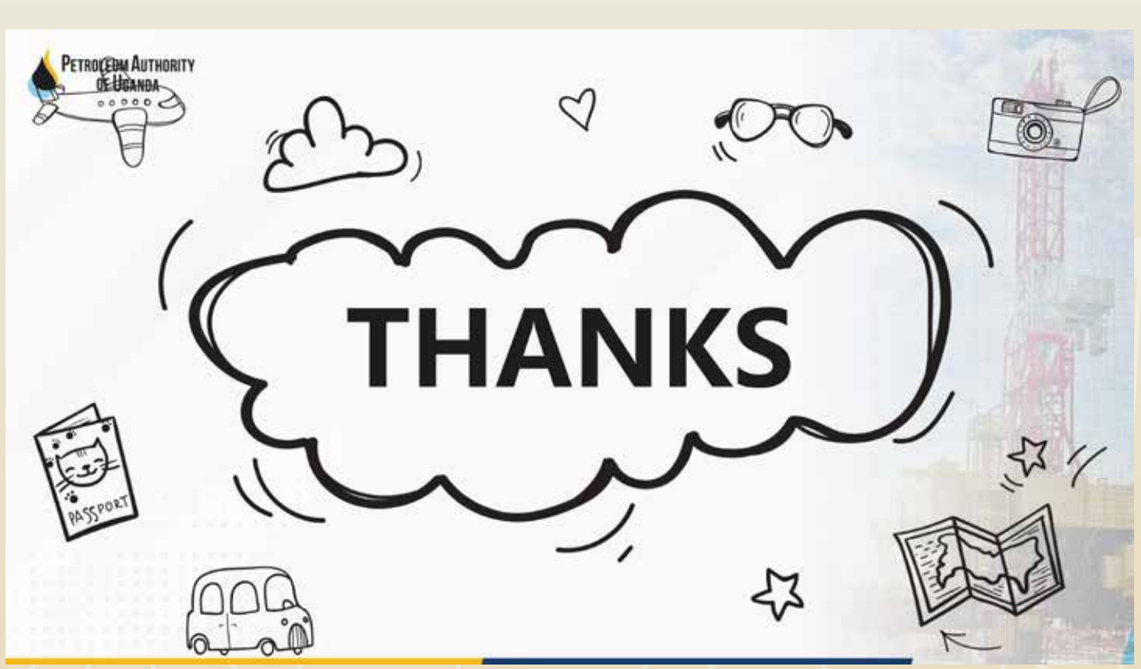
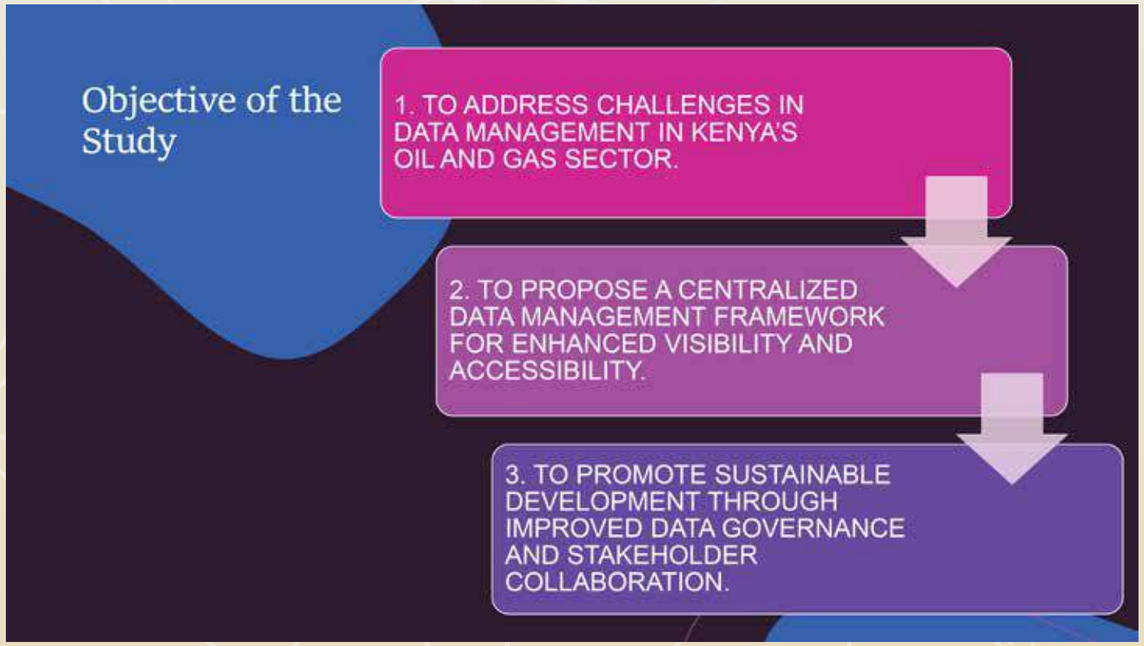


STEPHEN MWONI KITAVI

DATA MANAGEMENT: ENHANCING OIL AND GAS VISIBILITY AND ACCESSIBILITY IN KENYA FOR SUSTAINABLE DEVELOPMENT



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SUSAN BYONA

TOOLS AND BEST PRACTICES FOR PETROLEUM DATA QUALITY MANAGEMENT IN UGANDA

TOOLS AND BEST PRACTICES FOR PETROLEUM DATA QUALITY MANAGEMENT IN UGANDA

11TH EAST AFRICAN PETROLEUM CONFERENCE AND EXHIBITION

05TH – 7TH MARCH 2025, DAR ES SALAAM

SUSAN BYONA
SENIOR GEOPHYSICIST

VISION
A Model of Excellence in Sustainable Management and Utilisation of Energy and Mineral Resources

OUTLINE

1. Introduction
   - Institutional and Legal Framework
2. Management of Upstream Petroleum Data in Uganda
   - Types and Sources
   - Practices
   - Tools
   - Achievements in Uganda
   - Future Developments
3. Conclusion

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TOOLS AND BEST PRACTICES FOR PETROLEUM DATA QUALITY MANAGEMENT IN UGANDA

1.0 INTRODUCTION

1.1) Institutional and Legal Framework For Petroleum Data Management

Government, Organizational Structure, & Responsibilities

- Policy Formulation
- Approve DM systems
- Data provision and sales
- Data Acquisition
- Management of data in unlicensed areas

- Data management for licensed areas
- Ensure Compliance of licensees with data management laws regulations

- Use data to make investment decisions
- Generate Data

OTHER IOCS also generate and use data

Guiding Legal Framework of Data Management

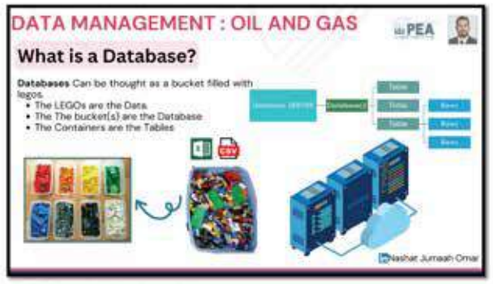
- National Oil and Gas Policy, 2008
- Petroleum (EDP) Act, 2013, Section 10(2)(n) on Management of Petroleum Data & Section 148 on Information, data and reports – Submission and related Regulations.
- Other Guidelines & Procedures (on ICT, Records Management, E&P activities) and other Government legislation on Information and ICT.

Other users include Academia, researchers, and national planners

1.0 INTRODUCTION

1.2) Petroleum Data Management

Efficient organization, storage, maintenance, and retrieving the physical and digital data used across the oil and gas industry.



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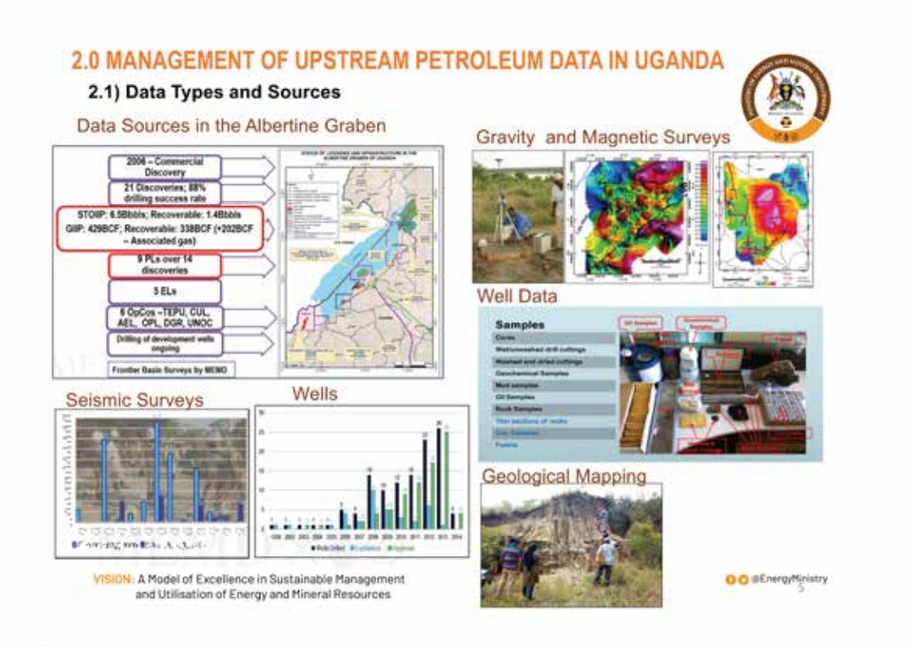
TOOLS AND BEST PRACTICES FOR PETROLEUM DATA QUALITY MANAGEMENT IN UGANDA



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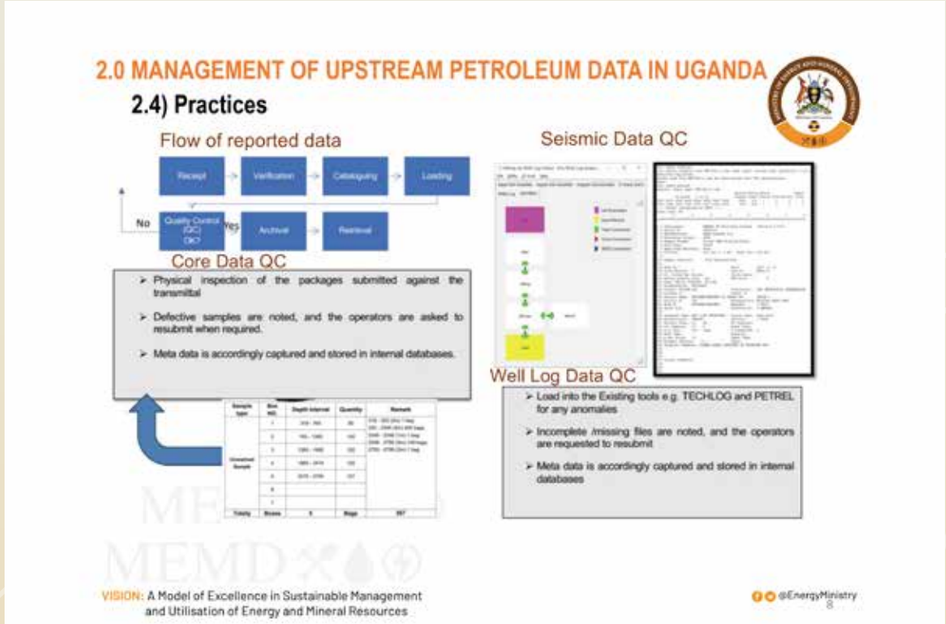

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TOOLS AND BEST PRACTICES FOR PETROLEUM DATA QUALITY MANAGEMENT IN UGANDA

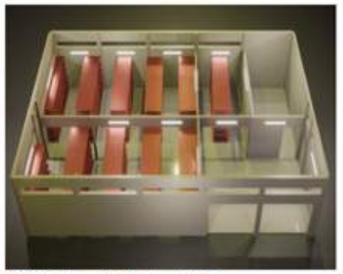
2.0 MANAGEMENT OF UPSTREAM PETROLEUM DATA IN UGANDA

2.5) Achievements

- A Better understanding of Uganda's petroleum resource potential.
  - Improved decision-making through access to quality data.
- Enhanced efficiency in promotion and licensing areas
- Increases revenues

2.6) Future Developments

- Set up of an offsite data backup and Disaster Recovery System (DRS)
- Equipping of the modern core storage facility
- Acquiring specialized data management tools



3D design of Modern Core

3.0 CONCLUSION

Implementing standardized data management practices promotes transparency & accountability.

Good quality data can generate income accruing from data sales.
Re-use of good quality data leads to more discoveries.

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TOOLS AND BEST PRACTICES FOR PETROLEUM DATA QUALITY MANAGEMENT IN UGANDA

Thank You

KANGOGO .A.

GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING

GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING.

- Presented by: Kangogo .A.

OBJECTIVE OF THE STUDY

- To investigate the effects of geopolitical factors on petroleum demand and pricing.
- To assess how political stability, trade relations, conflicts, and government policies influence global oil markets.
- To understand the economic impact of geopolitical events on oil prices and consumption patterns.
- To explore possible future trends in the petroleum market due to evolving geopolitical scenarios.

KANGOGO .A.

GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING

METHODOLOGY

- **Data Collection**: Review of historical data on petroleum prices, geopolitical events (e.g., conflicts, sanctions, trade agreements), and oil demand trends.Sources: OPEC, IEA, World Bank, national energy departments.
- **Qualitative Analysis**: Case studies of key geopolitical events (e.g.,Iranian Nuclear, Gulf Wars, Russian sanctions, OPEC decisions).

RESULTS OBTAINED

- **Oil Price Volatility**: Major geopolitical events (e.g., wars, sanctions) have led to significant fluctuations in oil prices. Examples include price hikes during the Gulf War (1990-1991) and the 2014 Russia-Ukraine conflict.
- **Shifts in Demand:** Geopolitical instability in oil-producing regions (Middle East, Russia) often leads to decreased supply, resulting in higher prices and lower demand in certain markets. Conversely, geopolitical cooperation (e.g., trade agreements) can lead to more stable prices and increased demand. Regional Variations:
- Demand in developed economies tends to be more sensitive to price changes driven by geopolitical factors.
- Emerging markets are increasingly influenced by global geopolitics, but their demand is more driven by economic growth.

KANGOGO .A.

GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING

CONCLUSION

- Oil-exporting countries leverage geopolitical influence to control market dynamics (e.g., OPEC's role in price setting).
- The global shift towards renewable energy and energy independence in response to geopolitical instability is reshaping the future of the petroleum market.
- Uncertainty due to conflicts, sanctions, and political instability often leads to volatility in oil prices.

POLICY IMPLICATIONS (GOVERNMENT)

- **International Cooperation:** Promoting international agreements on oil production and trade to ensure market stability and reduce geopolitical risk.
- **Strategic Reserves:** Establishing or enhancing national oil reserves to buffer against price spikes caused by geopolitical tensions.
- **Diversification of Energy Sources:** Governments should prioritize energy diversification to mitigate risks from geopolitical disruptions in the oil market.

KANGOGO .A.

GEOPOLITICAL INFLUENCE ON PETROLEUM DEMAND AND PRICING

BUSINESS OPPORTUNITY (PRIVATE SECTOR)

- **Technological Inventions Innovation in Energy Storage:** The need for better energy storage solutions to balance supply disruptions due to geopolitical events presents a growing market.
- **Energy Security Consulting:** Increased demand for consultancy services advising countries and companies on managing geopolitical risks in energy procurement.
- **Petroleum Infrastructure Development:** There's need for robust infrastructure to facilitate the safe and efficient transportation and storage of oil.
- **Oil & Gas Industry:** Companies operating in stable regions with access to strategic reserves or newer oil-producing areas (e.g., shale oil in the US) may have a competitive advantage in the face of global instability.

THANK YOU.

DORA ERNEST

THE STRATEGIC IMPERATIVE OF PETROLEUM RESERVES FOR EAST AFRICAN ENERGY SECURITY

THE STRATEGIC IMPERATIVE OF PETROLEUM RESERVES FOR EAST AFRICAN ENERGY SECURITY

PRESENTER: DORA ERNEST

PROBLEM STATEMENT

- ✓ East African countries, particularly Tanzania, are heavily reliant on imported petroleum products.
- ✓ Key Vulnerabilities:
  - Global supply disruptions.
  - Price volatility.
  - Trade currency challenges.
  - Geopolitical tensions.
- ✓ Risk: Dependency threatens energy security and economic stability amidst growing energy demands.

DORA ERNEST

THE STRATEGIC IMPERATIVE OF PETROLEUM RESERVES FOR EAST AFRICAN ENERGY SECURITY

GEOPOLITICAL EFFECTS ON PETROLEUM IMPORTS

- ✓ **OPEC+ Decisions:** Price impacts from production cuts>> Global price hikes reflected in import costs
- ✓ **Russia-Ukraine War:** Supply chain disruptions, Elevated shipping costs>> price volatility.
- ✓ **U.S.-China Trade Tensions:** Global shipping inefficiencies.
- ✓ Persian Gulf Instability: Risk to shipping routes (e.g., Strait of Hormuz). Potential supply bottlenecks increase prices
- ✓ **Trade Sanctions**: Limited access to certain crude oil sources>>>>>Reduced supply options.
- ✓ **Indian Ocean Maritime Security:** Piracy and trade risks.
- ✓ **Regional Conflicts**

WHY DO WE NEED SPR: RATIONALE

- ✓ **Ensure Energy Security:** Assured supply during emergencies/crisis and National Preparedness>>>>>Resilience against external shocks
- ✓ **Stabilize Markets:** Manage price volatility.
- ✓ **Economic Growth:** Infrastructure development and job creation
- ✓ Regional Petroleum Demand Growth: **6% annually.**
- ✓ **Storage Capacity Issues:** Most countries have limited storage (10-22 days vs. 90-day recommendation).
- ✓ **Dependence on Imports:** Vulnerable to geopolitical crises, shipping delays.
- ✓ **Economic Concerns:** Price instability increases inflationary pressures. Ports face capacity constraints during peak demand periods.

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STRATEGIES FOR SPR DEVELOPMENT

- ✓ **Regulatory & Policy frameworks:** legal mandate, stockholding obligations, price &market control
- ✓ **Infrastructure development plan:** Upgrade and expand current receiving facilities including depots, establish dedicated SPR storage with security measures, blended approach (combines Government reserve with mandated industry reserve)
- ✓ **Reserve size & stockholding level:** 60-90days, product mix, phased implementation
- ✓ **Financing Mechanisms:** Government budgetary allocation, Strategic reserve fees, Public-Private investment, Multilateral support
- ✓ **Supply chain logistics:** Imports& stockpiling mechanisms, road tankers, railways, inland deports for easy accessibility
- ✓ **Regional Integration & cooperation:** Align SPR polices, cross boarder storage agreements, Joint procurement initiatives

OVERVIEW OF SPR IMPLEMENTATION IN TANZANIA

THE CASE OF TANZANIA

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LEGAL & REGULATORY FRAMEWORK

Sn.	Legislation	Mandates
1	National Energy Policy, 2015	Define need of enhancing availability of reliable and affordable supply of petroleum to the domestic markets and its use in the sustainable manner.
2	Petroleum Act, 2015	Designate TPDC as National Oil Company and requires it at all times to keep and maintain the national reserve of petroleum products
3	EWURA ACT CAP 414	Regulates petroleum business.
4	STANDARD ACT	Set standards of quality of imported petroleum products
5	National Strategic Petroleum Reserve Regulations, 2014.	Guides on the operationalization of the SPR
6	Petroleum (General) Regulations, 2011	demands OMCs to maintain a physical operational stocks of not less than fifteen (15) days requirements in respective of their market share
7	Petroleum (Bulk Procurement) Regulations and its Amendment	Guides on efficient procurement of petroleum products through the Bulk Procurement System (BPS).
8	The standard (Import Registration and Batch Certification) Regulations 2021	Guides on procedures for testing of quality of petroleum before offloading from delivery vessel.
9	Petroleum Sampling Testing Rules 2010 G.N.211	Guides on procedures for testing of quality of petroleum in the country.
10	EWURA Petroleum (Product Price setting) Rules and its amendments	Guides on procedures for setting prices of petroleum products
11	The Petroleum (Whole sale Storage Retail and Consumer Installation operations) Rules and its amendments	Guides on standard of petroleum installations.
12	Petroleum Bulk Procurement System Implementation manual	Guides on the procedures for procurement, and offloading of Petroleum products

KEY FACTS

- The EWURA downstream Petroleum Subsector Performance Report for the financial year2022/2023 shows that, total consumption of petroleum products for 14 days amounts to **170,092,024.13 litres (equivalent to 170,092.02m^3)** of with petrol and diesel accounting for 94%.
- The analysis of the existing storage capacity shows that, the country has a total operational storage capacity of 1,637,222 m^3, Petrol and diesel constitute about 91 percent of the total capacity amounting to 1,495,962 m^3.
- Regulation 13 (4) of the SPR 2014 provides that SPR shall be financed by revenue collected from the petroleum fee. Currently the purpose of petroleum fee has not been achieved yet but serves for other uses based on the Government priorities
- TPDC has been given the legal mandate to establish the SPR>>>>Petroleum Act, 2025

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KEY ISSUES TO CONSIDER FOR SPR ESTABLISHMENT

- ✓ Financing options and criteria for selection of locations for SPR infrastructure facilities
- ✓ Operation and Management of SPR infrastructure
- ✓ Procurement of SPR products
- ✓ Financing of SPR product procurement
- ✓ Institutional responsibilities under SPR
- ✓ Pricing of SPR product
- ✓ Release and replenishment of SPR product

SPR VOLUME BUILDUP>>>>>TANZANIA

- ✓ SPR stock should be established based on the country's consumption for petroleum products mainly PMS and AGO
- ✓ Daily fuel consumption>>7.4 mil liters of AGO and 5.2 mil liters of PMS
- ✓ SPR tock build up >>>30 days by year 2040
- ✓ The initial stock is recommended to carter for 15 days, increase should be based on storage facility development plan which should be aligned with development of strategic infrastructure development in railway, pipeline and port.

Year	Reserve days	AGO (MT)	PMS (MT)
Dec-25	15	84,950	50,965
Dec-30	20	152,910	91,736
Dec-35	25	258,035	154,805
Dec-40	30	418,017	250,784

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ROADMAP FOR SPR INFRASTRUCTURE ESTABLISHMENT IN TANZANIA

ZONE	Location	SPR % allocation	Storage Capacity (MT)	Timeline	Cost (mil$)
Coastal Zone:	Dar es Salaam	25%	200,641	2027	188
Northern zone:	Tanga	20%	160,513	2029	238
Southern zone	Mtwara	10%	80,256	2031	143
Central zone:	Dodoma	15%	120,385	2033	143
Southern Highlands Zone:	Makambako Njombe	10%	80,256	2034	48
Lake & Western Zone:	Shinyanga	15%	120,385	2036	143
	Kigoma	5%	40,128	2037	95
Total		**100%**	**802,564**		**998**

Costs includes other associated infrastructure including logistics

SPR FINANCING AND PRODUCT PRICING

Financing of SPR Facilities

a) **Government budgetary Allocation**

b) **Petroleum and BPS SPR fee:** **Regulation** 13 (4) of the SPR 2014 provides that SPR shall be financed by revenue collected from a petroleum fee.

c) **BPS SPR fee:** In line with SPR Regulations 13 (3), the government through BPS may introduce BPS SPR fee to be payable by the suppliers through PBPA.

d) **Loans**

e) **Joint venture/ Involvement of private sectors**

SPR Stock Financing

- BPS LC arrangement
- Government funding
- Bilateral agreements

Pricing mechanism on SPR stocks

- FOB
- Premium
- Storage + MI Loss
- SPR sustainability cost (overheads and margin)
- Financing Cost

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THE STRATEGIC IMPERATIVE OF PETROLEUM RESERVES FOR EAST AFRICAN ENERGY SECURITY

THE IMPACT OF THE SPR RELEASE IN THE FINAL COST OF PETROLEUM PRODUCTS

Release of SPR cargo in the market is expected to affect final consumer prices given the timelines for release is longer though the magnitude will depend on the following factors

- ✓ FOB price of SPR cargo
- ✓ Storage fee accumulated
- ✓ Financing arrangements
- ✓ Other costs such as premium are assumed constant across the market

THE IMPACT OF THE SPR RELEASE IN THE FINAL COST OF PETROLEUM PRODUCTS

- ✓ Simulation on quarterly release of SPR cargo to monthly cost of importing petroleum products for period June 2022-June 2024.
- ✓ 50 percent of the SPR stock is released in the market quarterly.
- ✓ On average the costs/prices of AGO and PMS would have increased by TZS 44.9 and TZS 12.9 per litre as a result of SPR.
- ✓ It is worth noting that, in some months, per unit cost of SPR cargo is lower due to lower FOB.
- ✓ In general, as long release of SPR cargo is done gradually will not affect final consumer prices. Summary of simulation result is summarized below

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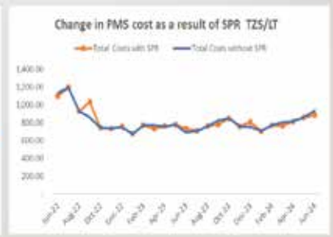
Simulation of Net effect of SPR cargo release in June 2022 – June 2023

	Unit	Av. Cost	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
AGO															
Total Costs Without SPR	$'MT	929.2	1,260	1,431	1,171	1,126	1,033	1,116	1,028	896	932	871	825	789	711
Total Costs with SPR	$'MT	952.5	1,204	1,431	1,171	1,286	1,033	1,116	1,038	896	932	891	825	789	775
Net Effect	TZS/LT	(44.9)	68	-	-	(308)	-	-	(10)	-	-	(30)	-	-	(125)
PMS															
Total Costs without SPR	$'MT	835.0	1,136	1,194	925	858	741	733	748	672	771	768	759	776	689
Total Costs with SPR	$'MT	842.8	1,098	1,194	925	1,036	741	733	754	672	771	730	759	776	734
Net Effect	TZS/LT	(12.9)	73	-	-	(342)	-	-	(12)	-	-	73	-	-	(87)



Graph showing the variation of net effect as a result of SPR

CONCLUSION AND RECOMMENDATIONS

- ✓ SPR is critical for enhancing **energy security and economic stability**
- ✓ Collaborative effort among government, private sector, and regional member state is essential
- ✓ Establishment of the SPR should be a priority for any National Energy Policies among east African countries

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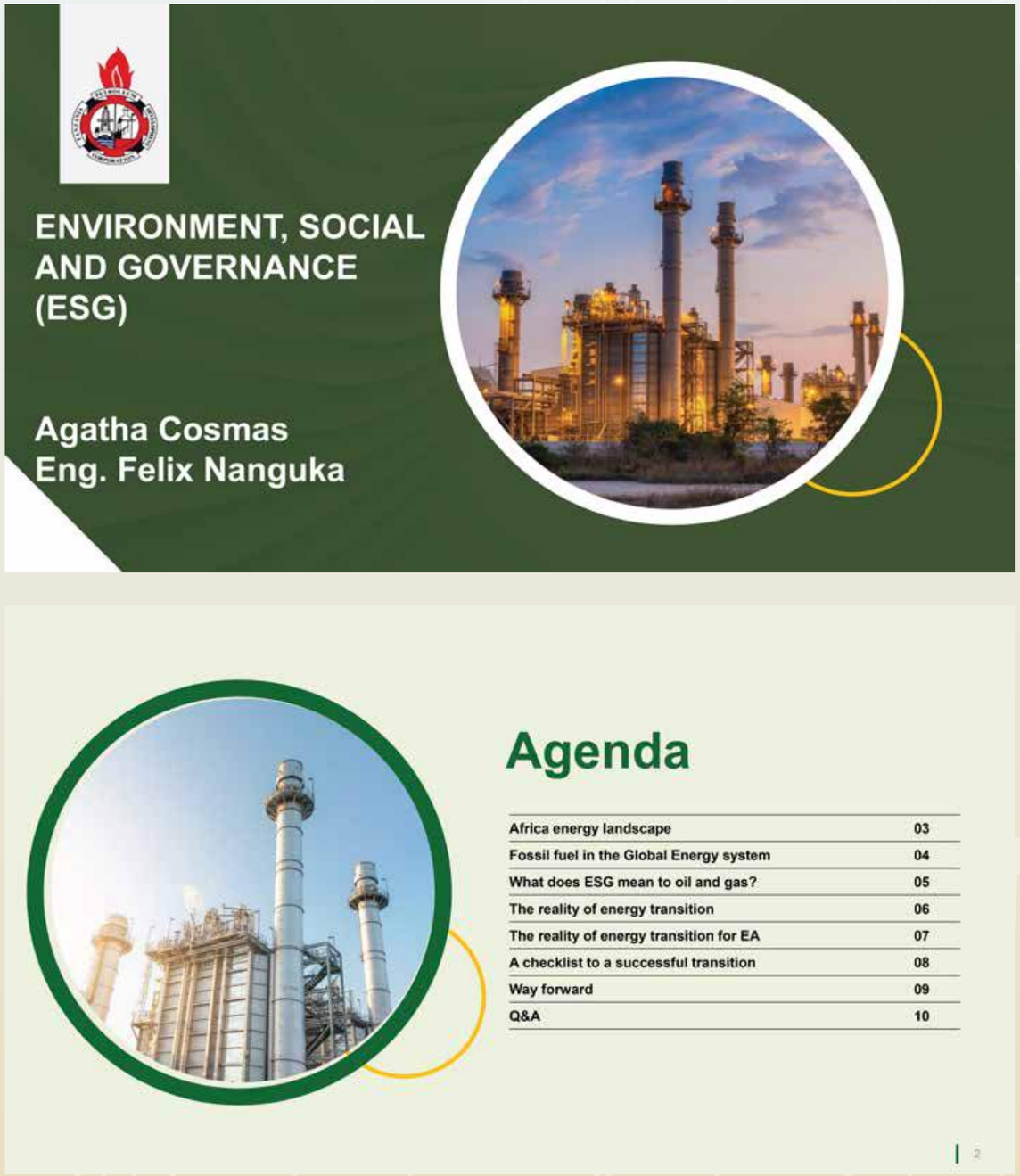
ENVIRONMENT, SOCIAL AND GOVERNANCE



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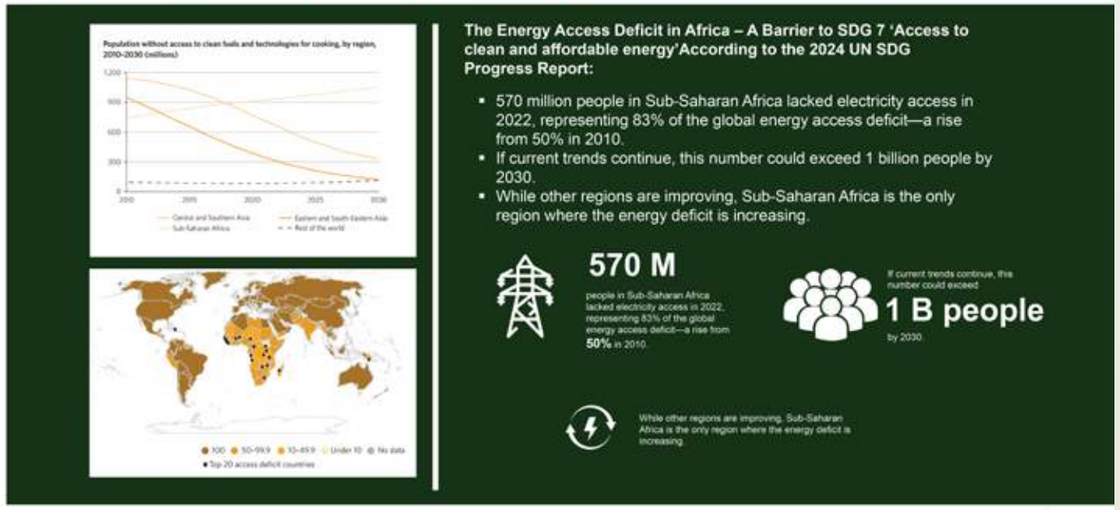
Africa energy landscape



Fossil fuel in the Global Energy system

As the world moves towards meeting net zero carbon emissions, many industry leaders, consumers and stakeholders are looking to the oil and gas industry to play a significant role to meet these targets. Despite renewable energy growth, the proportion of fossil fuels in global primary consumption has remained relatively stable and as of 2022 was 82%

Key Insights from the Energy Institute Statistical Review (2024):

- Fossil fuels accounted for **60% of global electricity generation in 2023, mainly from coal, Natural Gas, and Oil.**
- This highlights a critical reality: fossil fuels remain a key pillar of the global energy system.

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ENVIRONMENT, SOCIAL AND GOVERNANCE

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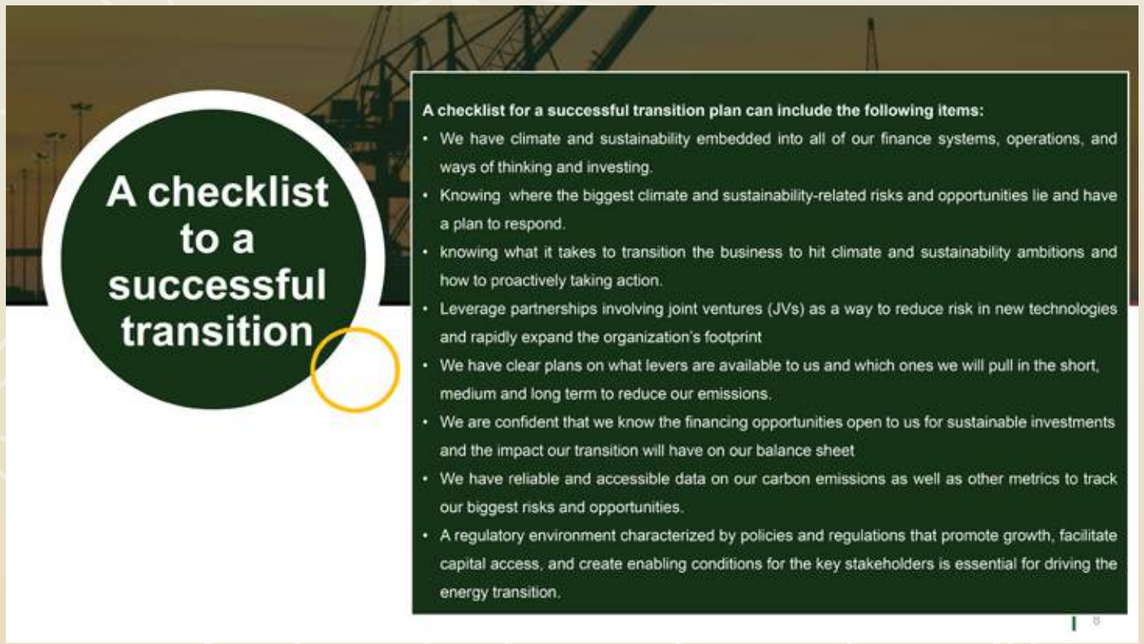

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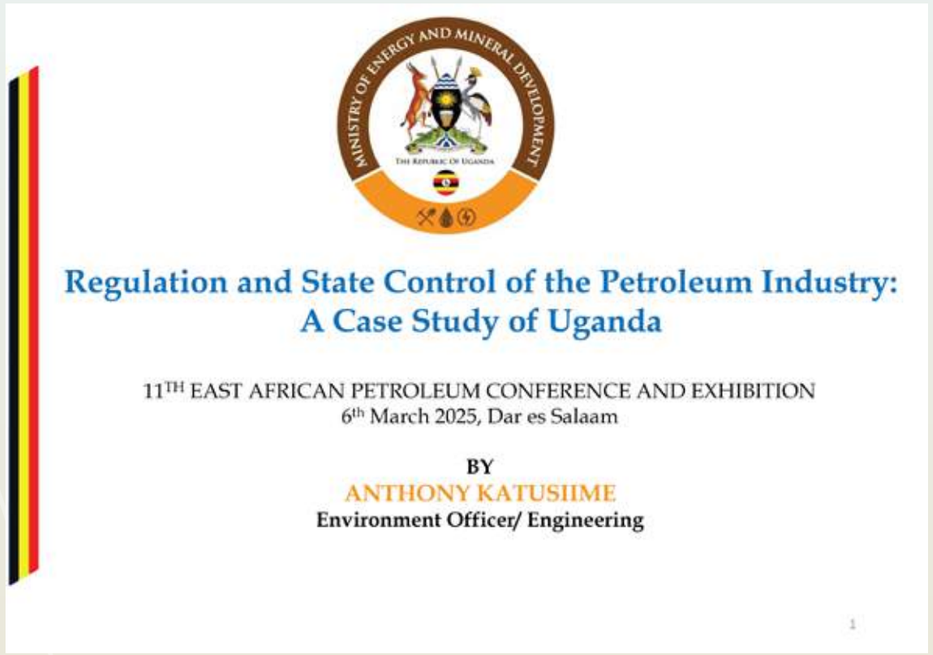
ANTHONY KATUSIIME

REGULATION AND STATE CONTROL OF THE PETROLEUM INDUSTRY: A CASE STUDY OF UGANDA



Regulation and State Control of the Petroleum Industry: A Case Study of Uganda

11TH EAST AFRICAN PETROLEUM CONFERENCE AND EXHIBITION
6th March 2025, Dar es Salaam

BY
ANTHONY KATUSIIME
Environment Officer/ Engineering

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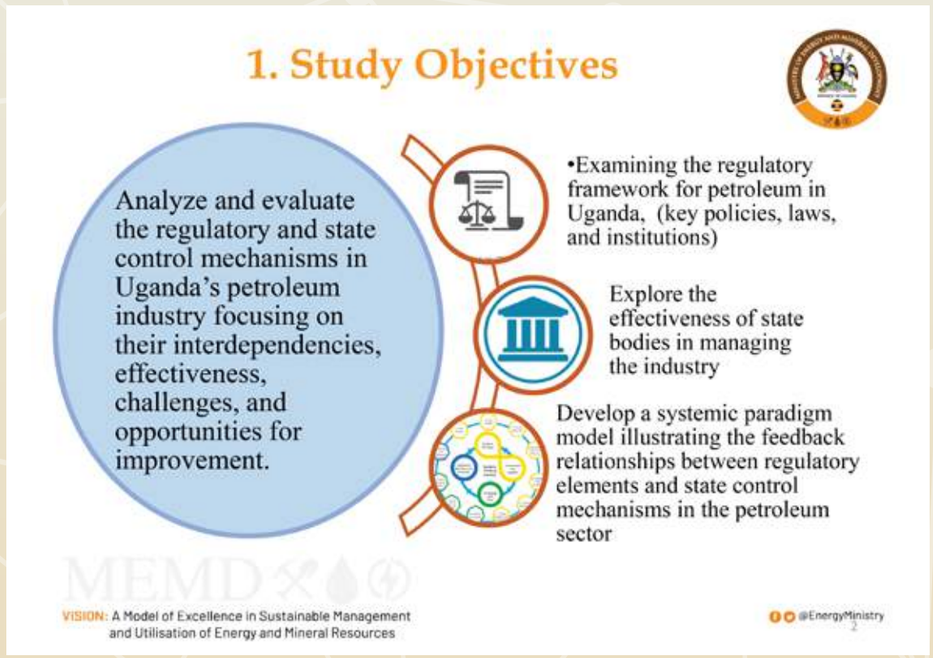

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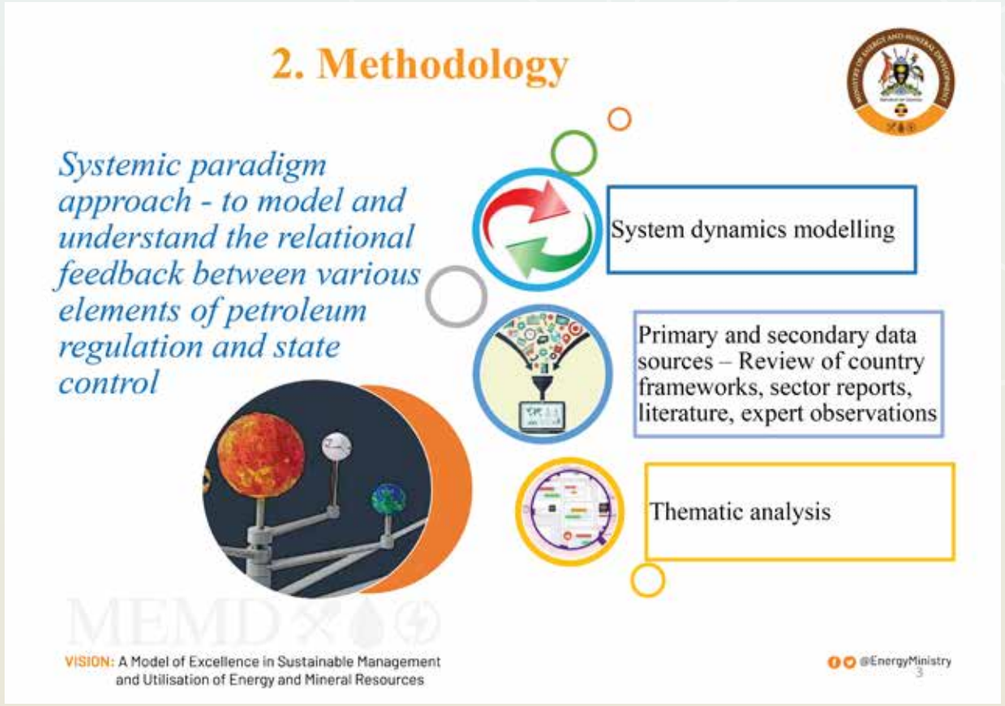

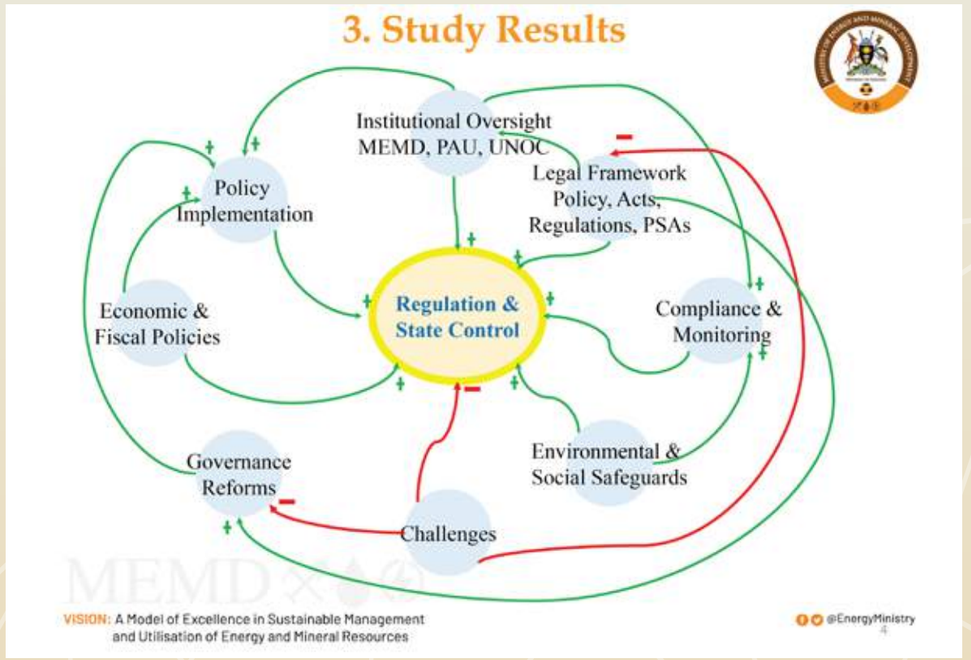

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4. Policy Implication

5. Regional Relevance & Opportunities

- Harmonized governance practices across the region
- Coordinated state control for cross-border infrastructure & trade
- Investment climate & regional cooperation
- Model for regional energy security & resource-sharing frameworks
- Shared environmental sustainability measures for transboundary projects

- ●Regional service hubs- for EA market
- ●Infrastructure Development- PPPs investment in refineries, pipelines, storage facilities.
- ●Local content & job creation- demand for local businesses to participate in supply chains.
- ●Technology & innovation: Key role in introducing advanced technologies and expertise

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REGULATION AND STATE CONTROL OF THE PETROLEUM INDUSTRY: A CASE STUDY OF UGANDA

6. Conclusion

- A holistic reform approach is needed to address feedback loops in the sector's management framework to ensure resilience in the face of emerging challenges.

Despite a proactive stance by the Ugandan government, challenges persist- enforcement, technical gaps, infrastructure needs, political risk & social concerns.

- Further research on other governance models, particularly regional cooperation mechanisms to inform Uganda's regulatory framework and reduce cross-border challenges in petroleum management.

"A well-regulated petroleum industry ensures long-term sustainability, economic growth, and environmental conservation."

Thank you

Ministry of Energy and Mineral Development
www.energy and minerals.go.ug

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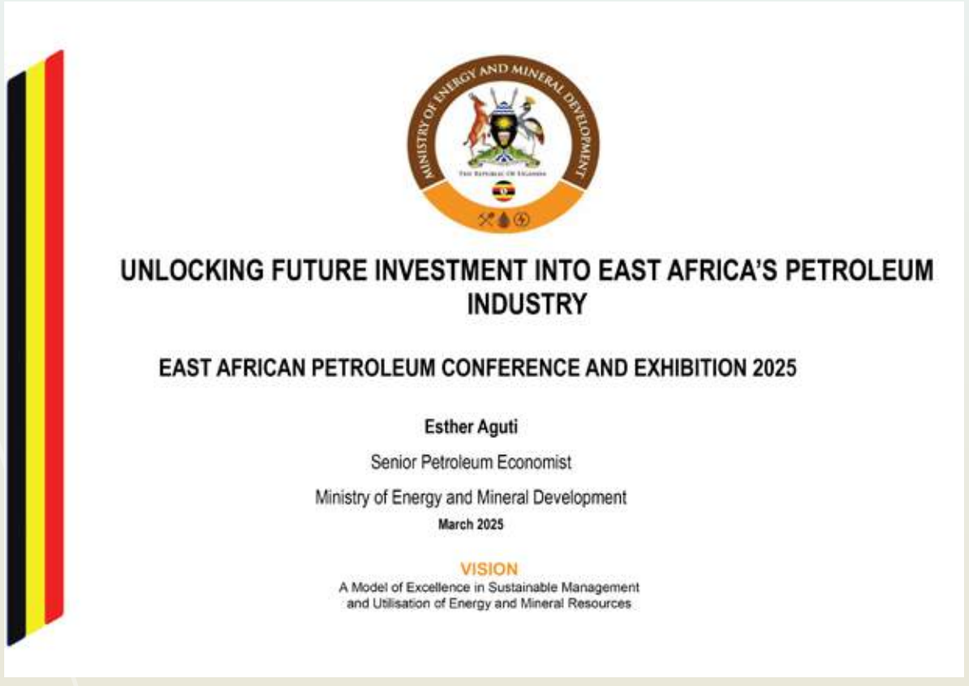


UNLOCKING FUTURE INVESTMENT INTO EAST AFRICA'S PETROLEUM INDUSTRY

EAST AFRICAN PETROLEUM CONFERENCE AND EXHIBITION 2025

Esther Aguti

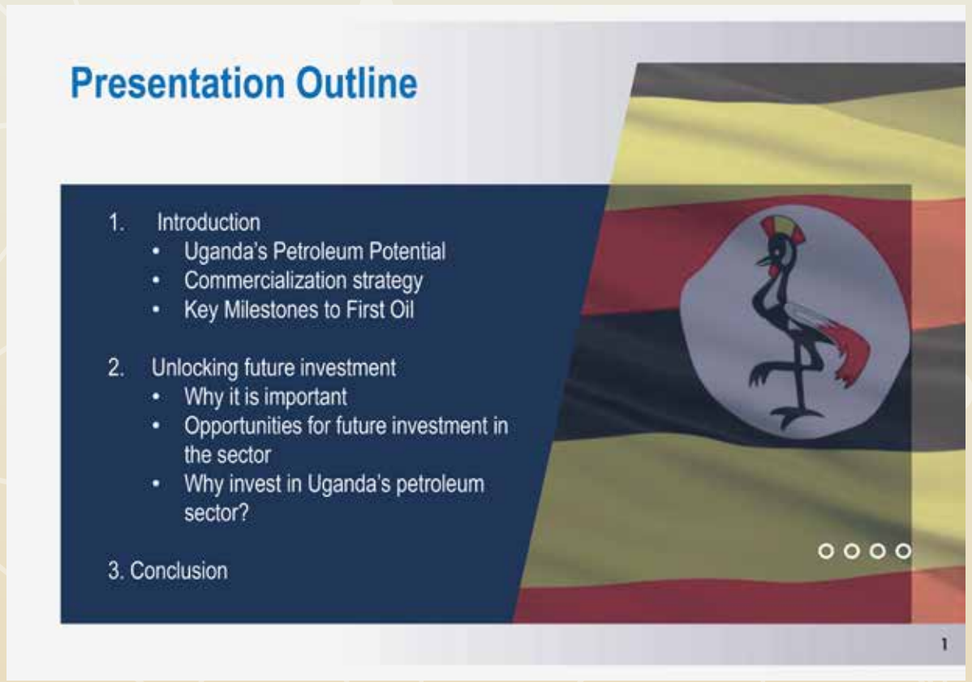
Senior Petroleum Economist

Ministry of Energy and Mineral Development

March 2025

VISION

A Model of Excellence in Sustainable Management and Utilisation of Energy and Mineral Resources



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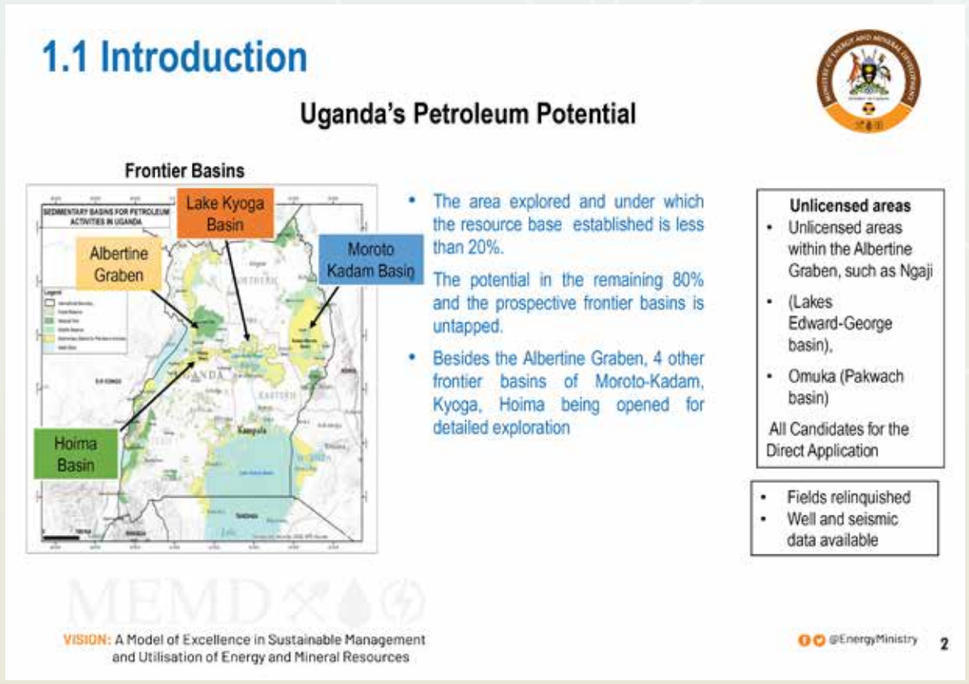

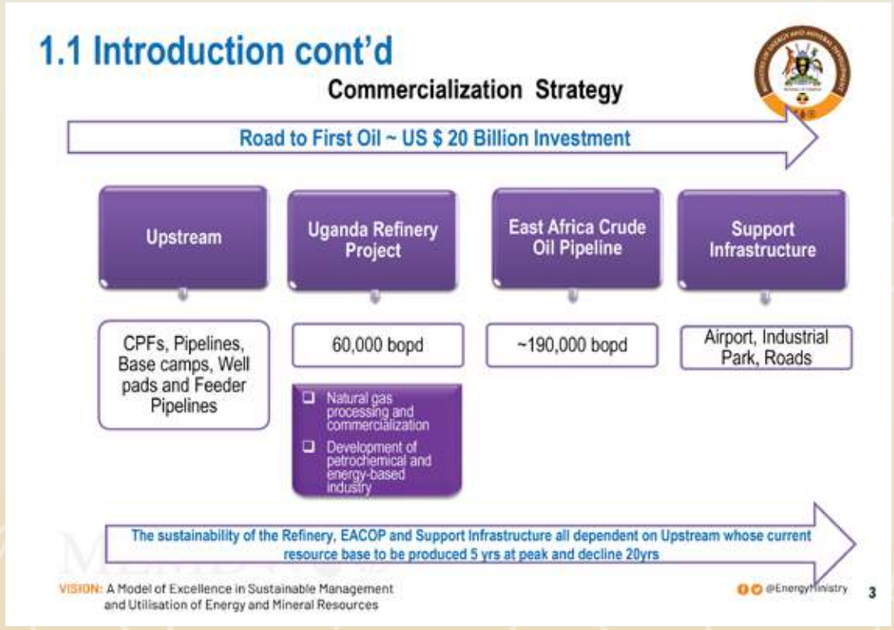

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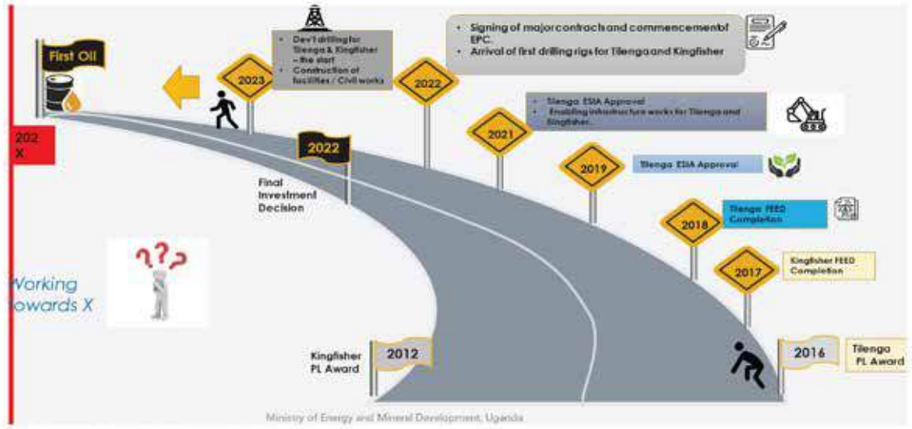
REGULATION AND STATE CONTROL OF THE PETROLEUM INDUSTRY: A CASE STUDY OF UGANDA

1.2 Introduction cont'd

Key Milestones to First Oil



2.1 Unlocking Future Investment in the sector cont'd

Why it is Important

- Enhance the current resource base for sustainable production and optimal utilization of the installed infrastructure
- Fast tracking exploitation of petroleum resources.
- Licensing to investors
- Value addition to the refinery products
- Stimulate and encourage local participation
- Enormous investment opportunities and innovation
- Already available skilled and unskilled labor
- Available market-demand for the product
- Reconnaissance surveys through speculative seismic data acquisition
- Conduct Research and Development

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REGULATION AND STATE CONTROL OF THE PETROLEUM INDUSTRY: A CASE STUDY OF UGANDA

2.2 Unlocking Future Investment in the Sector

Opportunities for future Investment

- Exploration licensing
- Permits for speculative seismic surveys
- Production Licenses for 3 oil fields to be announced at this conference
- Kabaalega Petro-based Industrial Park
  - Uganda Refinery
  - Hub for heavy, medium, and light petrochemical and fertilizer industries
  - Heavy Industrial Zone, Light and Downstream Industries
  - Agri zone
  - Business Park and Estate Area
- 24000 Tones of LPG consumed in 2020
  - Current demand for LPG consumption is increasing at 9% per annum

2.3 Unlocking Future Investment in the Sector

Why Invest In Uganda's Petroleum Sector

- **Unlicensed mature oil fields;** ready for development and production
- **Hydrocarbon potential** :New Producers Group with untapped hydrocarbon resources/potential (Geological promise)
- **Investment return**: returns on investment due to investment-friendly policies
- **Infrastructure:** Already existing and planned Large-scale infrastructure projects.
- **Location**: Strategic geographic position linking to the international markets.
- **Energy mix:** Regional focus on energy mix with more attention to cleaner sources of energy
- **Fiscal regime:** Favorable fiscal regimes
- **EITI member state:** Presence of transparency initiatives
- Uganda is politically stable

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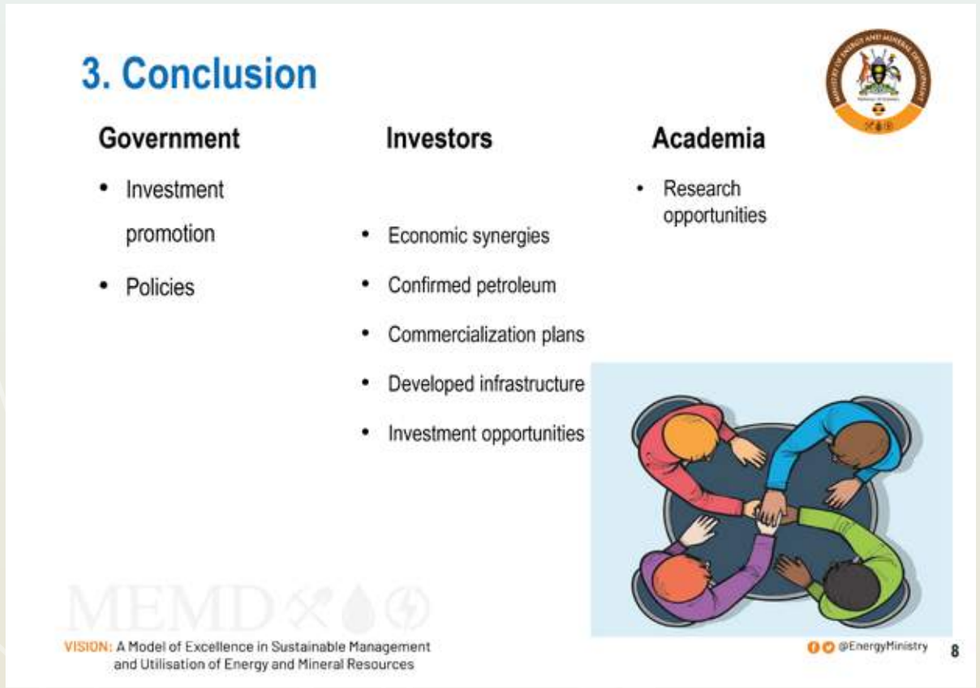

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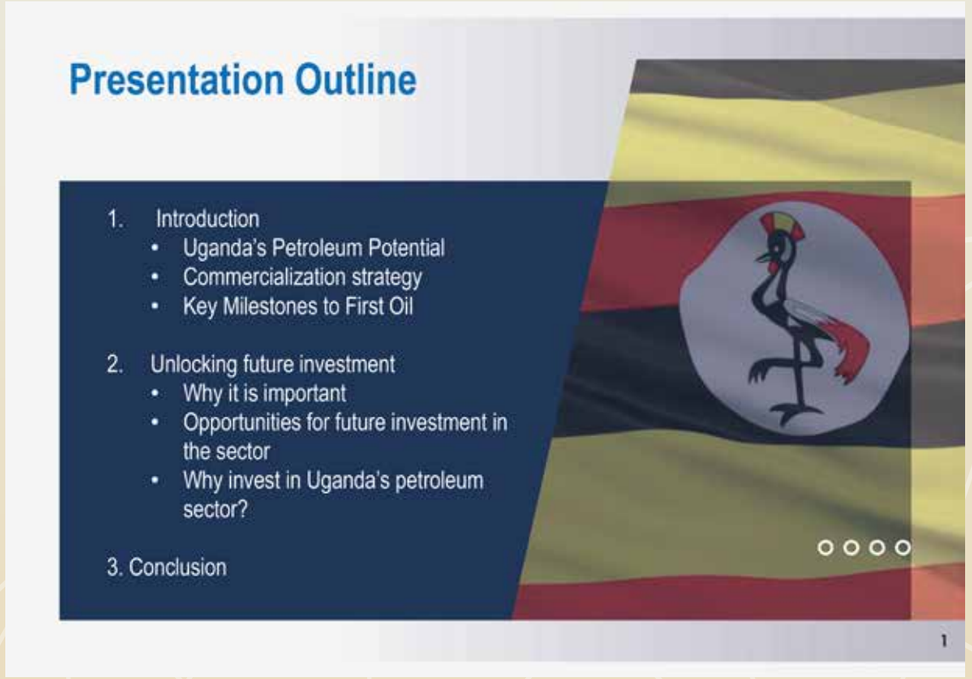

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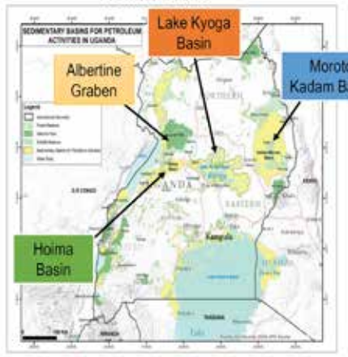
1.1 Introduction

Uganda's Petroleum Potential

Frontier Basins



- The area explored and under which the resource base established is less than 20%.
- The potential in the remaining 80% and the prospective frontier basins is untapped.
- Besides the Albertine Graben, 4 other frontier basins of Moroto-Kadam, Kyoga, Hoima being opened for detailed exploration

Unlicensed areas
- Unlicensed areas within the Albertine Graben, such as Ngaji
- (Lakes Edward-George basin),
- Omuka (Pakwach basin)

All Candidates for the Direct Application

- Fields relinquished
- Well and seismic data available

1.1 Introduction cont'd

Commercialization Strategy

Road to First Oil ~ US $ 20 Billion Investment

Upstream	Uganda Refinery Project	East Africa Crude Oil Pipeline	Support Infrastructure
CPFs, Pipelines, Base camps, Well pads and Feeder Pipelines	60,000 bopd ❑ Natural gas processing and commercialization ❑ Development of petrochemical and energy-based industry	~190,000 bopd	Airport, Industrial Park, Roads

The sustainability of the Refinery, EACOP and Support Infrastructure all dependent on Upstream whose current resource base to be produced 5 yrs at peak and decline 20yrs

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1.2 Introduction cont'd

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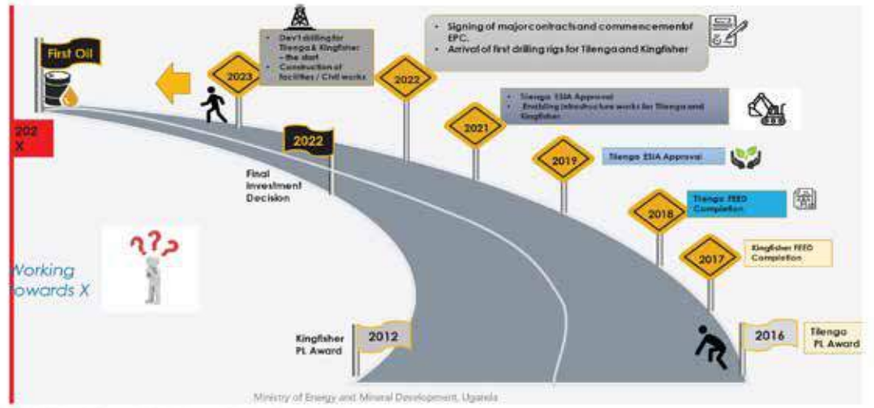

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UNLOCKING FUTURE INVESTMENT INTO EAST AFRICA'S PETROLEUM INDUSTRY

3. Conclusion

Government

- Investment promotion
- Policies

Investors

- Economic synergies
- Confirmed petroleum
- Commercialization plans
- Developed infrastructure
- Investment opportunities

Academia

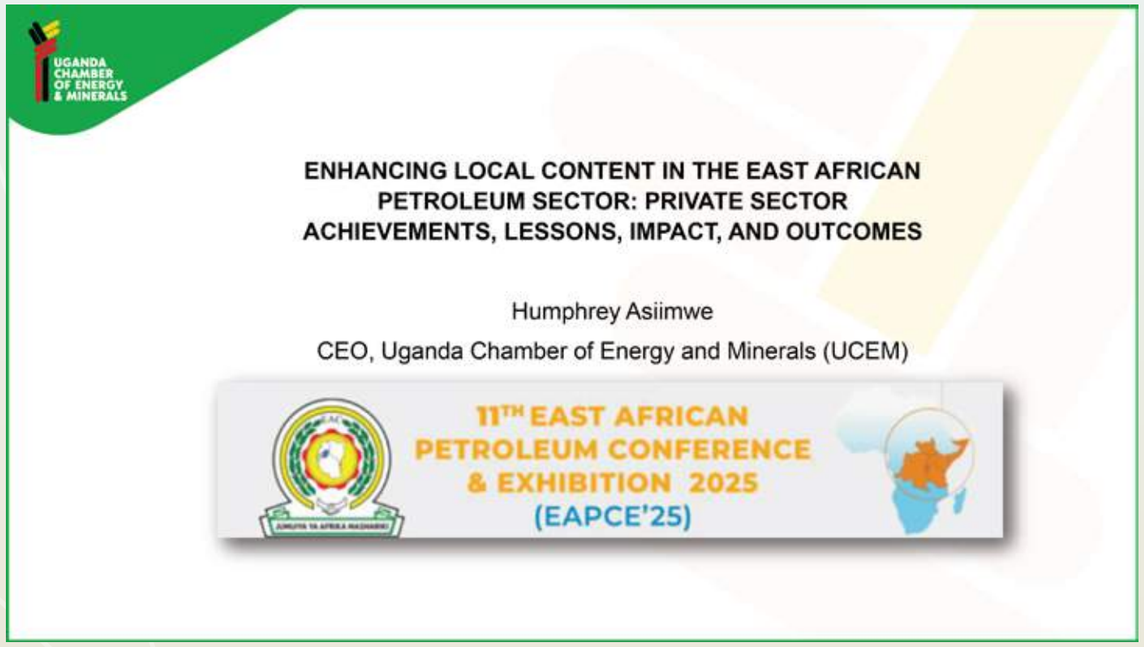
- Research opportunities

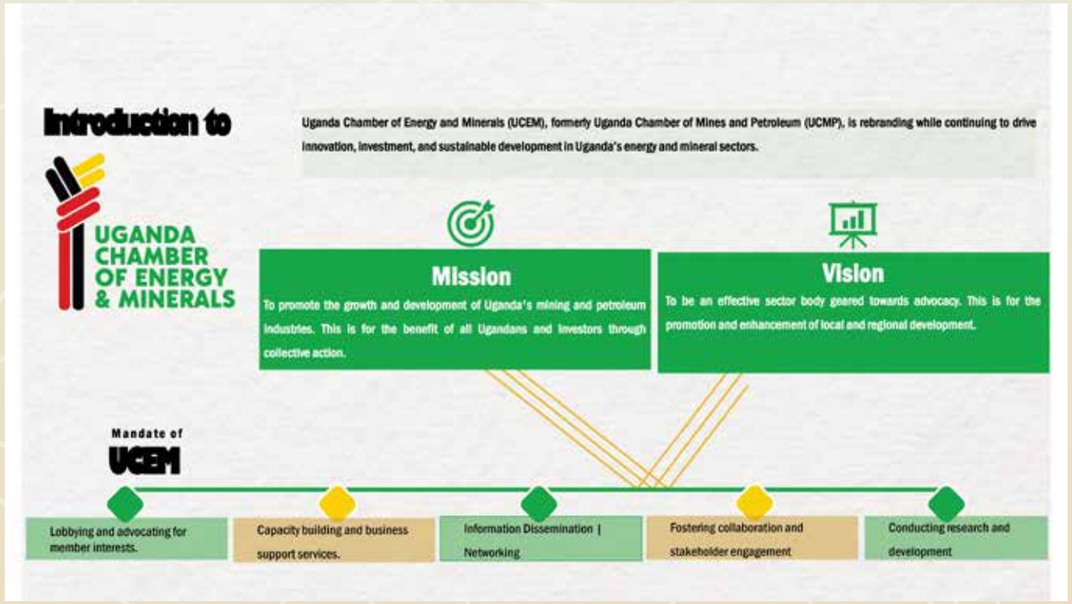
For more information, please contact;

Ministry of Energy and Mineral Development
psmemd@energy.go.ug
memd@energy.go.ug
www.energy and minerals.go.ug
@EnergyMinistry

HUMPHREY ASIIMWE

ENHANCING LOCAL CONTENT IN THE EAST AFRICAN PETROLEUM SECTOR: PRIVATE SECTOR ACHIEVEMENTS, LESSONS, IMPACT AND OUTCOME





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ENHANCING LOCAL CONTENT IN THE EAST AFRICAN PETROLEUM SECTOR: PRIVATE SECTOR ACHIEVEMENTS, LESSONS, IMPACT AND OUTCOME

HUMPHREY ASIIMWE

ENHANCING LOCAL CONTENT IN THE EAST AFRICAN PETROLEUM SECTOR: PRIVATE SECTOR ACHIEVEMENTS, LESSONS, IMPACT AND OUTCOME

Key Recommendations & Way Forward

1. **Training & Education**
   Increase investment in specialized institutions.
2. **Policy Harmonization**
   Align local content frameworks regionally.
3. **ESG Compliance**
   Strengthen environmental and sustainability policies.
4. **Supplier Development**
   Integrate local firms into supply chains.

HUMPHREY ASIIMWE

ENHANCING LOCAL CONTENT IN THE EAST AFRICAN PETROLEUM SECTOR: PRIVATE SECTOR ACHIEVEMENTS, LESSONS, IMPACT AND OUTCOME

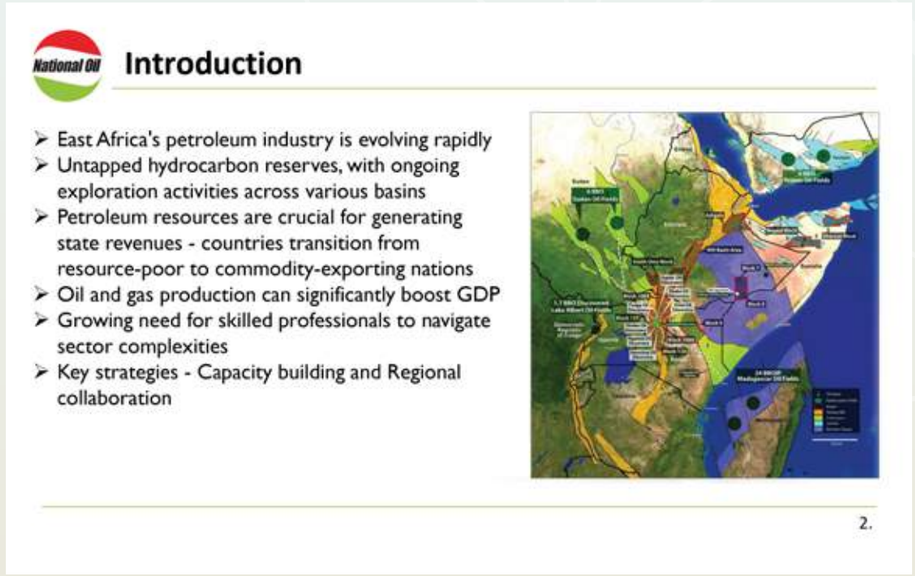
INVITATION TO UCEM ANNUAL ENERGY CONFERENCE

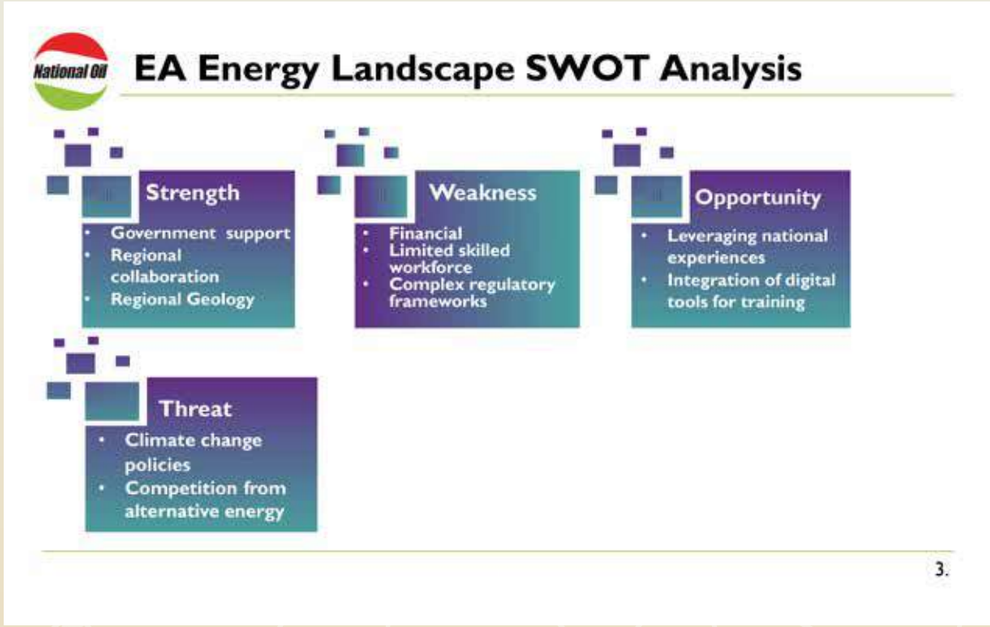
AYAN OMAR

EMPOWERING EAST AFRICA'S ENERGY FUTURE: BUILDING A SKILLED, COLLABORATIVE WORKFORCE FOR SUSTAINABLE GROWTH

AYAN OMAR

EMPOWERING EAST AFRICA'S ENERGY FUTURE: BUILDING A SKILLED, COLLABORATIVE WORKFORCE FOR SUSTAINABLE GROWTH





AYAN OMAR

EMPOWERING EAST AFRICA'S ENERGY FUTURE: BUILDING A SKILLED, COLLABORATIVE WORKFORCE FOR SUSTAINABLE GROWTH

Building a Collaborative Ecosystem

- Local universities
- International oil and gas companies
- Government bodies
- Regional organizations

Training Programs for Sustainable Growth

Mentorship opportunities
Field trips to exploration sites
Hands-on experiences
Integration of digital tools for expanded access

AYAN OMAR

EMPOWERING EAST AFRICA'S ENERGY FUTURE: BUILDING A SKILLED, COLLABORATIVE WORKFORCE FOR SUSTAINABLE GROWTH

Why Capacity Building Matters

Enhances technical expertise
Promotes regional collaboration
Fosters interdisciplinary skills for a just energy transition
Supports leadership development

Benefits:
More resilient and self-sufficient energy sector
Economically prosperous region
Culture of innovation and sustainability
Responsible resource management

Emerging Skillset

Business linguist
Leadership & Soft skills
Negotiation skills
Basic legal framework knowledge

- Industry 4.0
- M&A, Conglomerates

- Programming language
- Basic Troubleshooting
- Databases
- Domain knowledge

- Robotics, ML & AI
- Cloud computing (PaaS, SaaS, IaaS)

AYAN OMAR

EMPOWERING EAST AFRICA'S ENERGY FUTURE: BUILDING A SKILLED, COLLABORATIVE WORKFORCE FOR SUSTAINABLE GROWTH

Conclusion

- Strengthening East Africa's petroleum sector requires a collaborative approach to capacity building.
- By equipping local professionals with necessary skills and knowledge, we can drive sustainable energy development and economic prosperity in the region.
- Emphasis on innovation, sustainability, and responsible resource management is crucial for a resilient future.

DR. ACHILANA MTINGELE & WILFRED MWAKALOSI

TO ASSESS THE IMPACT OF CSR INITIATIVES IN TANZANIA'S PETROLEUM INDUSTRY: CASE OF TPDC

Objectives of the Study

ewura – Energy and Water Utilities Regulatory Authority

✓To Assess the **Impact of CSR Initiatives** in Tanzania's Petroleum Industry: Case of TPDC

- To understand CSR's role in **economic, social, and environmental** development.
- To provide recommendations for **policy & business opportunities**.

Thursday, 29 May 2025 1

Methodology

ewura – Energy and Water Utilities Regulatory Authority

- **How?** Systematic Desk-Review
- **Data Sources:** TPDC reports (2013/14–2022/23); Academic journal articles, research reports, and policy papers.
- **Approach:** Examined **CSR spending trends**; Assessed **Contribution on Sectors** (education, healthcare, governance, environment).

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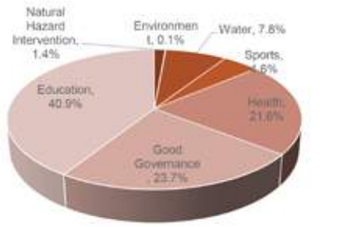
DR. ACHILANA MTINGELE & WILFRED MWAKALOSI

TO ASSESS THE IMPACT OF CSR INITIATIVES IN TANZANIA'S PETROLEUM INDUSTRY: CASE OF TPDC

Key Findings

- Over TZS 2 billion allocated to 113 programs between 2013/14 and 2022/23
- CSR spending fluctuated, peaking at TZS 506 million in 2014/15
- Largest focus: Education, Governance and Healthcare
- Geographic diversification shows an effort to extend CSR benefits broadly
- Balancing between targeted high-value projects and broader impact remains a challenge



Limited data on how CSR investments translate into lasting benefits

- ! Long-term employment impact is unclear
- ! Low funding allocation
- ! Some initiatives, no evidence of focus on sustainability

Conclusion

- CSR in Tanzania's petroleum sector enhances socio-economic development, particularly in education and healthcare.
- However, unclear policy enforcement and sustainability limit long-term impact.
- To optimize CSR benefits, a structured national CSR framework is necessary, integrating corporate accountability, impact measurement, and stakeholder participation.

DR. ACHILANA MTINGELE & WILFRED MWAKALOSI

TO ASSESS THE IMPACT OF CSR INITIATIVES IN TANZANIA'S PETROLEUM INDUSTRY: CASE OF TPDC

Policy Implications

- ✓ **Establish and Strengthen CSR Policy**
  - Establish clear national directives.
- ✓ **Follow Core Principles**
  - Ensure **Sustainability, Accountability, and Transparency**.
- ✓ **Enhance Stakeholder Engagement**
  - Promote inclusivity and decision-making transparency.
- ✓ **Align with Global Standards**
  - Improve accountability and best practices.
- ✓ **Improve Monitoring & Impact Measurement**
  - Ensure long-term sustainability and effectiveness.
- ✓ **Foster government-private sector partnerships**
  - For sustainable CSR investments.

Business Opportunity

How businesses can leverage CSR

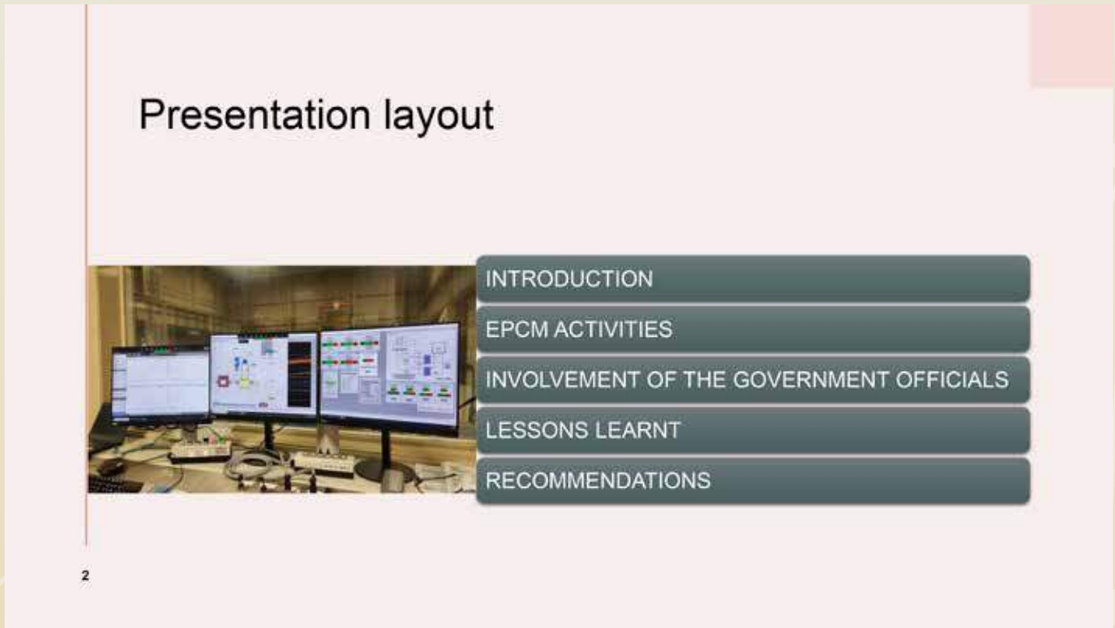
- ✓ Align CSR with government priorities to gain policy support.
- ✓ Invest in sustainable projects (renewable energy, vocational training, local industries).
- ✓ Use CSR branding to enhance corporate reputation & community trust.
- ✓ Develop public-private partnerships to drive long-term economic impact.

DR. ACHILANA MTINGELE & WILFRED MWAKALOSI

TO ASSESS THE IMPACT OF CSR INITIATIVES IN TANZANIA'S PETROLEUM INDUSTRY: CASE OF TPDC

ENG. LINDA MUWUMUZA (MEMD) & ENG. DEO BUKENYA (PAU)

OUR JOURNEY IN THE ENGINEERING PROCUREMENT CONSTRUCTION MANAGEMENT ACTIVITIES OF EACOP PROJECT



ENG. LINDA MUWUMUZA (MEMD) & ENG. DEO BUKENYA (PAU)

OUR JOURNEY IN THE ENGINEERING PROCUREMENT CONSTRUCTION MANAGEMENT ACTIVITIES OF EACOP PROJECT

Introduction

1. EACOP Project is a Pipeline system connecting the Albertine Graben in Uganda to the international oil markets terminal at Tanga
2. It is a 1,443km long, 24-inches diameter, heat-traced and thermally insulated pipeline.
3. EACOP Project is the **First Midstream Petroleum Infrastructure Project** in Uganda, and is the longest heat-traced pipeline in the world.
4. The Engineering, Procurement, and Construction Management contract for the EACOP Project commenced in 2019, following the completion of the Front-End Engineering Design (FEED) in 2018.
5. The EACOP project was deemed pertinent for the involvement of the GoU representation in the fundamental project development processes.
6. The Ministry of Energy and Mineral Development and the Petroleum Authority of Uganda officers were then involved in the design activities of the project.

3

EPcmC Activities

1. EPcmC activities include:
   - Detailed design
   - Procurement of components and systems
   - Construction management
   - Commissioning

FEED validation	3D Model Design	HAZOP(Hazard and Operability) Study Development	Factory Acceptance Tests	Technical discussions
Review and approving the FEED to be used as basis of the detail design	60% AND 90% 3D MODEL REVIEWS	Analyzing all the P&IDs (Piping and Instrumentation Drawings) to ascertain the process safety	Demonstration of the suitability of equipment and systems to be used on the project	Discussions with technical specialists on various aspects of the designs

4

ENG. LINDA MUWUMUZA (MEMD) & ENG. DEO BUKENYA (PAU)

OUR JOURNEY IN THE ENGINEERING PROCUREMENT CONSTRUCTION MANAGEMENT ACTIVITIES OF EACOP PROJECT

Involvement of Government Official

Involvement commenced in 2022 and included:

1. Participation in the technical discussions, HAZOP reviews, 3D model reviews, review of designs and consultations with the design team

5

Involvement of Government Official

Involvement commenced in 2022 and included:

2. Participation in the FATs and iFATs of the project

6

ENG. LINDA MUWUMUZA (MEMD) & ENG. DEO BUKENYA (PAU)

OUR JOURNEY IN THE ENGINEERING PROCUREMENT CONSTRUCTION MANAGEMENT ACTIVITIES OF EACOP PROJECT

Involvement of Government Official

3. Fully understanding the system design to facilitate a fast review and approval process of the designs as required by our laws
4. Provide an interface between the project design team and the government entities (PAU and MEMD) to ensure that government interests are well captured in the designs.
5. Capacity building – where else can one easily interface with, and learn from different specialists from all over the world apart from being part of a design team on a project as big as EACOP

Lessons learnt

1. The importance of managing interfaces: those internal and those with government entities, and the potential impact they have on the project schedule and quality, cannot be underestimated.
2. The EPcmC processes should not be looked at in a linear way as was anticipated by our laws. Overlaps exist between the different phases, but they should be well managed to ensure system integrity.
3. Project deliverables have to be well defined, especially at the interfaces between different contractors, to have a "seamless" design.
4. System redundancies have to be reasonable.
5. The concerns of climate activists have to be listened to, and their proposals which are reasonable can be considered. The genuine and learned activists actually provide a good check on the design.
6. During the design is the best time to ensure that any national interests are considered and embedded in the design. This will reduce potential delays during construction process.
7. The design activities cover multiple engineering disciplines. Without proper preparation and planning, it is very possible for the government representatives to not benefit.

ANNEX | LOCAL CONTENT AND CSR

ENG. LINDA MUWUMUZA (MEMD) & ENG. DEO BUKENYA (PAU)

OUR JOURNEY IN THE ENGINEERING PROCUREMENT CONSTRUCTION MANAGEMENT ACTIVITIES OF EACOP PROJECT

Recommendations

1. Government entities spend a lot of money in the training of their staff. However, if an opportunity of a project design activity avails itself, it is the best training that the staff can attain since it is work-based.
2. Staff with the right qualifications should be nominated to participate in the design activities so that maximum benefit can be attained
3. The government entities should prepare the nominated staff well, including having technical sessions with their colleagues before the attachment, to ensure maximum benefit from the attachment
4. In order to share knowledge, technical sessions should be held frequently during the attachment between the nominated government officials and their colleagues on the design so as to ensure knowledge sharing and continuity in case of a change in the attached officers.
5. It should be well set as a standard by the government entities that, for all design activities, government officers will be attached with the design teams.
6. More efforts should be undertaken by the governments to ensure officers participate in the FATs and iFATs.

This presentation is dedicated to

Eng. Stephen Emmanuel Yateesa Igalo and Mr. Pastore Masengere

The amazing fathers that dedicated their lives to ensure that we are who we are today

ROSE N. NYONGESA & JOYCE KARIUKI

CORPORATE SOCIAL RESPONSIBILITY IN THE PETROLEUM SECTOR: A CATALYST FOR SUSTAINABLE DEVELOPMENT IN KENYA

Objectives of the Study

- To explore how Corporate Social Responsibility (CSR) practices in the petroleum sector contribute to sustainable development in Kenya.
- To examine the role of CSR in mitigating social and environmental impacts.
- To identify how CSR can support energy transition and economic empowerment.

ROSE N. NYONGESA & JOYCE KARIUKI

CORPORATE SOCIAL RESPONSIBILITY IN THE PETROLEUM SECTOR: A CATALYST FOR SUSTAINABLE DEVELOPMENT IN KENYA

Methodology Adopted

RESEARCH APPROACH: Qualitative(interviews, case studies) and Quantitative analysis (surveys, CSR reports).

DATA COLLECTION : Interviews with industry experts, surveys from local communities, and review of CSR reports from petroleum companies.

ANALYSIS TOOLS: Comparative case studies and thematic content analysis.

Results Obtained

Environmental Impact Mitigation: Adoption of cleaner extraction technologies, biodiversity conservation initiatives *ie reduced carbon footprints, reforestation and sustainable extraction techniques).*

Economic Empowerment: Job creation, skills development programs, and local supplier engagement.

Community Engagement: Education and healthcare initiatives, infrastructure development.

Energy Transition Support: Investment in renewable energy projects and energy efficiency programs.

ROSE N. NYONGESA & JOYCE KARIUKI

CORPORATE SOCIAL RESPONSIBILITY IN THE PETROLEUM SECTOR: A CATALYST FOR SUSTAINABLE DEVELOPMENT IN KENYA

Conclusion (Academia Perspective)

- CSR is pivotal for balancing economic growth with environmental and social responsibilities.
- Effective CSR practices foster community trust and long-term sustainability.
- The petroleum sector has a vital role in supporting Kenya's sustainable development goals and energy transition.

Policy implication (Government)

- ***Regulatory Framework:*** Advocate for policies that promote CSR integration in the petroleum sector.
- ***Public-Private Partnerships (PPPs):*** Encourage collaboration with petroleum companies on community development projects.
- ***Incentives for Sustainability:*** Offer tax breaks or subsidies for companies investing in cleaner technologies and local initiatives.
- ***Monitoring and Evaluation:*** Implement mechanisms to ensure transparency and accountability in CSR projects.

ANNEX | LOCAL CONTENT AND CSR

ROSE N. NYONGESA & JOYCE KARIUKI

CORPORATE SOCIAL RESPONSIBILITY IN THE PETROLEUM SECTOR: A CATALYST FOR SUSTAINABLE DEVELOPMENT IN KENYA

Business Opportunity (Private Sector Perspective)

- **Investment Opportunities:** Collaboration on renewable energy projects and CSR initiatives.
- **Market Differentiation:** Enhanced reputation through sustainable practices.
- **Community Partnerships:** Joint ventures to promote local economic development.
- **Technology Innovation:** Development of cleaner extraction technologies and energy-efficient solutions.

THANK YOU FOR YOUR ATTENTION!

WINSTON MUGUMYA

EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

EXTENDED REACH DRILLING -ACCELERATING SUSTAINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSITIVE AREAS

WINSTON MUGUMYA

SENOIR PETROLEUM ENGINEER

5 - 7 March, 2025
JNICC | Dar es Salaam,
Tanzania

1

OUTLINE

- Introduction
- Basis of exploration and development in East Africa rift systems
  - Environmental significance of E.A rift systems
  - Fundament drivers of Resource Development in E.A rift systems
- The Uganda Lake Albert Development Drilling ERD technologies
  - ERD Technologies Applications
  - ERD Limitations and Challenges
- Results Analysis and discussions
- Recommendations and Conclusions

2

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EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

1.0 EAST AFRICAN REGION AND ITS RIFT BASINS

The E.A countries present alternative destinations for private capital, with individual countries seeking to gain sustainable development advantage via a competitive design of their Basin Wide Development Plans..**But How??**

- Uganda 6.5 billion barrels of oil in place has been discovered in Albertine graben as much as 1.4 billion barrels of recoverable oil
- In Kenya approx. Over 600 million barrels of oil in place been discovered greater Turkana Basin
- Tanzania approx.. over 57 trillion cubic feet (Tcf) of natural gas reserves have discovered in Tanzania
- 100 trillion cubic feet (Tcf) of proved natural gas reserves in Mozambique.
- Rwanda(1.5Tfc)
- Burundi and South Sudan(3.5 billion barrels in place)
- DRC and Somalia

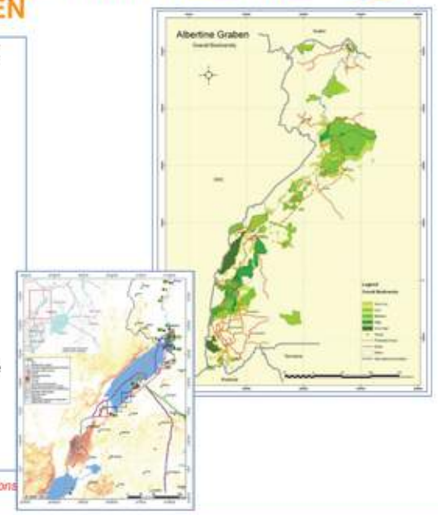
The US geological surveys estimates that EA Rift system could be holding up to 27.1 billion barrels of oil in reserves

3

ENVIRONMENTAL SIGNIFICANCE OF THE ALBERTINE GRABEN

- Protected areas cover 70% of prospective area:
- Murchison Falls National Park
- Queen Elizabeth National Park
- Virunga National Park
- Tourism contributes 7.7% to Uganda's GDP
- It is the highest foreign exchange earner.
- Critical habitat coverage: 42% of project area
- Home to over 50% of Uganda's biodiversity
- 39% of Africa's mammal species.
- 35% of Africa's bird species
- 19% of Africa's amphibian species
- Vital water catchment area supporting rivers like the Might Nile.
- Forests and wetlands that provide climate regulation and carbon sequestration

UBOS and NEMA reports (2017-2022)



Estimated additional resources: of approximately: 6.5 billions barrels of STOIIP(MEMD-GOV 2020-2022 internal work)

4

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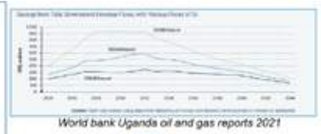
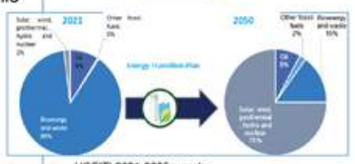
EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

FUNDAMENTAL DRIVERS OF RESOURCE DEVELOPMENT

- Potential to significantly boost Uganda's GDP(8-9%)
- Contributed 0.74% to Government revenues during the FY 2022-23
- Thousands of direct and indirect jobs in the energy, Petroleum development construction, and service sectors
- 3,265 employed directly in the Oil & Gas Sector – 2022-23
- Increased foreign investment and regional economic influence(10-15 billion US$)
- Oil and gas can fund critical sectors such as healthcare, education, and infrastructure
- Increased government revenue to fund poverty alleviation and sustainable development programs



World bank Uganda oil and gas reports 2021



UGEITI 2021-2022 reports

5

ENVIRONMENTAL REQUIREMENTS AND SUSTAINABILITY GOALS

Environmental Standards-Uganda

- Noise limits: 35 dB (night) / 45 dB (day)
- Air quality: PM_10 < 40 µg/m³ (Annual average)
- Water quality: TSS < 50 mg/L
- Light spillage: < 0.1 lux at sensitive receptors

Sustainability Goals-Uganda

- Reducing carbon emissions during production.
- Minimize surface facilities, footprint, visual impact and noise at surface.

  Long-term resource management.
- Ensuring safe production operations for workers and nearby ecosystems.

Aligning ERD with UN Sustainable Development Goals

SDG 7: Affordable and Clean Energy.

SDG 9: Industry, Innovation, and Infrastructure.

SDG 13: Climate Action – Reducing carbon footprint.

SDG 15: Life on Land – Minimizing ecosystem disruption.

6

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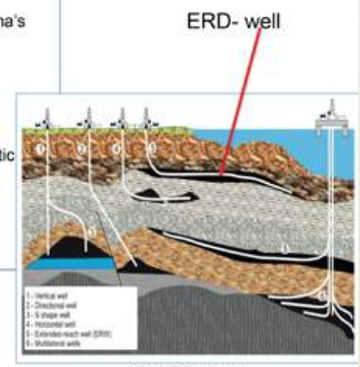
EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

EXTENDED REACH DRILLING (ERD)-TECHNOLOGIES

- Drilling horizontally or at high angles to reach distant reservoirs.
- Applications: Offshore and onshore fields, especially in sensitive environments.

Global Success Stories of ERD

- Example 1: Zhaungdong-6 Well, Bohai Bay, China – China's longest ERD well(6.088 Km)
- Example 2: Wytch Farm, UK - ERD on land(a horizontal reach of 10.1 km)
- Example 3: Sakhalin-1, Russia – ERD in challenging Arctic conditions(a horizontal reach of 37,648 feet (11,475Km)



Karim El Sabeh et.al

7

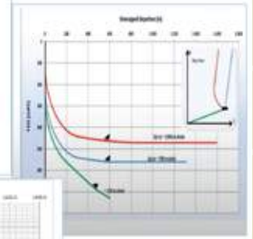
ERD CAPABILITIES IN UGANDA'S ALBERTINE GRABEN

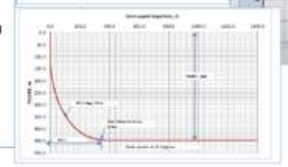
Well Characteristics:

- Average ERD ratio of 1.70 – 2.1
- Average inclination: 85°
- Slim Hole Architecture(Tilenga Project)
- Artificial lift running requirements

Challenges Addressed:

- Shallow reservoir depths (400-860 mTVD/RT)
  - Shallow kick-off depth starting from approx. 60 m TVD/RT
  - Dogleg severity: 5°-6°/30m
  - Minimum aerial distance to heels of 400m
  - Average reach = approx. 1,300-1500m
- Unconsolidated formations
- Well Count (ERD) 178 wells





TEPU –Tilenga project reports 2022-2024

8

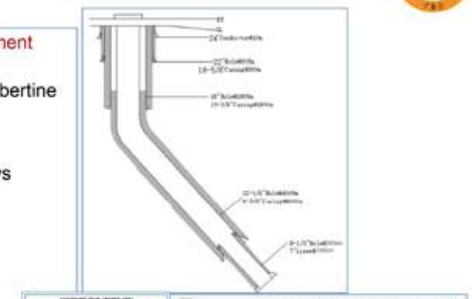
WINSTON MUGUMYA

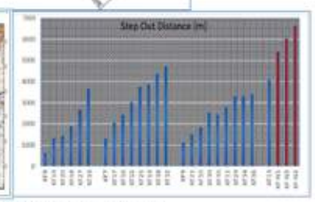
EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

ERD CAPABILITIES IN UGANDA'S ALBERTINE GRABEN

Kingfisher-Project Uganda Development Case

- Field Location: Offshore South Albertine
- Well Count (ERD): 13 wells
- Step-out: >3 km
- Well Duration Estimate > 114 days
- Challenges:
  - Complex Geology:
    - Multiple fault zones
    - High pressure zones
    - Unstable formations
- Technical Solutions:
  - Use of Advanced RSS technology
  - Managed pressure drilling
  - Real-time geomechanics
  - Specialized drilling fluids





CNOOC Kingfisher Project reports 2019-2024

9

TILENGA-PROJECT UGANDA SUSTAINABLE PERFORMANCE METRICS

Environmental Impact Reduction

- Well pad count reduction by 11.5 %(From 35 well pads optimized to 31well pads) saving nearly 24 Million US Dollars.
- Well count Reduction (from nearly over 426 to 420 wells reduction of 1%)
- Access roads length reduced by over 8 km
- Habitat preservation: 57 hectares
- Wildlife corridor maintenance: 100%
- The Tilenga Project had an approved land use permits to operate in nearly over 10% of the MFNP (3,840 km2).
- The project has voluntarily reduced Land use Area to less than 1% within the park and relinquished undeveloped areas

10

ANNEX | MANAGING ENVIRONMENTAL

WINSTON MUGUMYA

EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

RECOMMENDATIONS AND CONCLUSIONS

Policy Implications(Governments)

- Prospecting Governments should ensure that Special in-place ERD and trenchless technologies are designed within their individual Field Development Plans(FDPs) to encourage sustainable investment/Exploration of oil and gas in Environmental Sensitive basins in East African rift systems.
- Prospecting Governments to need change their petroleum Licensing Policies and offer acreages for oil and gas exploration and development in these environmental sensitive acreages without much fear of impacting these Social and Environment habitats.

Business Opportunities(Private Sector)

- Business Opportunities exist in supplying and application of in place ERD technologies to IOCs, Contractors and National oil Companies in prospecting acreages, in order to provide sustainable oil and gas developments technology solutions.

Academia Opportunities

- Research and Development (R&D), conducting Integrated research in ERD technologies to solve in place challenges that still limit application of ERD technologies in East African Rift system, such constant seismicity and faulting is a very big limitation.

11

ASANTE SANA
THANK YOU
MERCI

12

FAUSTIN KAYOMBO

EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

11TH EAST AFRICAN PETROLEUM CONFERENCE AND EXHIBITION 2025 (EAPCE' 2025)

5th – 7th March, 2025

Evaluation of the Effectiveness of Environmental Impact Assessment for Petroleum Land Seismic Surveys, Tanzania

Author: Faustin Kayombo (Senior Geophysicist)

INTRODUCTION

- In Tanzania, EIA studies for petroleum exploration seismic operations have been undertaken as per requirements of EMA (2004) and EIA and Audit regulations (2005), and its amendment (2018).
- Seismic surveys have been conducted both onshore and offshore since the 1950s (TPDC, 2021).
- Seismic surveys have impacts on biological environment, physical environment, socio-economic environment, and cultural environment.
- Several studies conducted regarding the challenges facing EIA practice in developing countries and the findings indicate that some projects have been executed without EIA even if they have adverse impacts on the environment, & poor public participation (Sosovele, 2011)& (Michael, 2015).
- EIA studies are still the key decision-making tool in the petroleum sector for sustainable development.
- The question is how effective are EIAs for petroleum land seismic surveys in Tanzania?
- However, there are previous studies that looked at the effectiveness of the EIA process in other sector, not in specific petroleum land seismic surveys (Baker & McLelland, 2003) & (Theophilou et al., 2010).

ANNEX | MANAGING ENVIRONMENTAL

FAUSTIN KAYOMBO

EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

OBJECTIVE

- **Main objective:** to evaluate the effectiveness of the environmental impact assessment in petroleum land seismic surveys conducted in Tanzania.
- **Specific objectives:**
  i. To identify factors affecting the effectiveness of the EIA process for Tanzania land seismic surveys.
  ii. To assess the extent of public engagement in the EIA process in Tanzania's petroleum land seismic surveys.
  iii. To analyse the effectiveness of Tanzania's implemented ESMPs and Monitoring Plans for petroleum land seismic surveys.
  iv. To propose the strategies for improving effectiveness of EIA in land seismic projects.

METHODOLOGY

Stakeholders Group	Questionnaires Distributed	Questionnaires Received
TPDC	13	13
NEMC & TAC	6	6
PURA	8	7
International Oil Companies (IOCs)	6	5
Environmental Consultancy Firms	5	3
Geophysical Contractors	5	5
Total	43	39

Methods of Data Collection	Number of Participants	Percentage (%)
Questionnaires	39	75.0
Focused Group Discussions	9	17.3
Interviews	4	7.7
Total	**52**	**100.0**

FAUSTIN KAYOMBO

EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

RESULTS AND DISCUSSION

Survey	Impacts Identified	Mitigation & Enhancement Measures Proposed	Mitigation & Enhancement Measures Implemented
Mtwara 3D_2022	34	40	38
Ruvu 3D_2021	29	34	27
Kilosa -Kilombero 2D_2013	25	29	21
	88	103	86 (83.5%)

Project Phase	Mitigation & Enhancement Measures Proposed	Percentage
Preparation	22	21.36 %
Construction	27	26.21 %
Operational	43	41.75 %
Decommissioning	11	10.68 %
	103	100.00

CONCLUSIONS

- Political interference and EIA follow-up are still major challenges to the effectiveness of EIAs.
- Public participation plays a crucial role in contributing to the effectiveness of EIA, the participation of the public has great roles and benefits for most of the effectiveness types, except for transactive effectiveness, where the public engagement does not insert objectives to save transactive cost or time.
- 83.5% of proposed mitigation measures in three EISs were implemented during the execution of the project.
- The implementation of ESMPs and monitoring plans in petroleum land seismic surveys in Tanzania is satisfactory.
- The EIS is an important tool in environmental management for sustainable development, which means the respective regulatory authority bodies should make sure the proponent and environmental consultant prepare comprehensive EISs and implement them as per environmental standards and practices.

FAUSTIN KAYOMBO

EXTENDED REACH DRILLING - ACCELERATING SUSTINABLE DEVELOPMENT DRILLING IN EAST AFRICAN ENVIRONMENTAL SENSTIVE AREAS

POLICY IMPLICATION

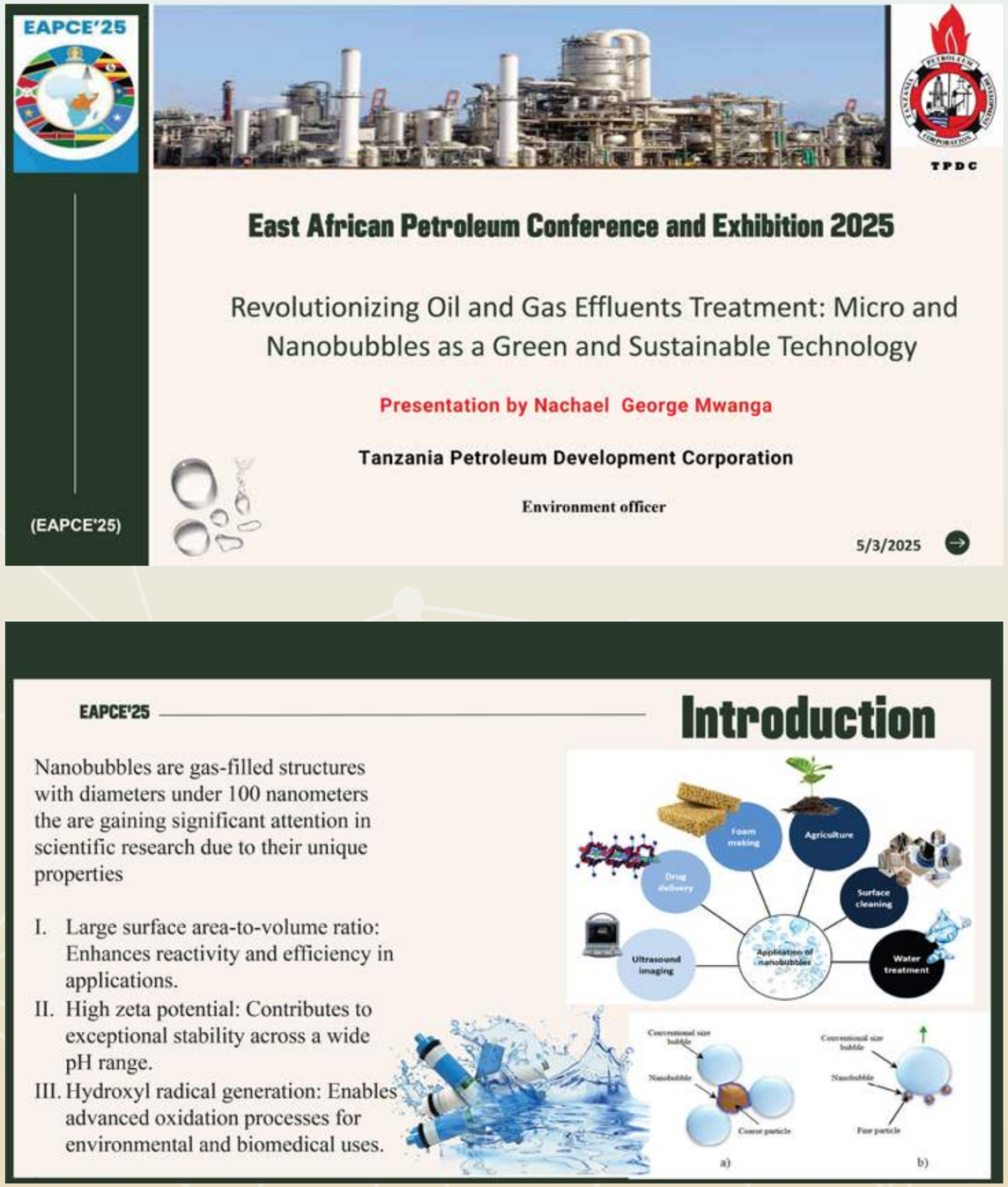
- Since the seismic methods play a key role in discovering the oil and natural gas in the world. On the other side, methods have a negative impact on the environment.
  - ✓ In order to promote sustainable development, Tanzania's energy and environmental policies aim to provide guidelines and ensure the resources are explored without having a significant impact on the environment.

BUSINESS OPPORTUNITY

- **Energy Companies:** These companies are responsible for exploring and producing oil and gas resources. They may engage in seismic surveys.
- **Geophysical Contractors:** These companies provide geophysical services related to the design and acquisition of seismic data.
- **Environmental Consultancy Firms:** These firms provide services related to environmental compliance, such as ESIA and environmental audits.
- **Service providers:** Service providers such as logistics companies, catering companies, and security firms may provide support services to exploration and production companies, helping to ensure the smooth running of operations.

NACHAEL GEORGE MWANGA

REVOLUTIONIZING OIL AND GAS EFFLLUENTS TREATMENT: MICRO AND NANOBUBBLES AS A GREEN AND SUSTAINABLE TECHNOLOGY



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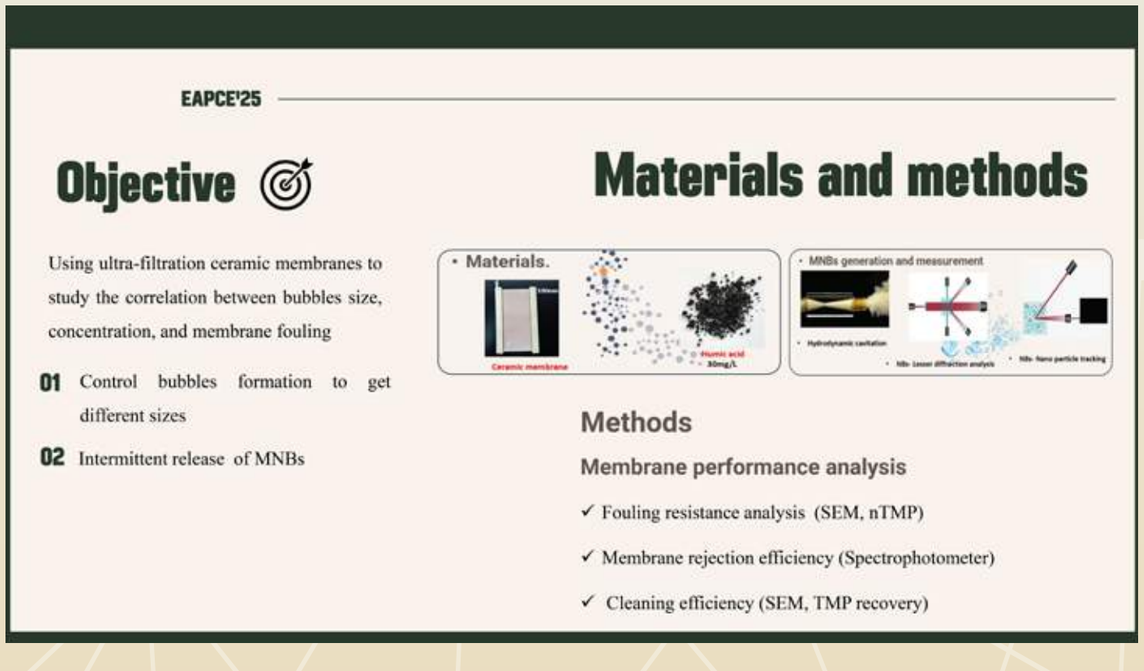

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REVOLUTIONIZING OIL AND GAS EFFLLUENTS TREATMENT: MICRO AND NANOBUBBLES AS A GREEN AND SUSTAINABLE TECHNOLOGY

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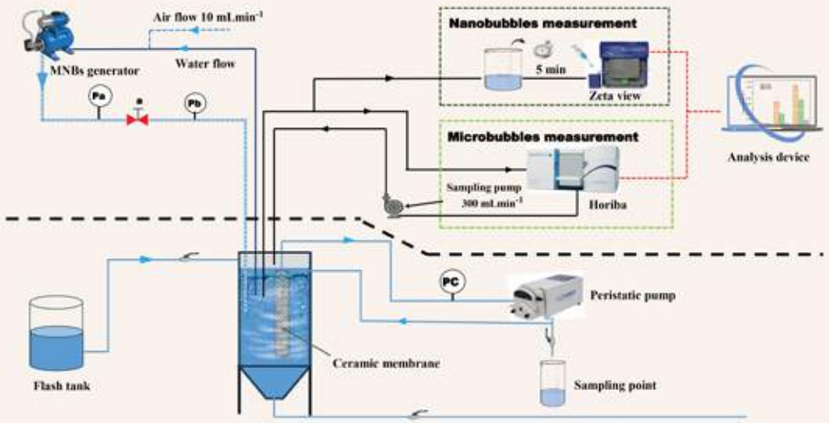
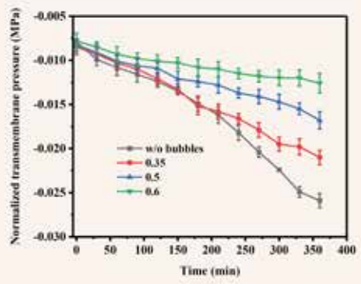
Experimental setup



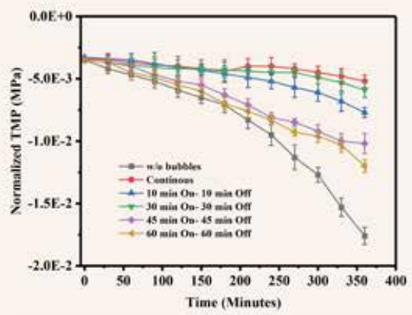
RESULT

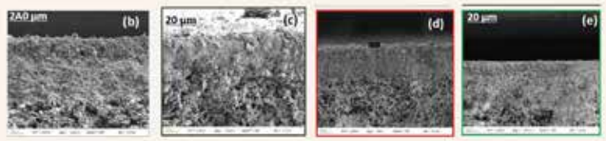
- **Effects of bubbles size and concentration on membrane fouling**

Small and high concentrated bubbles decreased the normalized TMP by 52.29% compared to larger



- **Effect of release pattern on fouling resistance**





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REVOLUTIONIZING OIL AND GAS EFFLLUENTS TREATMENT: MICRO AND NANOBUBBLES AS A GREEN AND SUSTAINABLE TECHNOLOGY

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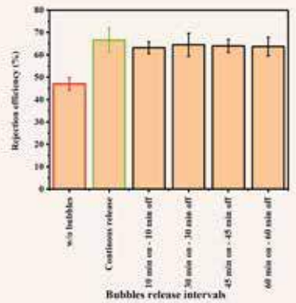
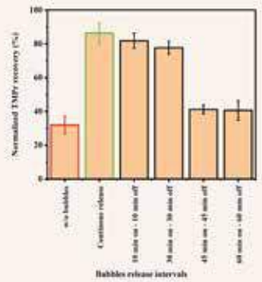
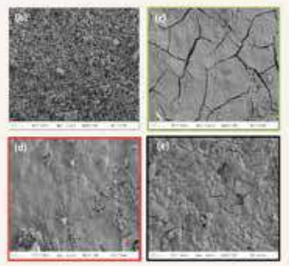
b) Effect of release pattern on rejection efficiency



c) Effect of release pattern on cleaning efficiency





(8th ISPFB 2024)

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Conclusion

- ✓ Small micro and nanobubbles offers the best results in water treatment
- ✓ 30 Minutes intermittent release can offer best results saving the energy by 50%
- ✓ Cleaning results is best when small micro bubbles are deployed

ELSEVIER

Desalination

Volume 587, 15 October 2024, 117929

Effect of micro and nanobubble size and concentration on membrane fouling: Strategies for energy-saving and ultrafiltration efficiency enhancement

Nachael Mwanga [a b], Xitong Wang [a], Pan Li [a b c], Yanling Liu [a b c], Shengji Xia [a b c], Daqiang Yin [a b c], Min Rui [d], Yubin Ye [d]

Show more

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REVOLUTIONIZING OIL AND GAS EFFLLUENTS TREATMENT: MICRO AND NANOBUBBLES AS A GREEN AND SUSTAINABLE TECHNOLOGY

POLICY IMPLICACTION

Using micro and nanobubbles in oil and gas effluent treatment has policy implications for

- ✓ Stricter discharge limits
- ✓ Safety standards
- ✓ Economic incentives
- ✓ R&D funding
- ✓ Sustainability goals.

Governments may revise regulations, promote adoption, and integrate MNBs into carbon reduction and circular economy strategies.

BUSINESS OPORTUNITIES

- ✓ Wastewater Treatment Services
- ✓ Consulting & Compliance Advisory
- ✓ Research & Innovation Partnerships
- ✓ Carbon Credit & Sustainability Solutions

THANK YOU

for

your attention

EAPCE'25

DR. ABIUD MASINDE

GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Introduction

- Kenya is seeking innovative and sustainable solutions to address its growing energy needs and environmental concerns
- The National Oil Corporation of Kenya (NOC-Kenya) is leading this initiative
- NOC-Kenya aims at producing sustainable aviation fuel [SAF] and biodiesel from Jatropha seeds, offering a greener alternative to fossil fuels
- The pilot project, initiated in November 2023, targeting 25,000 trees in 25 acres
- An 8,668.9-hectare area in Kajiado County has been earmarked for this energy forestry project

DR. ABIUD MASINDE

GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Project Alignment with Climate Policies

7 AFFORDABLE AND CLEAN ENERGY

13 CLIMATE ACTION

Produce biofuel that is cleaner and more sustainable energy source, reducing GHGs emission

8 DECENT WORK AND ECONOMIC GROWTH

Community engagement through local capacity building, employment and inclusion in climate action

PARIS AGREEMENT...

Careful consideration of land use practices, encouraging sustainable land management and promote agroforestry, has the potential to sequester carbon in the soil, capture and store carbon

3

Project Scope

- Energy forestry
  - The project commenced with a pilot phase in Magadi area in 2023 (ASAL)
  - Targeting 10 Ha. with 25,000 trees
  - 2025-2027 - Upscale the project to 400 Ha. (ca. 1,000,000 trees)
  - Long term plan is to utilize the 8,668.9 Ha. (ca. 21,600,00 trees)
- Mechanical pressing and biofuel refining
  - Establish biofuel processing unit, for the extraction of oil from the seed and refinery of the raw fuel to produce biodiesel and sustainable aviation fuel (SAF)
- Biogas production and biomethane
- Off grid power production and supply

4

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GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Eni visit

- Located in Wote, Makueni County, the centre, also known as an agri-hub,
- has a capacity of 15,000 tons per year and,
- since 2022, has been supplying the Eni biorefinery in Gela.

5

Project status

6

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GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Project status

- Over 2ha re-forested, close to 3000 planted

7

Project Roadmap

- Comprehensive site assessment and feasibility study for the cultivation
- Engage the local community to promote awareness and gain support
- Capacity building to farmers on sustainable farming practices
- Establish biofuel processing plant
- Collaborate with local business for marketing and distribution

8

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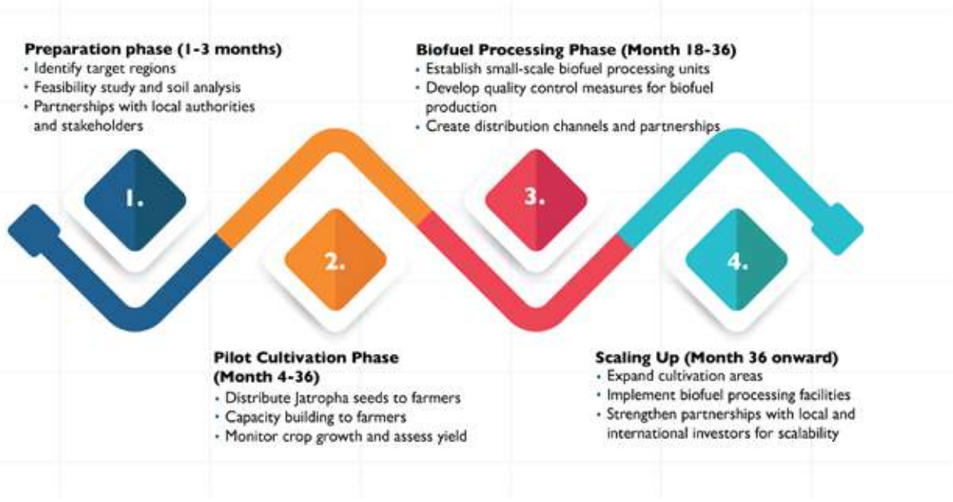
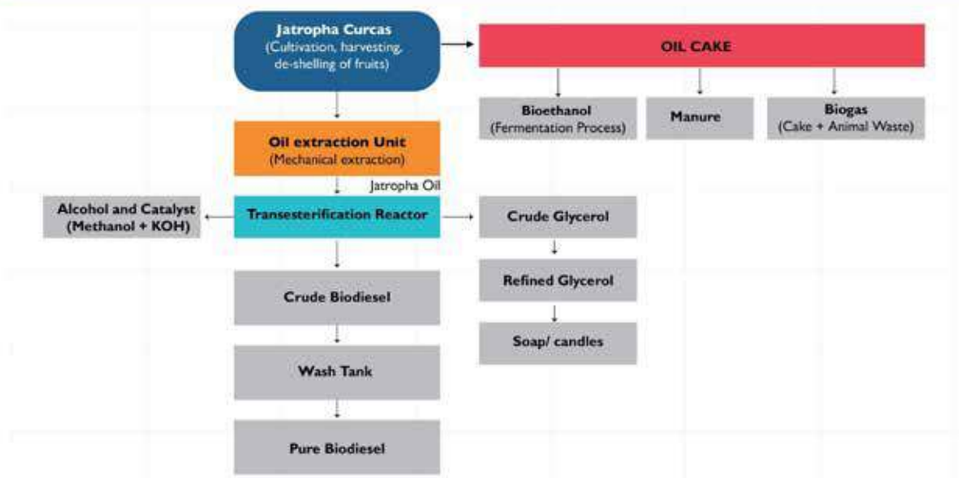
Implementation Plan



Flow Chart of Biofuel Processing



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GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Business Case

- 1 Ha. – 2,500 Jatropha trees (spacing 2m by 2m)
- Annual yield per tree = ca. 3 kgs
- 1 Ha. Yields 7,500 kgs of feedstock annually
- 1 kg of feedstock yields 0.25 litres of raw biofuel
- 1 Ha. = 1,875 litres of raw biofuel annually
- 1 litre of raw biofuel yields 0.8 litres of refined biodiesel

8,668.9 Ha. = 13 Million litres of refined biodiesel Annually (Biodiesel can be blended with regular diesel for engine combustion)

11

European Commission Rules on Biofuels

European Commission

Energy, Climate change, Environment

- Adopted in June 2023 new rules establishing the share of biofuels and biogas in mixed fuels
- Under the Renewable Energy Directive, EU countries are obliged to ensure that the share of renewable energy in the final consumption of energy in transport is at least 14% by 2030
- including a minimum share of 3.5% of advanced biofuels.

12

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GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

Alignment with Circular Economy

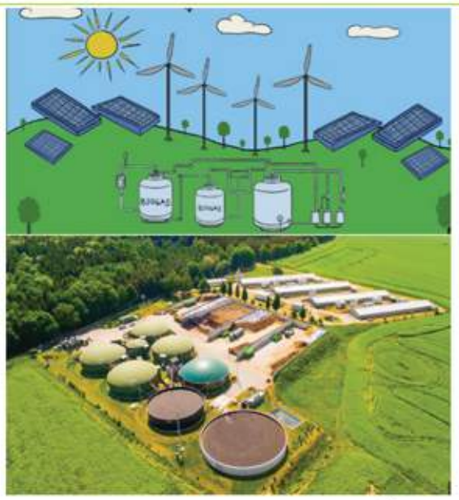
Opportunities

Integrated Green Energy Hub

Biodiesel production plant:

- The plant will process Jatropha seed oil and produce biodiesel.
- The biodiesel is used to generate power.

- **Biomethane facility**
  - The facility shall utilize the oil cake a byproduct of Jatropha pressing together with the animal waste from the local community to generate biogas.
  - The biogas shall be reticulated directly to the schools and nearby community and shall also be processed further to produce biomethane.
  - The biomethane is then used as fuel to generate electricity.
- **Solar grids:**
  - The facility shall be used to power all the operations and the extra power to be added to the local off-grid system.



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GREENING KENYA'S ENERGY FUTURE: HARNESSING JATROPHA BIOFUELS - A STRATEGIC INITIATIVE FOR THE NATIONAL OIL CORPORATION

National Oil

Q & A

ELIA LEMA

REVOLUTIONIZING INDUSTRIAL INSPECTIONS WITH DRONE TECHNOLOGY: ENHANCING SAFETY, EFFICIENCY AND COST SAVINGS

ELIA LEMA

REVOLUTIONIZING INDUSTRIAL INSPECTIONS WITH DRONE TECHNOLOGY: ENHANCING SAFETY, EFFICIENCY AND COST SAVINGS

ASSETS INTEGRITY MANAGEMENT SERVICES
• DRONE INSPECTION

SOLUTIONSTAG Better tomorrow

What are drones?

- A drone is an aerial vehicle that can be controlled remotely or independently through software-regulated flight plans within its embedded systems.
- These systems function in coordination with onboard sensors and a Global Positioning System (GPS) to enable autonomous flight

Revolutionizing Industrial Inspections with Drone Technology:
Enhancing Safety, Efficiency, and Cost Savings

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Drone inspection

Drone inspection is basically the process of using an unmanned aerial vehicle for visual inspection and data collection for maintenance programs, planning and facility expansion.

Benefits of using drones in inspection

1)Saving inspection Time

- With a speed of 22 m/s our MATRICE 350 RTK drone can cover large areas more quickly than traditional inspection methods, allowing for faster inspection times and reduced downtime.

2)Saving inspection Costs

- Drones minimizing any shutdowns time if needed and removing the need to hire specialists and equipment such as scaffolding.

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• DRONE INSPECTION

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Benefits of using drones in inspection

3)Reducing Safety risks

- Eliminating the risk of exposing workers to confined spaces, working at height or exposure to unhealthy chemicals.
- Our drones are also equipped with Anti-Collision sensors to avoid obstacles making them non-intrusive & non destructive during inspections

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Benefits of using drones in inspection

4) Improving inspection accuracy & data collection

- Accurate and high quality data. Using advanced and top spec sensors the drones acquire high quality data for every point in a facility removing any errors as opposed to human interventions.

Revolutionizing Industrial Inspections with Drone Technology:
Enhancing Safety, Efficiency, and Cost Savings

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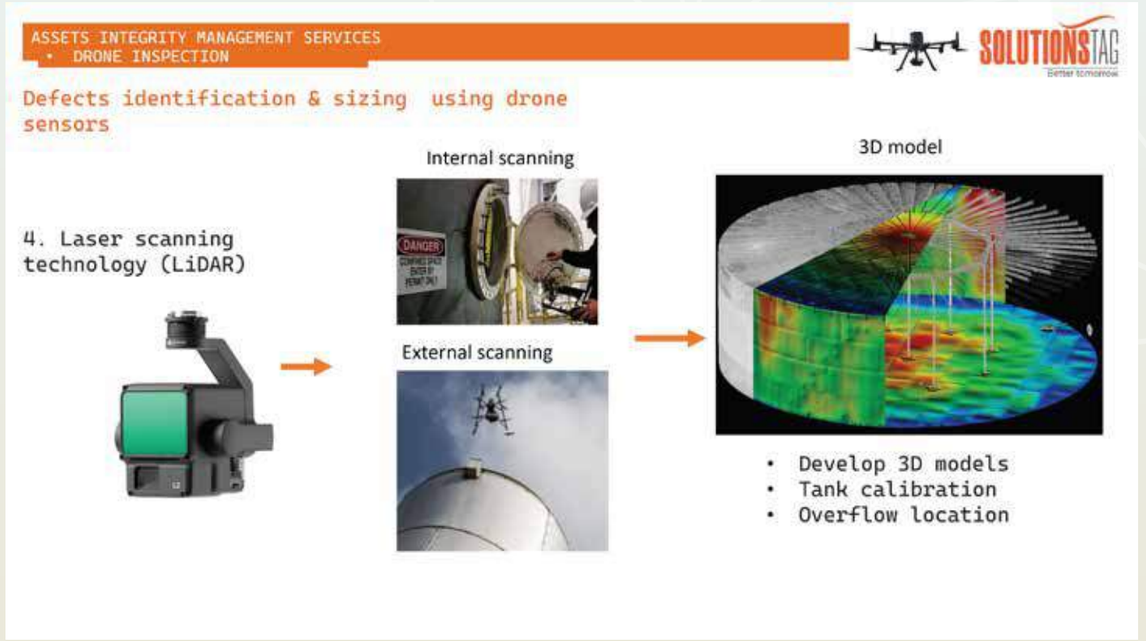

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Our drone technology

Flyability Elios 3 for indoor inspections

Key features
- Collision resilience
- Confined space accessibility
- Robust transmission
- Full UHD (4K) and thermal camera
- GPS-free stabilization
- Distance lock
- Dustproof lighting

DJI matrices 350 RTK

Key features
- Extended flight Time up to 55 minutes
- Obstacle Avoidance-Six obstacle avoidance sensors for improved safety while flying
- Transmission Range-15 Km
- Rain and dustproof-The M350 has a weather sealing rating of IP55.
- With high speed of 22m/s

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Thank you

We do it innovatively for a better tomorrow

Let's keep in touch:

info@solutionstag.co.tz

elia.lema@solutions.co.tz

+255 653 236 885

SolutionsTag Consulting Company Limited

JACKSON IMANI

ETHANOL-BLENDED FUELS AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

ETHANOL-BLENDED FUELS AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

PRESENTED BY; Jackson Imani

DATE

Objectives

- Explain the role of ethanol-blended fuels in reducing greenhouse gas
- Assess Environmental, economic and energy security benefits of ethanol

JACKSON IMANI

ETHANOL-BLENDED FUELS AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

Methodology

- Analyzed This methodology outlines the process of collecting and analyzing gas samples from an internal combustion engine running on **E10 ethanol-blended fuel** and **pure petrol**, followed by Gas Chromatography with Spectroscopic Identification Detection (GCSID) for emission profiling.

Experimental Setup

- **Engine Type**: A standard gasoline engine (4-stroke, fuel-injected) was used.
- **Fuel Types Tested**:
  - E10 (10% ethanol, 90% petrol)
  - Pure petrol (0% ethanol)
- **Controlled Conditions**:
  - Engine warmed up to operating temperature.
  - Sampling conducted at **idle, mid-load, and full-load conditions**.

Results

Gas Component	E10 Blended Fuel (ppm or %)	Pure Petrol (ppm or %)	Change in Emissions (%)
Carbon Monoxide (CO)	0.7%	1.2%	↓ 41.7%
Carbon Dioxide (CO_2)	13.5%	14.8%	↓ 8.8%
Nitrogen Oxides (NOx)	280 ppm	310 ppm	↓ 9.7%
Sulfur Oxides (SOx)	10 ppm	18 ppm	↓ 44.4%
Hydrocarbons (HCs)	0.35%	0.48%	↓ 27.1%
Particulate Matter (PM2.5)	15 µg/m³	22 µg/m³	↓ 31.8%

ANNEX | TECHNOLOGICAL ADVANCEMENT

JACKSON IMANI

ETHANOL-BLENDED FUELS AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

Conclusion

Impacts

Ethanol blends reduce CO2 emissions by up to 50% compared to compared to normal petrol

Improves air quality by lowering carbon monoxide and particulate matter

Ethanol improves fuel combustion, leading to cleaner engine performance

Creates jobs in agriculture, biofuel production and technology sectors

Reduces dependency on crude oil imports, stabilizing prices

Policy Implementation Strategies

- Provide subsidies and tax incentives for ethanol producers and consumers
- Expand ethanol distribution networks and refueling stations
- Support vehicle adaptation and technological advancements in ethanol compatible engine
- Public awareness by educating consumers about ethanol benefits and dispel myths
- Collaboration between fuel distributers, automakers and environmental agencies

JACKSON IMANI

ETHANOL-BLENDED FUELS AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

Business opportunities to partner in the ethanol sector

- Ethanol production and supply chain-investments in bio-refineries for large scale ethanol production ,supply chain development for efficient distribution and storage. Nock welcomes partnership in this area.
- Agriculture and feedstock cultivation-expansion of sustainable biofuel crop farming
- Retail consumer markets-Nock is one of the biggest oil company in Kenya with retain stations around the country which makes it a good investment

PETER S. KICHOGO

COMPOSITE METAL REPAIR: ADVANCED TECHNOLOGICAL APPROACH TO PIPELINE REPAIR

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11th EAPCE 2025

Composite Metal Repair: Advanced Technological Approach to Pipeline Repair

Paper Presented at East Africa Petroleum Conference and Exhibition
5-7 March 2025
JNICC

Presented by: Presented by:
Peter S Kichogo
Director
SolutionsTag Consulting Company Limited

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Content

1. Introduction
2. Composite repair Technology
3. How does it work?
4. Why adopting Composite repair?
5. Use cases

PETER S. KICHOGO

COMPOSITE METAL REPAIR: ADVANCED TECHNOLOGICAL APPROACH TO PIPELINE REPAIR

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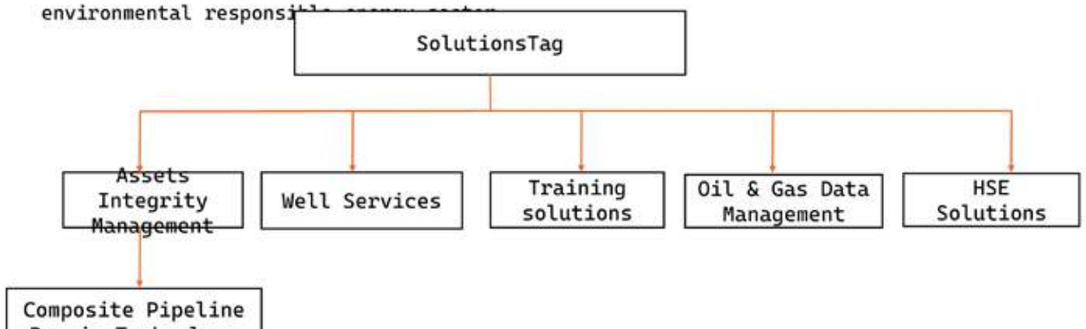
About SolutionsTag

- An ISO9001:2015 certified Tanzanian owned and operated energy service company
- Providing reliable and innovative solutions toward sustainable and globally environmental responsible energy sector



Creating a Better Tomorrow through Innovative Solutions

At somepoint in life, pipeline will require repair!

Creating a Better Tomorrow through Innovative Solutions

PETER S. KICHOGO

COMPOSITE METAL REPAIR: ADVANCED TECHNOLOGICAL APPROACH TO PIPELINE REPAIR

What are available Pipeline Repair Options?

Clamp repair

- Costs of implementation
- Bolted induced weakness
- Need continous servicing
- Challenging in complex locations, eg. Tee, Elbows, etc

Metal Replacement

- Cost of implementation
- Time of implementation
- Non-Production Time (NPT)
- Hot work associated risks
- Girth weld induced anomalies

Metal Sleeve

- Hot work associated risk
- Cost of implementation
- Time of implementation-Start at the workshop
- Non-Production Time (NPT)

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Composite Repair Technology

So what is composite repair?

- A great alternative to metal clamp, welded sleeve or metal replacement
- Made of Kevlar tape, filler and bi-epoxy resin

Key features

- User friendly
- Controlled QA/QC-Start with computerized simulation
- Wide range of pipeline geometries-Straight, Tee, elbow, risers, etc

Why composite repair

- Cost effective-40% less than traditional approaches
- No hot work
- No Non Production Time
- Emergency Pipeline Repair System (EPRS)
- Long term performance-up to 20 years lifetime

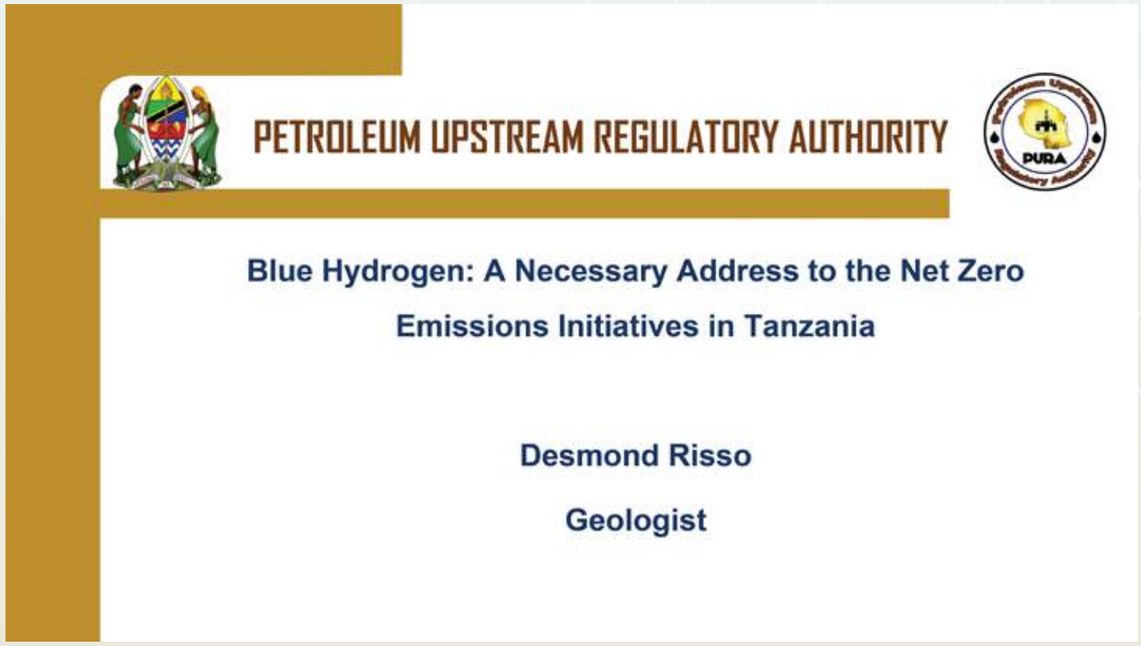
Creating a Better Tomorrow through Innovative Solutions

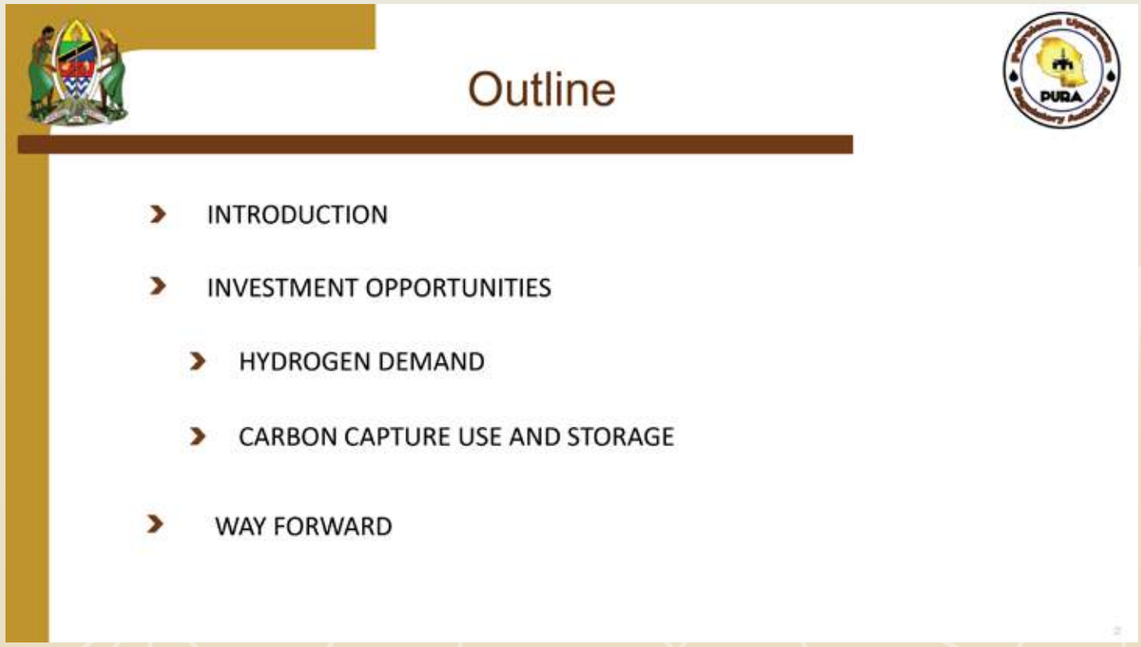
PETER S. KICHOGO

COMPOSITE METAL REPAIR: ADVANCED TECHNOLOGICAL APPROACH TO PIPELINE REPAIR

DESMOND RISSO

BLUE HYDROGEN: A NECESSARY ADDRESS TO THE NET ZERO EMISSIONS INITIATIVES IN TANZANIA

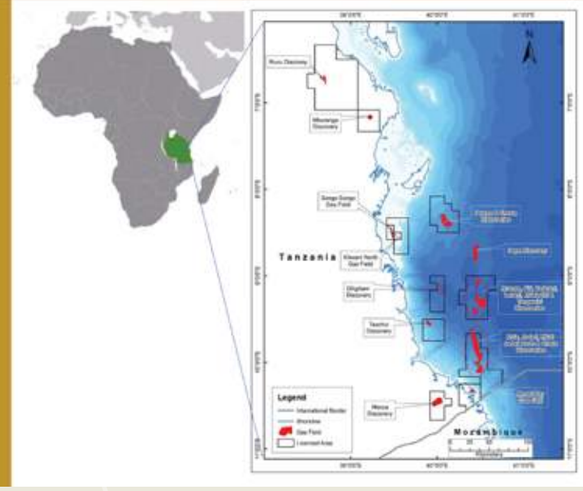




DESMOND RISSO

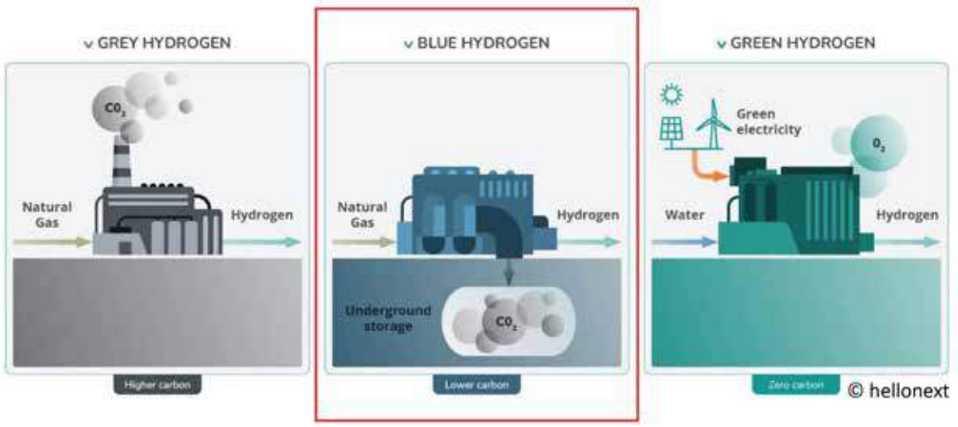
BLUE HYDROGEN: A NECESSARY ADDRESS TO THE NET ZERO EMISSIONS INITIATIVES IN TANZANIA

Introduction



- Natural gas discovery at 57.54 TCF
- Power to economies
- Associated with GHG emissions, one of them CO_2
- Tanzania is one of signatories to Paris Agreement 2015
- Net zero emissions at 2050
- Blue hydrogen – critical tech pathways

Blue Hydrogen



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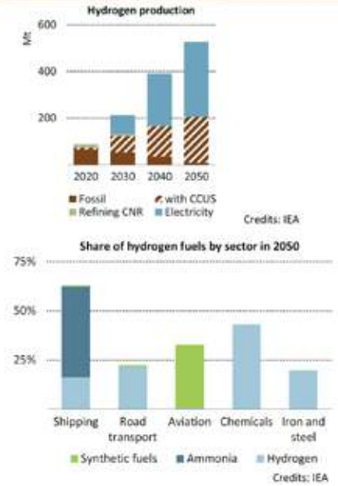
Investment Opportunities

- Tanzania's Nationally Determined Contribution (NDC) published in July, 2021
- Business-As-Usual (BAU) scenario to reduce greenhouse gas emissions economy-wide between 30-35% by 2030.
- Environmental Management (Control and Management of Carbon Trading) Regulations, 2022
- Demonstration of commitment to cut down emissions toward net zero emissions.
- Warrants for sustainability of investments and fosters for possibility of emerging interrelated economic niches

Hydrogen Demand



- Global hydrogen demand was around 90 million tonnes (Mt) in 2020, mainly produced from fossil fuels (mostly natural gas) and emitting close to 900 Mt CO_2
- Demand increases almost sixfold to 530 Mt in 2050
  - half in heavy industry (mainly steel and chemicals production) and transport
  - 30% is converted into other hydrogen-based fuels
  - 17% is used in gas-fired power plants
- Hydrogen-based fuels account for 13% of global final energy demand in 2050.

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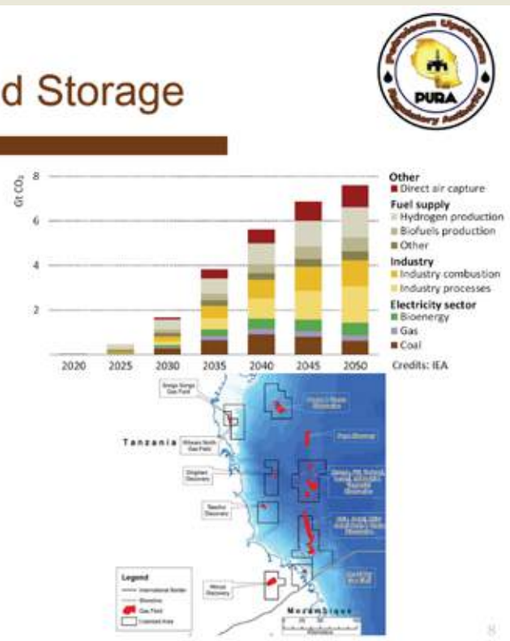
Carbon Capture and Storage (CCS)

- Hydrogen mainly produced from fossil fuels (mostly natural gas) emits close to 900 Mt CO_2
- CCUS is particularly important for cement manufacturing and electricity production which account for more than 60% of CO_2 emissions.
- To meet NZE by 2050, CO_2 emissions must be 90% lower by 2040 compared with 2020.
- Currently, less than 5% of produced CO_2 is captured.
- All these present and opportunity for carbon capture and storage.

Carbon Capture and Storage

- IEA anticipates that
  - in 2030 50 GW of coal-fired power plants (4% of the total at that time) and 30 GW of natural gas power plants (1% of the total) will be capturing CO_2,
  - rise to 220 GW of coal (almost half of the total) and 170 GW of natural gas (7% of the total) capacity in 2050. A further 30% of CO2 captured in 2050 comes from fuel transformation, including hydrogen and biofuels production as well as oil refining.
- EIA highlights that energy-related and process CO_2 emissions in industry account for almost 40% of the CO2 captured in 2050.
- In Tanzania, depleting natural gas fields present and opportunity to inject CO_2.
  - Potential space for more than 80Mt CO_2 to be injected
  - Potential for more space to be discovered.



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Way Forward

- A comprehensive assessment of
  - technical,
  - economic, and
  - environmental factors
- To determine the feasibility and viability of integrating blue hydrogen project.
- A call for studies and investment in this newly emerging area.

THANK YOU

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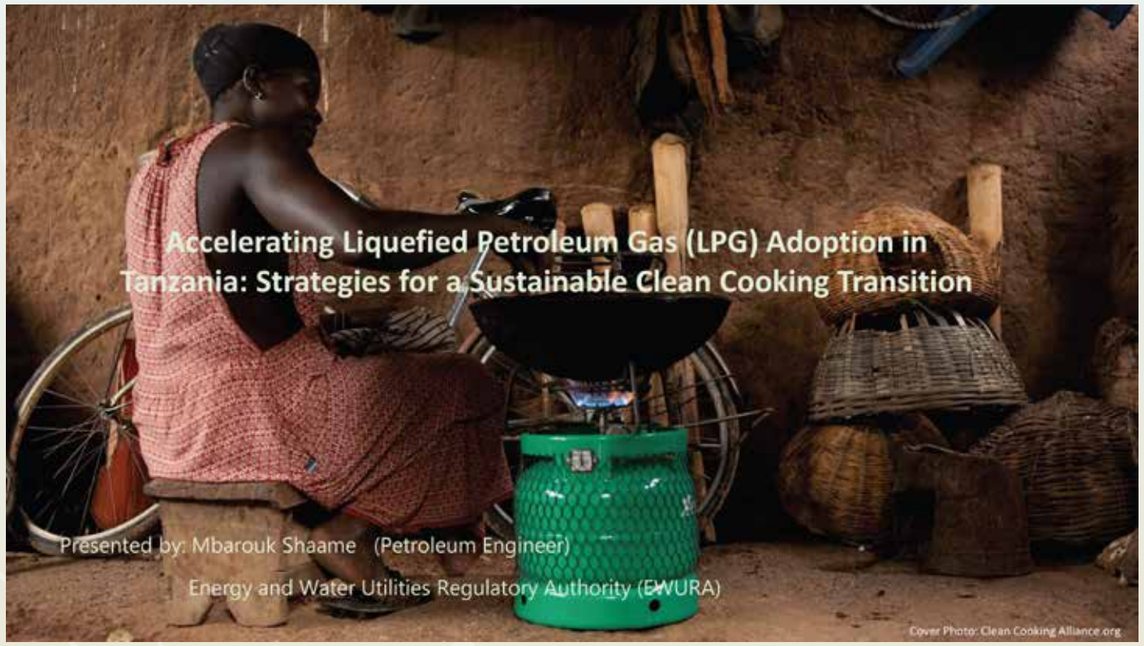
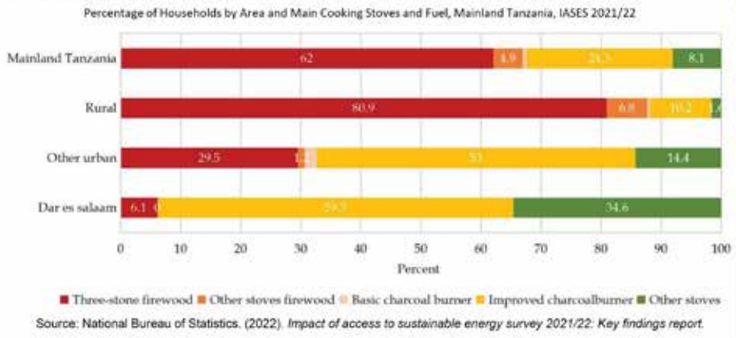


1. Introduction

- Tanzania with over 60 million people, majority rely on charcoal and firewood for cooking/heating leading deforestation, indoor air pollution, and adverse health effects
- The solution is improving access to clean cooking and improve public health



Source: National Bureau of Statistics. (2022). *Impact of access to sustainable energy survey 2021/22: Key findings report.*

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2. LPG as a Clean Cooking Solution

Why LPG?

a) Portable, convenient and reaches population beyond the reach of natural gas piped networks and electricity grids

b) Clean-burning : Low CO2-e, reduction in respirable particulate matter PM2.5 and black carbon emissions

- Central Contribution to SGD 7
- Direct Contribution to 3,5,8,9,11,13
- Indirect Contribution to Remaining Ten

3. Objective of the study

- **Assess Tanzania's LPG Subsector:** Evaluate legal framework, infrastructure, market structure, pricing, and promotional strategies while identifying growth barriers.
- **Learn from Global Best Practices** : Analyze successful LPG adoption models from other countries for lessons applicable to Tanzania.
- **Recommend Strategies for Growth:** Propose solutions to expand LPG use

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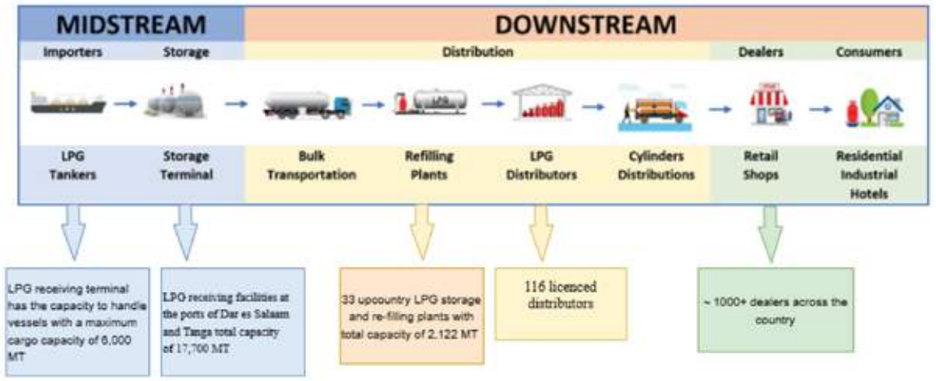
3. Methodology

- ❑ Review of literature on LPG adoption including relevant government policies documents, regulations, industry reports and international best practices
- ❑ Semi-structured interviews with key stakeholders
  - ✓ **Government Officials** (EWURA, Ministry of Energy, REA,PBPA,TRA),
  - ✓ **LPG Marketing companies** (Taifa Gas, Puma Gas, Oryx, TotalEnergies, Lake Gas, TZALPGA, M-Gas)
  - ✓ **Consumers**
- ❑ Thematic analysis for qualitative data from interviews

4. Results Obtained

4.1 Current State of LPG in Tanzania

- ❑ The LPG supply chain in Tanzania begins with importation and ends with last-mile distribution to households and businesses.



LPG Supply Chain in Tanzania Mainland adopted from EWURA 2023/24 report

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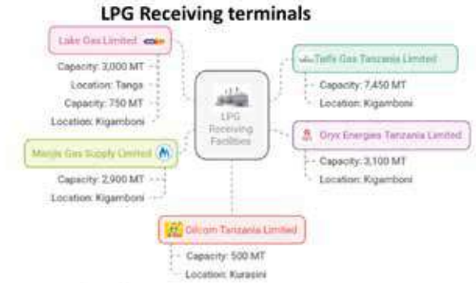

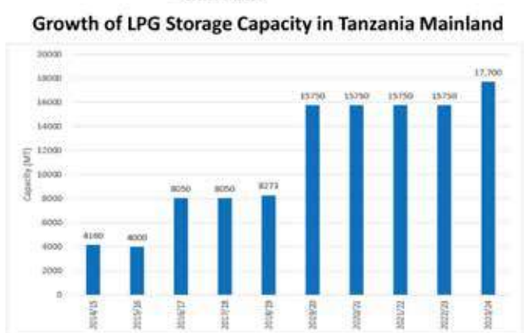

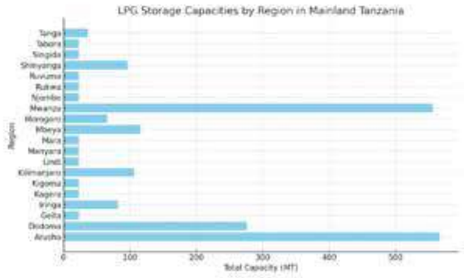

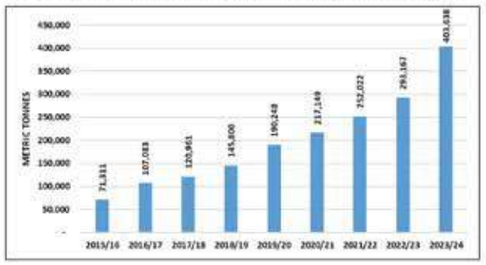

Source: EWURA report 2023/24

4.2 LPG Regulation and Market structure in Tanzania

Regulation

- ❑ Petroleum Act 2015
- ❑ The Petroleum (LPG Operations) Rules, 2020 GN 825 and its Amendment

Standards

- ❑ TZS 916:2015, TZS 2374-1:2020-EAS 924-1:2018, TZS 1228:2009 and TZS 818:2004

The retail market

- ❑ Branded Cylinder Recirculation Model (BCRM)
  - ✓ LPG marketing company owns the cylinder and are fully responsible for maintenance, safety inspections and refilling of cylinder

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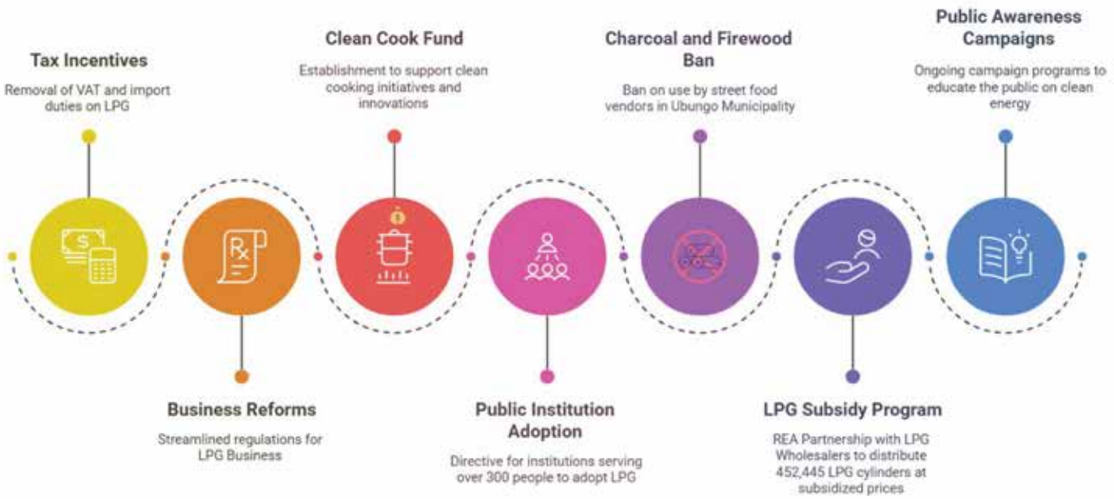
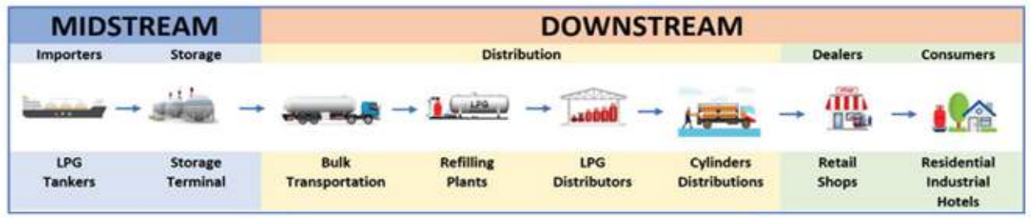
4.3 Promotion strategies



4.4 Barriers to LPG Adoption



- Insufficient Receiving terminals and storage facilities and the need for expansion
- Price instability due fluctuations in global oil prices

- Limited LPG refilling plants and distribution network, particularly in rural areas
- Illegal refilling and smuggling of cylinders
- Challenge in tracing of LPG cylinders circulated in the market
- High investment costs especially in cylinders and bulk installations
- Insufficient number of competent and certified Technical expertise in LPG

- High upfront cost of purchasing an LPG starter pack & ongoing refills
- Misconception of LPG & lack of Consumer awareness
- Counterfeit/fake LPG accessories e.g. burners

ANNEX | CLEAN COOKING

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BLUE HYDROGEN: A NECESSARY ADDRESS TO THE NET ZERO EMISSIONS INITIATIVES IN TANZANIA

4.5 Case Studies on LPG Adoption: Lessons for Tanzania

INDIA
- Direct Benefits transfer for LPG (DBTL)
- 'Give it Up' campaign to encourage wealthier households to forgo subsidies
- Free LPG connections for poor households (Ujjwala scheme)

INDONESIA
- Nationwide kerosene-to-LPG conversion program
- Free starter kits (cylinder, stove, regulator)
- Investment in LPG infrastructure

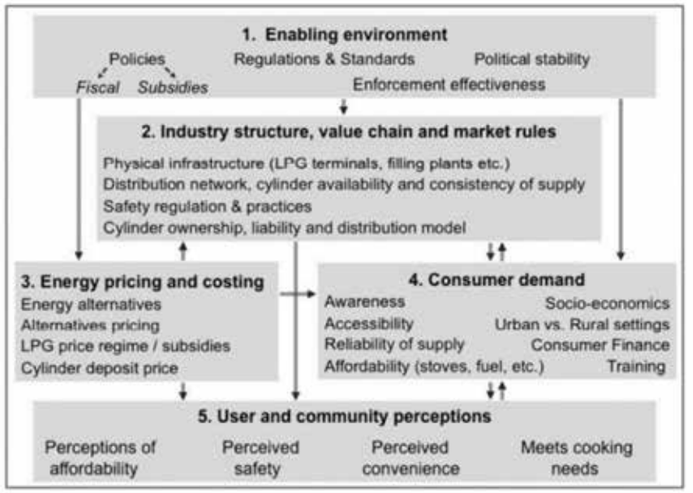
CAMEROON
- National LPG Master Plan (2016)
- Tax reductions on cylinders and accessories
- Microfinance programs for LPG equipment (Bottled Gas for Better Life initiative)

LATIN AMERICA (Brazil)
- Government-led market expansion
- Targeted subsidies for low-income households
- Strong local manufacturing of LPG equipment

KENYA
- Tax exemptions for LPG (VAT zero rating)
- Microfinance programs for LPG kits such as Bottled Gas for Better Life initiative
- Innovative Technology such as pay as you cook
- Restrictions/regulation on and bans to control charcoal use and production

5. Conclusion (Academia)

- ❑ Tanzania LPG sector is growing however some challenges such as limited infrastructure, inadequate distribution networks and low consumer awareness hinder its full potential
- ❑ Five Key Elements: Essential for LPG scaling up, based on global best practices.
- ❑ Multi-Stakeholder Engagement: Collaboration across sectors and stakeholders.
- ❑ A need for LPG Master Plan: Guides systematic development of the LPG sub-sector.



Source: Adopted from Bruce et al. 2017

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BLUE HYDROGEN: A NECESSARY ADDRESS TO THE NET ZERO EMISSIONS INITIATIVES IN TANZANIA

6. Policy Implications (Government)

- ❑Government support in incentives for investors in infrastructure expansion and protection
- ❑Regulation and safety standards must be enforced along LPG supply chain
- ❑Public-private partnerships for LPG investment and adoption
- ❑Awareness raising and education to eradicate LPG misunderstandings and misconceptions
- ❑Government micro-financing and partnerships between financial institutions and energy companies
- ❑Policy adjustments for import duties and VAT exemption on LPG appliances
- ❑Well targeted LPG subsidies program to enable lower-income households
- ❑Foster partnerships and collaboration with local governments, NGOs, and development partners

7. Business Opportunity (Private sector)

- ❑Investment opportunities for expanding LPG storage, transport and distribution networks
- ❑New innovations that can make LPG more affordable such as payment models (Pay-as-You-Go)
- ❑Offering of tech solutions such as Cylinder tracking through QR codes and radio-frequency identification (RFID)
- ❑Innovative digital media, such as social networks and content sharing platforms for public awareness campaigns and educational programs
- ❑Microfinance for LPG and its equipment

ANNEX | CLEAN COOKING

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BLUE HYDROGEN: A NECESSARY ADDRESS TO THE NET ZERO EMISSIONS INITIATIVES IN TANZANIA

WANJIKU MANYARA

ENERGY MIX AND JUST ENERGY TRANSITION: CLEAN COOKING

PETROLEUM INSTITUTE OF EAST AFRICA

11TH EAST AFRICA PETROLEUM CONFERENCE AND EXHIBITION

5-7 MARCH 2025

UNLOCKING INVESTMENT IN FUTURE ENERGY: THE ROLE OF PETROLEUM RESOURCES IN THE ENERGY MIX FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA

ENERGY MIX AND JUST ENERGY TRANSITION:CLEAN COOKING.

ANNEX | CLEAN COOKING

WANJIKU MANYARA

ENERGY MIX AND JUST ENERGY TRANSITION: CLEAN COOKING

The Petroleum Institute of East Africa (PIEA)

PIEA Vision and Mission

1. The PIEA is a professional association for the oil and gas industry in the East Africa region whose key mandate is advocacy. Membership is drawn from large, medium, small oil marketing companies, vital petroleum common user facilities –as well as oil and gas service providers like transporters, financial institutions and engineering consulting firms, amongst others.

Agenda

1. Introduction to the PIEA
2. Case for LPG
   a) Health product
   b) Transition cooking fuel
   c) Catalyst for Sustainable Development Goals
   d) Key to unlocking investments

Case For LPG

Health Product

- Antidote for preventable diseases and deaths resultant from indoor pollution.
- Facts from many scientific studies proof that transitioning households that use harmful sources of energy(charcoal, firewood and kerosene)eliminates the occurrence of respiratory illnesses and related deaths.
- East Africa needs to prioritize quick transitions that prevent non-communicable diseases and related deaths, and which are enabled by technologies in existing energy forms -a case in point is LPG which is a fossil resource technology that is beyond all else –**a health product.**

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ENERGY MIX AND JUST ENERGY TRANSITION: CLEAN COOKING

Case For LPG

Transition cooking fuel

- East Africa must take charge of her own transition journey given that access of cleaner and ultimately clean energy is progressive.
- The rate of Africa's transition is tied to access of the clean energy sources which does not in any case mean deferment.
- LPG offers the shortest and efficient route to clean cooking transition.
- LPG is also a key constituent in transitioning beyond cooking and specifically the mobility, power generation and agriculture sectors though it's recognized that there are other clean energy sources that are available and in use for the non-cooking sectors; solar, wind, geothermal, electricity.

5

Case For LPG

Catalyst for Sustainable Development Goals(SDGs)

- Transitioning households that use harmful sources of energy(charcoal, firewood and kerosene)to LPG will yield a quick transition win that will compound the rate of success in achieving the SDGs beyond SDG 7 Affordable and Clean Energy.
- It is evident that the access and transition to clean cooking will unlock and indeed facilitate the realization of:
  - ✓ SDG 1- No Poverty, access to basic human needs of health, education, sanitation;
  - ✓ SDG 3- Good Health and Wellbeing: Better, more accessible health systems to increase life-expectancy ;
  - ✓ SDG 5-Gender Equality: Education regardless of gender, advancement of equality laws, fairer representation of women
  - ✓ SDG 8-Decent Work and Economic Growth;
  - ✓ SDG 9- Industry, innovation, and infrastructure, and
  - ✓ SDG 13 -Climate action.

6

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ENERGY MIX AND JUST ENERGY TRANSITION: CLEAN COOKING

Case For LPG

Key to unlocking investments

- Requisite infrastructure for import, storage, refilling and distribution
- Cylinders, appliances and accessories manufacturing
- Last mile distribution innovations
- Consumer awareness and education

Favorable Conditions: Sound policy, legal and regulatory framework

7

Conclusion

- Cease wastage of recourses on more studies –effects of polluting cooking fuels known as is the quickest fix in East Africa energy mix - LPG.
- Clean cooking transition resources/initiatives should match East Africa Countries energy transition policies and targets.
- Time for clean cooking transition is now-it is a matter of life and death.

8

WANJIKU MANYARA

ENERGY MIX AND JUST ENERGY TRANSITION: CLEAN COOKING

PIEA

Thank You!

CONTACT DETAILS

Wanjiku Manyara
General Manager, Petroleum Institute of East Africa
cmanyara@petroleum.co.ke

ELLY BOGI

SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

MINISTRY OF ENERGY AND PETROLEUM
STATE DEPARTMENT FOR PETROLEUM

Scaling Up Public-Private Partnerships (PPPs) to Enhance Liquefied Petroleum Gas (LPG) Access for Clean Cooking in Peri-urban Regions of East Africa

EAPCE'25

Elly Bogi

Outline

1. Introduction
2. Access Deficit
3. Cleaning cooking access
4. Need to transition to LPG
5. Scaling up LPG uptake though PPP
6. Conclusion

ELLY BOGI

SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

Introduction

- Globally, 2.3 billion people do not have access to clean cooking technologies and less than 20% of residents in 29 sub-Saharan African countries have access to clean cooking solutions.
- In 2022, the number of individuals lacking access to clean cooking facilities rose to about 990 million, (WHO).
- As a result, attainment of Sustainable Development Goal (SDG) 7 of universal access to modern energy remains a distant goal and will likely be unachievable by 2030 or even by 2050.

1. Introduction Cont'd...

- The use of biomass contributes to the deforestation rate and its health implications are equally severe.
- According to the WHO, an estimated 3.2 million deaths occurred due to household air pollution, with over 237,000 of those fatalities involving children under the age of five by the year 2020.
- Reliance on polluting fuels costs approximately $791.4 billion annually, with health-related impacts accounting for $526.3 billion

ANNEX | ENERGY INTEGRATION

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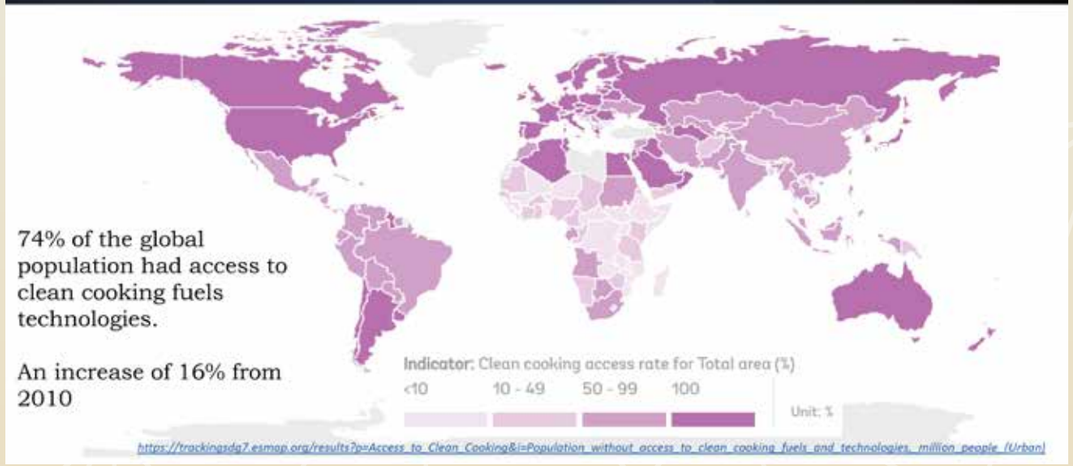
SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

2. The Access Deficit- Sub-Saharan Africa

- While gains have been made toward the 2030 target for universal access, major disparities persist.
- Countries in Sub-Saharan Africa, Central Asia, and Southern Asia dominate the global access deficit.
- By 2024, 84% percent of the population in Sub-Saharan Africa continue to rely on polluting fuels and cooking technologies.
- Sub-Saharan Africa remains the only region where the number of people without access continues to climb.
- The access deficit in Sub-Saharan Africa more than doubled between 1990 and 2022, primarily due to a rapid increase in population size (United Nations 2018), which translates into 923 million (888–954) people without access to clean cooking fuels and technologies in 2022.
- If no action is taken and current trends continue, the access deficit in Sub-Saharan Africa is projected to exceed 1 billion people by 2030.

3. Clean Cooking: Global Population With Access to Clean Cooking Fuels and Technologies- 2022



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Global Access to Clean Cooking for Urban Area-2022

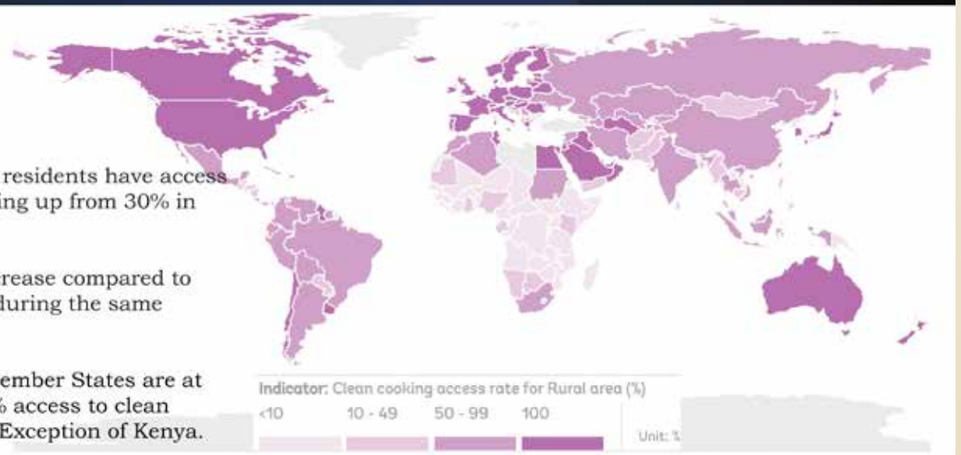
88% of urban residents had access to clean cooking up from 82% in 2010

In East Africa

- Kenya- 50-99;
- Ethiopia and United Re. of Tanzania- 10-49
- Rest of EAC member States- Less than 10%

https://trackingsdg7.esmap.org/results?p=Access_to_Clean_Cooking&i=Population_without_access_to_clean_cooking_fuels_and_technologies,_million_people_(Urban)

Global Clean Cooking Access for Rural Area-2022



- 54 % of rural residents have access to clean cooking up from 30% in 2010.
- A five-fold increase compared to urban areas during the same period.
- East Africa Member States are at less than 10% access to clean cooking with Exception of Kenya.

https://trackingsdg7.esmap.org/results?p=Access_to_Clean_Cooking&i=Population_without_access_to_clean_cooking_fuels_and_technologies,_million_people_(Urban)

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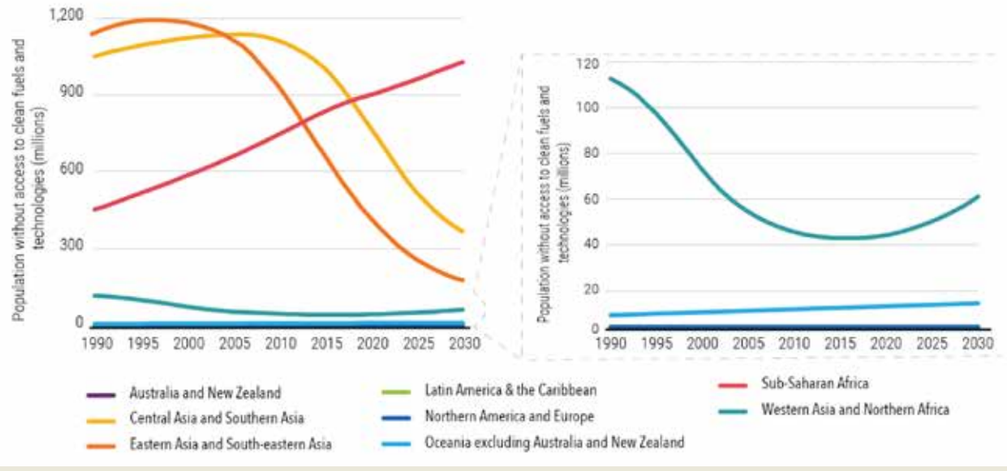
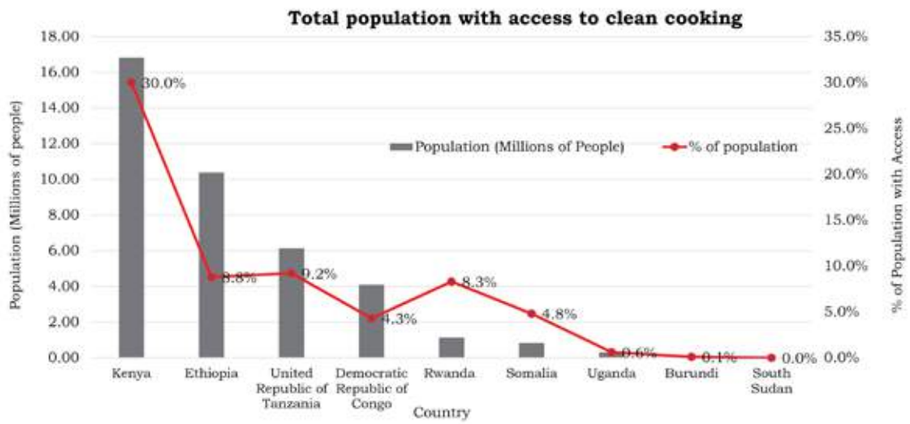
SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

Number of People Without Access to Clean Fuels and Technologies, by Region, 2000–22



Total Population with Access to Clean Cooking in East Africa Region-2022



Population with access to clean cooking fuels and technologies in East Africa

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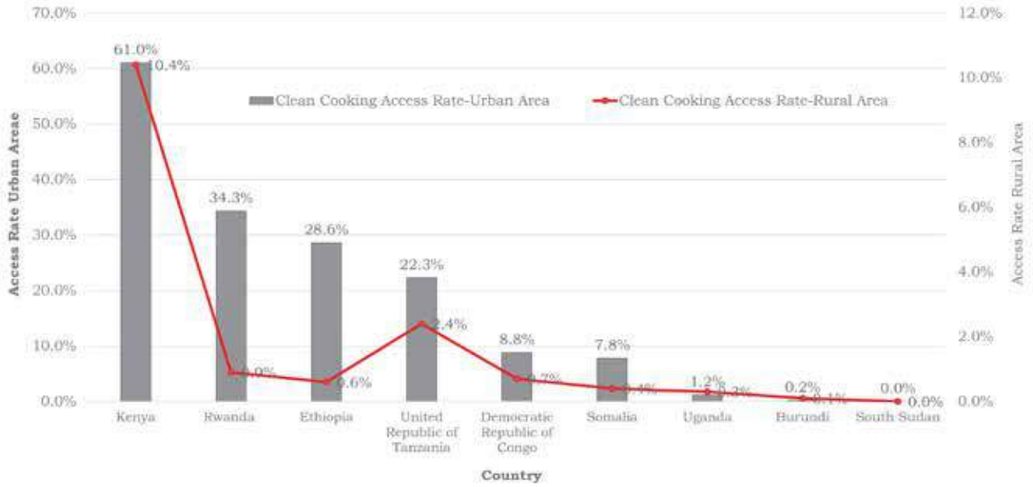
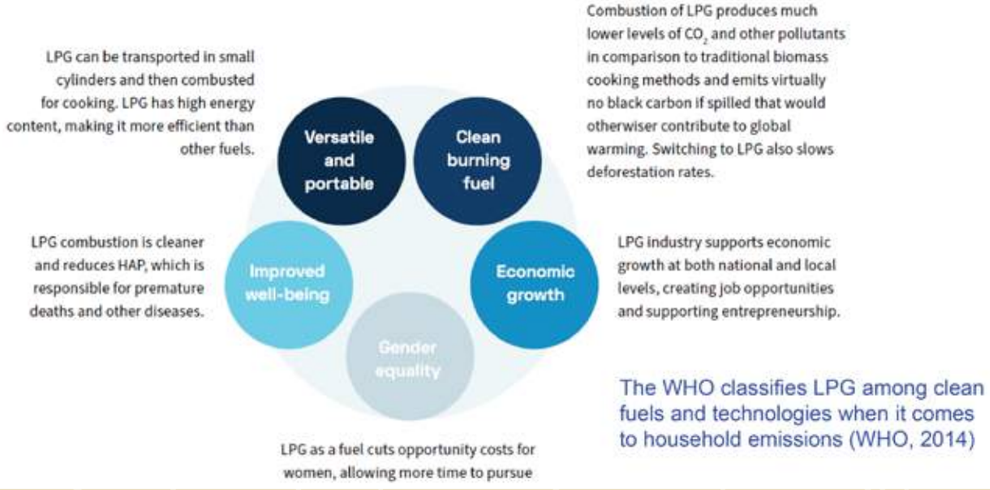
Percentage of Population with Access to Clean cooking in East Africa Region: Urban and Rural Areas -2022



Need for Transitioning to LPG Uptake in East Africa



ANNEX | ENERGY INTEGRATION

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SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

5. Scaling Up LPG Uptake in East Africa Through Public Private Partnership (PPP)

Scaling LPG for cooking requires coordinated, systems-approach

Governments
consistent regulation and enforcement

Private Sector
financing and technological innovation

Investors
finance across the entire LPG supply chain

Public Sector
targeted support that leaves no one behind

5.1. Governments-Consistent Regulation and Enforcement

- Prioritise Regulatory Foundations
- Establishing clear, enforceable regulations- first step towards a sustainable LPG market.
- Creating partnerships between governments and industry stakeholders
- Promoting the Cylinder Recirculation Model (CRM) to ensure safe and efficient distribution, and
- Implementing comprehensive safety regulations for LPG cylinders.
- Effective regulatory frameworks will build consumer confidence and encourage investment in the LPG sector.

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SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

5.2. Public Sector and Investors

Implement Consumer Financing and Payment Strategy

Overcoming the economic barriers to LPG adoption requires innovative financing solutions:

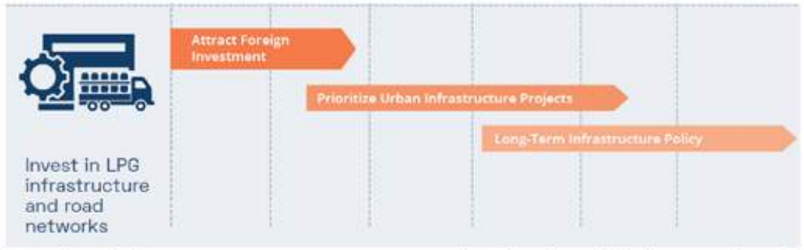
- Wide-spread access to micro-financing,
- Pay as-you-go systems, and
- partnerships between financial institutions and energy companies
- Foster partnerships and court non-traditional finance
- Expand pilot projects and Promote Finance Tech
- Harness Carbon Markets

5.2. Private Sector and Investors Cont'd...

b. Invest in LPG Infrastructure and Road Networks

Significant investment in infrastructure supports the widespread adoption of LPG. This includes:

- developing urban storage and distribution networks,
- enhancing rural road connectivity, and
- attracting foreign investment to fund largescale projects.



Prioritizing urban infrastructure can create economies of scale, while improved rural transport networks will facilitate the delivery of LPG to remote areas.

ANNEX | ENERGY INTEGRATION

ELLY BOGI

SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

High opportunity markets for LPG consumption in Kenya, Rwanda and Tanzania

Country	Supply	Infrastructure	Existing LPG Market	Policy	Investment Climate	Affordability
Kenya	• No domestic supply • limited storage infrastructure	• Investment in storage and bottling plant underway • rural buildout needed. • Max storage capacity of 50KMT	• Diverse and experienced distribution and retail markets	• Ambitious clean cooking fuel goals and strategy with LPG at the forefront; • The National LPG Growth Strategy; • 2023-27 clean cooking strategy	• Economic uncertainty, • Rural safety risks; • gov't support for LPG very strong	• Established distribution networks positive; • Zero rated taxes on LPG, etc.; • import price Uncertain
Rwanda	• No domestic Supply • Dependent on imports which will increase with demand	• No refining capacity and insufficient storage capacity; • landlocked country with expensive road access	• Liberalized LPG market; • Diverse retail market with multiple international and domestic Companies	• Gov't developed National LPG Master Plan and results-based financing program rollout with partners	• Licensing requirements induced International investment and M&A in a fairly liberalized downstream Market	• Positive regulatory environment to improve affordability through investment and financing instruments.
Tanzania	• No domestic supply; • Proximity to Middle East markets positive	• Relatively expansive existing road and rail network; • More storage and rural investment needed. • A max cargo capacity of 5,500 metric tons	• Relatively small volumes, • Strong distributors and some smaller distributors, • expansion needed	• Strong government-led National Clean Cooking Strategy	• Relatively stable • and low risk • investment climate; • increasingly open • to foreign • investment	• Rail/road network • positive for cost

Conclusion

By undertaking PPP to Scale LPG Uptake Will:

- Reduce household air pollution in and respiratory diseases
- Promote gender equity in the region
- Enhance economic growth at local and national levels in the member countries of EAC
- Transit about 404.27 million without access to clean cooking technology

ELLY BOGI

SCALING UP PUBLIC-PRIVATE PARTNERSHIPS(PPPs) TO ENHANCE LIQUEFIED PETROLEUM GAS (LPG) ACCESS FOR CLEAN COOKING IN PERI-URBAN REGIONS OF EAST AFRICA

Parting Shot

"We must prioritize investments in clean cooking infrastructure and support policies that enable access to affordable and sustainable cooking solutions for all. This is essential not only for health but also for economic development and environmental sustainability," - **Tanzania's Vice President Philip Mpango**

"Clean cooking is not just a health issue; it is a matter of human dignity. We cannot allow our sisters and mothers to suffer in silence while we have the power to change this," **- Kevin Kariuki, African Development Bank Group Vice President for Power, Energy, Climate & Green Growth**

DANIEL CHEGE REUBEN

ESSENTIAL CLEAN COOKING EDUCATION WITH ENERGY4ME

University of Dar es Salaam

Essential clean cooking education with energy4me

Student: Daniel Chege Reuben

In association with:

Society of Petroleum Engineers
Tanzania section
www.spe.org

University of Dar es Salaam

Background

- 81.5% of population use charcoal and firewood in Tanzania (NBS Census 2022)
- 18.5% remaining use clean sources (gas-9.4%, electricity-4.3%, others-4.8%)
- 33,024 premature deaths occur in Tanzania annually (National clean cooking strategy 2024)
- 500,000-700,000 premature deaths occur in Africa.

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ESSENTIAL CLEAN COOKING EDUCATION WITH ENERGY4ME

University of Dar es Salaam

Problem Statement: Causes for use of unclean sources

Lack of Awareness, Poverty, Unavailability of clean sources etc.

3

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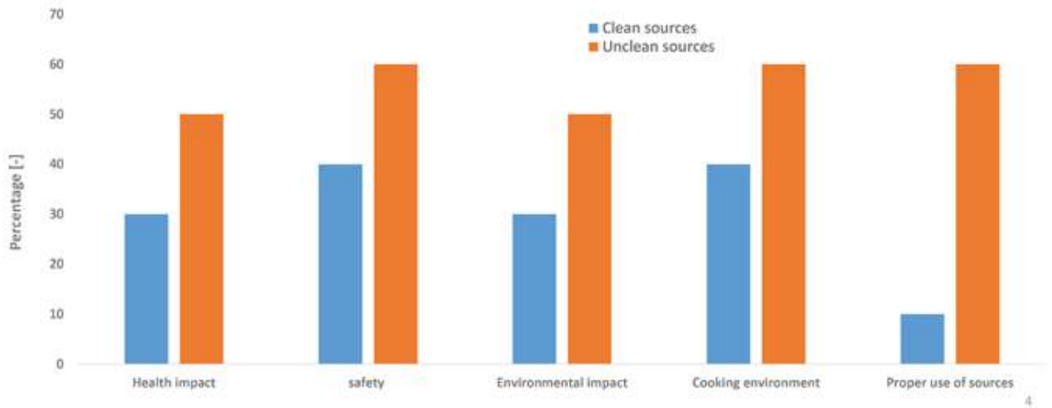
Awareness of villagers on using both energy sources: Nyabinda, Kilimanjaro-Tanzania.



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DANIEL CHEGE REUBEN
ESSENTIAL CLEAN COOKING EDUCATION WITH ENERGY4ME

University of Dar es Salaam

Energy4me

About: A name dedicated to program under Society of Petroleum Engineers.

Scope: Energy education.

Objective: Awareness on energy sources.

Period of implementation: 3 years per phase (3 phases)

Budget: USD 39,000 for all phases.

5

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Energy4me Education shared

- Importance of using clean sources.
- Side effects of unclean sources.
- Opportunities toward clean energy future.
- Energy sources mixing.
- How to use the clean sources.
- Accidents mitigation for all sources.

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ESSENTIAL CLEAN COOKING EDUCATION WITH ENERGY4ME

University of Dar es Salaam

Ongoing initiatives: Society/family outreach

University of Dar es Salaam

Ongoing initiatives: Learning institutions

DANIEL CHEGE REUBEN

ESSENTIAL CLEAN COOKING EDUCATION WITH ENERGY4ME

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Ongoing initiatives: Research weeks and exhibitions

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Ongoing initiatives: Online webinars

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ESSENTIAL CLEAN COOKING EDUCATION WITH ENERGY4ME

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Challenges

- Lack of enough research and outreach funds.
- Lack of material support to people.
- Identity.
- People's beliefs on gender roles.
- Monitoring and evaluation.

11

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Areas of collaboration

- Research and Innovation towards cleaner future.
- Education outreaches.
- Awareness to students.

12

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Appreciations

Ministry of Energy

Tanzania Section

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Thank you for Listening.

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WAVINYA KALUNGU

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

Promoting use of Clean Cooking Gas in Kenya

Author : Felistus Wavinya Kalungu
Co-Author: Jane Oremo

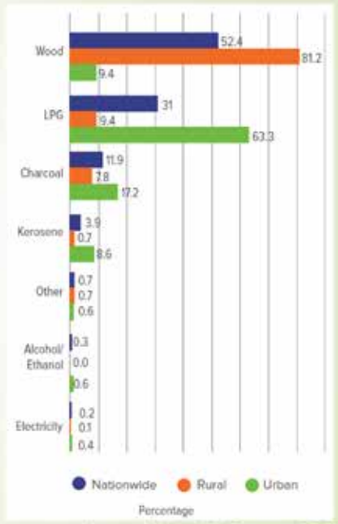
Ministry of Energy and Petroleum
State Department for Petroleum
KENYA

Background Information

- About 2.5 billion people use traditional biomass for cooking, accounting to 15% of global energy use.
- Household air pollution from unclean cooking fuels leads to 3.8 million premature deaths annually (WHO, 2018).

Kenya's Current Situation:

- 68.5% of the population (9.1 million households) rely on traditional cooking fuels, firewood being the predominant cooking fuel.
- 31% of households use Liquefied Petroleum Gas (LPG)
- LPG is the most widely used clean cooking option in Kenya.



(KNBS Demographic and Health Survey, 2022)

WAVINYA KALUNGU

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

Cont...

Government's Goal:

- Achieve universal access to clean cooking by 2028.
- Enhanced LPG Uptake Projects (ELUP) aim to increase LPG consumption from 7.5kg to 15kg per capita/year and LPG penetration from 24% to 70% by 2028.

Objectives

Objectives for Clean Cooking Gas promotion are:

i. To reduce health impacts associated with indoor air pollution as a result of sustained use of firewood and charcoal.

ii. To reduce environmental impacts associated with the use of charcoal and fuelwood

iii. To lower Green House Gas (GHG) emissions that are major contributors to global warming

iv. To enhance job creation in LPG distribution and services.

WAVINYA KALUNGU

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

Current Challenges in Clean Cooking Gas Adoption

1. Infrastructure and Distribution:
   - **Storage** capacities are **insufficient** to compensate demand fluctuations
   - Inadequate distribution **networks** in rural regions that limit access to LPG.
   - Supply routes not developed
   - Limited refilling stations – leads to inconsistent supply of LPG.
2. Access and Affordability:
   - High initial **cost** of LPG equipment (e.g., cylinders, stoves) compared to other fuel types
   - Low-income households have low disposable income - refill costs are high and at once
3. Awareness and Education:
   - Lack of awareness about the health, economic, and environmental advantages of LPG.
   - Improper use and lack of maintenance of LPG cylinders leads to accidents.
   - Myths and misconceptions about LPG, such as safety concerns

Others: **Price volatility, cylinder tracking.**

Ongoing Initiatives to increase LPG Uptake

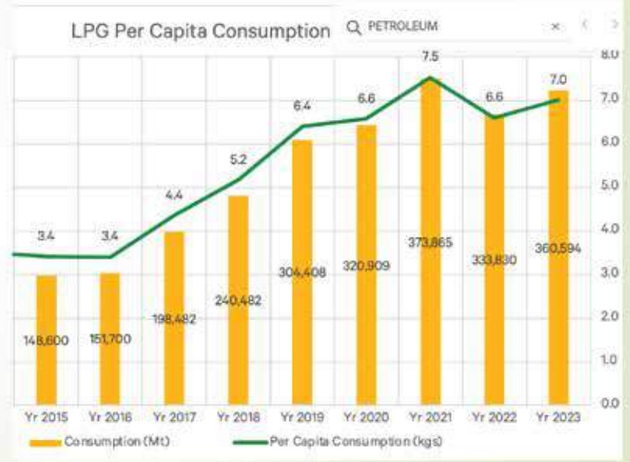
- Fiscal incentives for LPG adoption - VAT exemptions on LPG, tax breaks for private sector investment in LPG distribution
- LPG infrastructure development -public institutions of learning
- Distribution of subsidized cylinders to low-income households
- LPG reticulation in Affordable housing
- Public Awareness and consumer education Campaigns – benefits of LPG
- Expansion of LPG Infrastructure
- Private sector involvement

WAVINYA KALUNGU

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

Results Obtained

- In 2023, demand for LPG increased by 8%.
- This increase is attributed to Government initiatives to increase LPG uptake (Bi-annual Energy and Petroleum Statistics Report FY 2023/2024).



Conclusion

LPG is a viable clean cooking solution for Kenya

Multi-stakeholder collaboration is essential for success.

Strategic policies, infrastructure investment, and community engagement are critical.

LPG supports global energy transition and public health goals.

WAVINYA KALUNGU

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

Policy Implication (Government)

- Ensure continuous consumer education campaigns highlighting LPG benefits.
- Enhance and enforce safety standards for LPG usage – proper storage of LPG cylinders, maintenance.
- Encourage/Strengthen public-private partnerships to invest in infrastructure to ensure reliable LPG supply, especially in underserved areas.
- Ensure continuous provision of financial incentives or subsidies to reduce initial adoption costs.
- Robust policies, legal and regulatory framework - conducive environment.

Business Opportunity (Private Sector)

- Investment in development of LPG Bulk infrastructure for storage and distribution of LPG
- Investment in LPG distribution and retail sectors.
- Opportunities for LPG appliance manufacturing and servicing.
- Investment in LPG infrastructure in underserved areas.
- Investment in the promotion of health and education related to clean cooking technologies.

ANNEX | ENERGY INTEGRATION

WAVINYA KALUNGU

PROMOTING USE OF CLEAN COOKING GAS IN KENYA

THANK YOU

WILFRED MWAKALOSI

ASSESSMENT OF SOCIO-ECONOMIC CONTRIBUTION OF NATURAL GAS IN THE TANZANIAN PUBLIC TRANSPORT

ewura
Energy and Water Utilities Regulatory Authority

ASSESSMENT OF SOCIO-ECONOMIC CONTRIBUTION OF NATURAL GAS IN THE TANZANIAN PUBLIC TRANSPORT

✓ Objectives of the Study

- To assess availability of compressed natural gas services in Tanzania;
- To evaluate its economic potentials in transportation sub-sector;
- To examine the existing marketing structure in relation to investments;
- To recommend policy and operational measures to promote the use of CNG in transportation.

1

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Methodology

How?
- Systematic Desk-Review,

Data Sources:
- EWURA Natural Gas Sector Reports (2021/22, 2022/23 and 2023/24)
- EWURA Petroleum Downstream Subsector Performance Report
- BoT Annual Reports for 2021-2024.
- TRA website
- Academic journal articles, research reports, and policy papers.

Approach:
- collecting and analyzing existing data and documents related to the CNG

2

WILFRED MWAKALOSI

ASSESSMENT OF SOCIO-ECONOMIC CONTRIBUTION OF NATURAL GAS IN THE TANZANIAN PUBLIC TRANSPORT

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Energy and Water Utilities Regulatory Authority

Results

- Overall CNG Activities growth:
  - CNG Automobiles increased to 7,000, from 1,139 in just three years;
  - CNG consumption reached 5,662,448.20 Kg (2024), up from 3,754,493 Kg (2022);

Type of CNG-V	CNG (kg)	Distance (Km)	% Fuel saving
Heavy Truck	180	1300	78.6
Medium Vehicle	15	350	75.0
Bajaj	6	200	79.0

Source: Gerutu et al (2023)

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Conclusion

- With conversion workshops increasing from five to 12; CNG stations from 3 to 6; CNG Vehicles from 1,139 to 7,000; the industry future is bright.
- CNG saving of 78.6%-79.0% means enormous economic potentials; with trickle down effects from pockets to strengthening the TZS
- However, there is a missing link in policy & legal framework in promoting CNG in transportation. No Government CNG usage appetite indicated yet.

4

WILFRED MWAKALOSI

ASSESSMENT OF SOCIO-ECONOMIC CONTRIBUTION OF NATURAL GAS IN THE TANZANIAN PUBLIC TRANSPORT

Policy Implications

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- Policy framework for the CNG government vehicles;
- Policy guide on the use of least cost fuels in public transport system (BRT project, inter-regional buses, trucks etc; and
- TRA to recognize CNG as an alternative fuel in its tax assessment system.

5

Business Opportunity

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- ✓ Long ques in CNG stations means they can't cope with the increased demand; so more stations needed
- ✓ CNG outlets are concentrated in three coastal regions of Mtwara, Lindi & DSM. Opportunity for upcountry market.
- ✓ Need for more conversion workshops and alternative technology to push down conversion costs

6

WILFRED MWAKALOSI

ASSESSMENT OF SOCIO-ECONOMIC CONTRIBUTION OF NATURAL GAS IN THE TANZANIAN PUBLIC TRANSPORT

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ASANTE SANA

CNG's Future is here

PRESENTED BY
WILFRED MWAKALOSI & DR. ACHILANA MTINGELE
5TH MARCH 2025

7

PAULINE KICONCO

BUILDING A GENDER-JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

BUILDING A GENDER- JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

11TH EAST AFRICAN PETROLEUM CONFERENCE AND EXHIBITION

6TH MARCH 2025, DAR ES SALAAM

BY

PAULINE KICONCO

GEOLOGIST/ EXPLORATION

1

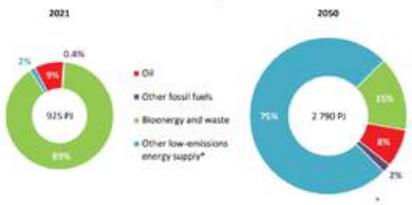
1.0 Introduction

- Uganda's approach towards the energy transition means making **every** energy resource available; including fossil fuels.
- With the energy industry's broad reach, its impact is most acutely felt by women; from household energy access to workplace conditions and opportunities in leadership roles.

1.1 Objectives

- Assess the role of women in Africa's just energy transition
- Examine the effectiveness of existing policies and initiatives on gender inclusion in the just energy transition
- Propose policy recommendations for effective gender mainstreaming in energy governance

Share of total energy supply by fuel in the Energy Transition Plan, 2021-2050



**Includes solar, wind, geothermal, hydro and nuclear.*

Source: Uganda Energy Transition Plan

PAULINE KICONCO

BUILDING A GENDER-JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

2.0 Methodology

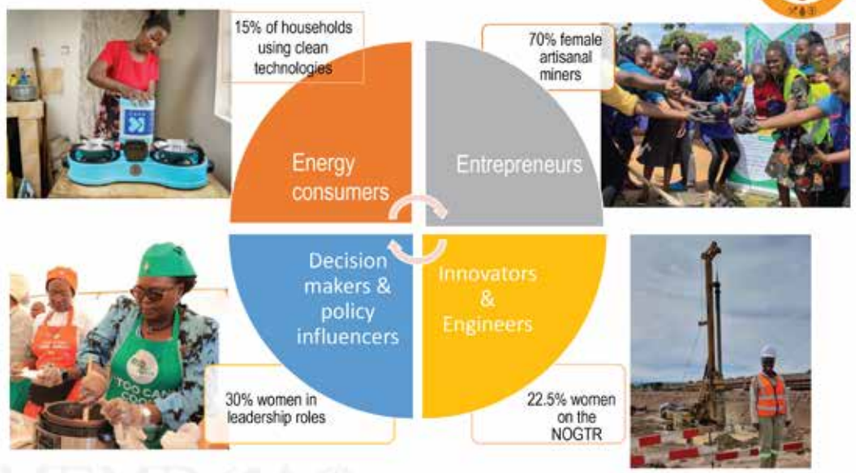
3.0 Results

Category	Key Facts and Statistics
Women's representation in Energy	• Women make up 32% of the global renewable energy workforce (IRENA, 2019). • Uganda's Petroleum sector: 35% of Uganda's workforce are women (PAU, 2022).
Gender Gaps in Energy Decision-Making	• Women hold only 15% of technical and decision-making roles in African energy utilities (World Bank, 2023). • In Uganda, women take up approximately 30% of top leadership in the energy sector
Economic Impact of Gender Inclusion in Energy	• Achieving full gender parity could boost GDP in emerging markets and developing economies by 23% on average (EIB,2024) • Universal access to clean cooking can avoid 50,000 premature deaths from indoor air pollution per year by 2030 (Uganda Energy Transition Plan, 2023)
Women's Role in Energy Access and Sustainability	• Empowering women in clean energy adoption can improve energy access for over 600 million people in Sub-Saharan Africa (IRENA, 2022). • In Uganda, less than 5% of households use LPG for cooking (UBOS, 2024).

PAULINE KICONCO

BUILDING A GENDER-JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

3.0 Results



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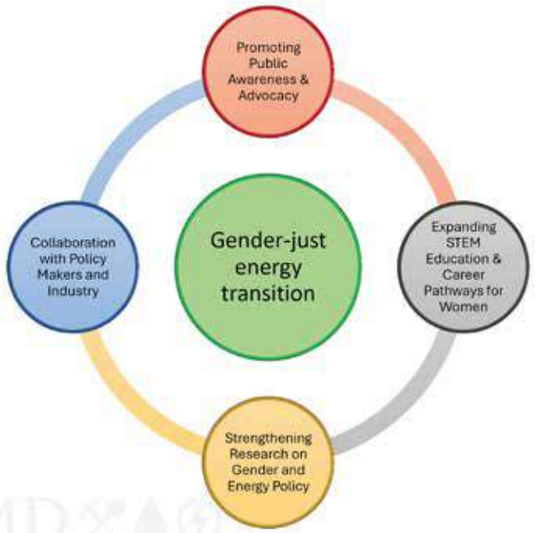
4.0 Academia in Energy Transition



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BUILDING A GENDER-JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

5.0 Policy Implication

- ❑ Institutionalising Gender-Inclusive Energy Policies
- ❑ Strengthening Women's Participation in Decision-Making
- ❑ Expanding Access to Education and Workforce Development
- ❑ Removing Structural and Financial Barriers
- ❑ Strengthening Cross-Sector Collaboration

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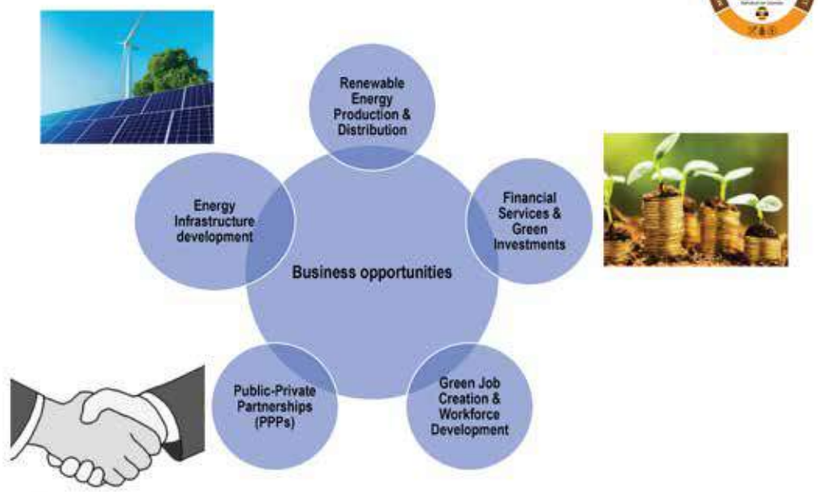
6.0 Business Opportunities



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PAULINE KICONCO

BUILDING A GENDER-JUST ENERGY TRANSITION: UGANDA'S PATH TO A DECARBONIZED ECONOMY

NALUZZE PAMELLA PRAISE

THE ROLE OF PETROLEUM RESOURCES IN ACHIEVING A JUST ENERGY TRANSITION IN EAST AFRICA

NALUZZE PAMELLA PRAISE

THE ROLE OF PETROLEUM RESOURCES IN ACHIEVING A JUST ENERGY TRANSITION IN EAST AFRICA

3 INTRODUCTION AND METHODOLOGY

INTRODUCTION

Just energy transition?

- ❑ A fair, equitable, and inclusive process of moving toward a low-carbon economy

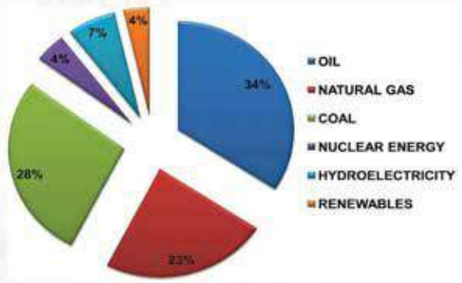
METHODOLOGY

- ❑ Literature Review
- ❑ Case studies

Source: The Energy Justice Workbook 2019

4 RESULTS OBTAINED

- ❑ Petroleum resources continue to play a crucial role in East Africa's energy supply
- ❑ Petroleum revenue contributes to economic growth
- ❑ Oil and gas companies are expanding into renewables



Showing the percentages of sources of energy used to fulfill global energy demand (Dudley 2018)

ANNEX | ENERGY SECURITY

NALUZZE PAMELLA PRAISE

THE ROLE OF PETROLEUM RESOURCES IN ACHIEVING A JUST ENERGY TRANSITION IN EAST AFRICA

5 POLICY IMPLICATION

STRATEGIC PRIORITIES(RECOMMENDATIONS)

- ❑ Policies should promote cleaner energy fuel alternatives.
- ❑ Strengthen regional cooperation through cross-border energy projects.
- ❑ Policies should encourage carbon capture and storage.

6 BUSINESS OPPORTUNITIES

INVESTMENT PROSPECTS:

- ❑ Diversification into renewable energy
- ❑ Expanding LPG distribution for clean cooking solutions
- ❑ Investing in low carbon Petroleum technologies (CCUS)

NALUZZE PAMELLA PRAISE

THE ROLE OF PETROLEUM RESOURCES IN ACHIEVING A JUST ENERGY TRANSITION IN EAST AFRICA

7 CONCLUSION

- A just energy transition doesn't mean an immediate end to petroleum but rather a well-planned shift that ensures economic resilience, energy access, and environmental sustainability.
- When managed well, petroleum resources can serve as a bridge toward a more sustainable future.

ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

11TH EAST AFRICAN PETROLEUM CONFERENCE & EXHIBITION

Theme: Unlocking Investment in Future Energy: The Role of Petroleum Resources in the Energy Mix for Sustainable Development in East Africa

5-7 March, 2025, Dar es Salaam, Tanzania

Paper title: CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA – CLEAN COOKING

BY

ENG ROSELANE M.A. JILO

FIEK, RE EBK, Kenya Pipeline Company

05/30/2025 11:53

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ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

1.0 INTRODUCTION

- Natural gas is one of the mainstays of global energy.
- Worldwide consumption is rising rapidly and in 2018 gas accounted for almost half of the growth in total global energy demand
- IEA's report - switching to natural gas has already helped to limit the rise in global emissions since 2010, alongside the deployment of renewables and nuclear energy and improvements in energy efficiency (Dr. Fatih Birol, 2022)

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Introduction Cont.

- Nearly one in three people, the vast majority of them in the poorest regions of the world, still lack access to clean cooking facilities
- Inhaling hazardous smoke from traditional stoves and open fires causes millions of premature deaths annually, disproportionately affecting women and children
- Countries like China, India and Indonesia have made commendable strides in disseminating clean cooking technologies
- In sub-Saharan Africa, there are a rising number of people without access to cleaner stoves and fuels, largely because population growth is outpacing gains.

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ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

2. 0 ANALYSIS OF ACCESS TO CLEAN COOKING

2.1 Africa

- The use of inefficient biomass cookstoves is estimated at 40% of the world's population whereas in Sub-Saharan Africa (SSA) it is estimated at 68% of its population, which is nearly 792 million people (World Bank, 2018).
- In Africa alone, women and children account for 60% of premature deaths related to smoke inhalation and indoor air pollution

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- **Table 1.0 Access rates and population without access to clean cooking in Africa, 2022**

Country	Access rate	Population without access (million)
Africa	31%	989
North Africa	>95%	1
Sub-Saharan Africa	19%	988
Central Africa	10%	144
Cameroon	23%	22
Congo	34%	4
Democratic Republic of Congo	<5%	95
Gabon	90%	<1
East Africa	16%	279
Burundi	<5%	13
Ethiopia	8%	114
Kenya	20%	43
Rwanda	5%	13
Somalia	<5%	17
Uganda	<5%	47

Source: Analysis based on the world Health Organization household energy data base & other national sources

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ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

Country	Access rate	Population without access (million)
West Africa	15%	364
Nigeria	15%	186
Benin	<5%	13
Côte d'Ivoire	31%	19
Ghana	30%	23
Senegal	29%	12
Guinea-Bissau	<5%	2
Mali	<5%	22
Mauritania	48%	2
Niger	<5%	25
South Africa	89%	7
Other Southern Africa	31%	200
Angola	50%	18
Botswana	66%	<1
Madagascar	<5%	29
Malawi	<5%	20
Mozambique	6%	31
Namibia	47%	1
Tanzania	6%	61
Zambia	10%	18
Zimbabwe	30%	11

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2.2 Kenyan household cooking analysis

- Cooking in Kenya is characterised by primarily firewood (55.1%) and charcoal (11.6%).
- Only 24% of the population in Kenya relies on LPG, most of them living in urban areas, 17.7% use paraffin and as their primary cooking fuel

3.0 NATURAL GAS AS A RESOLUTION

- Electric cooking will increase demand by 10% by 2030, which could place strains on electricity networks at the distribution level if not paired with effective electricity planning.
- Contribution of natural gas to energy transitions varies widely across regions, between sectors and over time.
- China, Japan, South Korea and India are the world's leading importers of LNG despite the fact that they do not have any reserves of NG, they are among the highest consumers of NG in the world.

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ANNEX | ENERGY SECURITY

ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

- For example, KOGAS of South Korea has the largest storage capacity of LNG. 84% of household energy use in S. Korea is from LNG piped directly to homes.
- Tanzania is a sleeping giant as far as NG is concerned. It has 57.54T of NG both offshore and onshore yet it is estimated that 67 to 92.2% of households in Tanzania use firewood and charcoal as their source of energy for cooking and with electricity access at only 45.8% in 2022
- Tanzania's estimated natural gas reserves, are enough to cover the country's domestic use and make Tanzania the next natural gas hub in Africa

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- The vast reserves of NG in Tanzania could just be the solution as we reconsider alternative sources of fuel to biomas
- Way forward is to understudy Angola that is involved in upstream, mid and downstream petroleum business.
- For Upstream oil and gas business, Angola is involved in exploration. Adopting this strategy, East Africa and Tanzania in particular would ensure that they exploit the vast NG resources in the region using local content, develop sufficient energy for the region for industrial and household use. This will ensure energy demands are met as well as providing better and healthy alternative cooking fuel.

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ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

Table 2: List of countries by natural gas reserves, export and consumption

Country	Leading gas reserve		Position as exporter	Position as consumer
	Position	% world share		
Russia	1	24.3%	1	2
Iran	2	17.3	16	4
Qatar	3	12.5	3	22
United State	4	5.3	2	1
Saudi Arabia	5	4.2	none	7
Unite Arab Emirate	7	3.1	25	10
Nigeria	9	2.6	10	38
China	10	2.4	28	3
Algeria	11	2.3	9	26
Tanzania	82	0.003	none*	91
Mozambique	14	1.4	*	82

Table 3: Top 10 African Countries Sitting on the Most Natural Gas

Position	Country	Reserves in TCF	Position as exporter
1	Nigeria	206.53	10
2	Algeria	159.1	9
3	Senegal	120	none
4	Mozambique	100	none
5	Egypt	77.2	27
6	Tanzania	57.5	None
7	Libya	53.1	30
8	Angola	13.5	none
9	Congo	10.1	none
10	Equatorial Guinea	5	Exports*

Source: Energy Capital Power, 2021 (TCF – Trillion Cubic Feet) * Export position not stated

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ENG. ROSELANE JILO AMBASI

CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

4.0 CHALLENGES AND INTERVENTIONS OF FOR USE OF NG IN HOUSE HOLDS

4.1 Challenges

- challenges along the value chain include high-cost storage, limited or lack of geographic distribution network and filling stations.
- Lack of production and refining capacity
- Lack of bulk storage capacity
- Lack of existing cross country gas pipelines
- Weak rail transport infrastructure
- Not available for households
- High relative cost of gas once made available compared to other fuels like firewood

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4.2 Interventions

- Aggressively undertake NG exploration
- Initially for Africa, enhance the generation of electricity using NG. This will boost access to electricity
- Later as the infrastructure is developed introduce LNG for cooking
- Leverage on the already existing infrastructure & policies of LPG however small
- Bulk Storage: Private sector, joint ventures
- Transport:
  - Bulk tankers/trucks used in the absence of reliable, safe rail and pipeline infrastructure – potentially much more expensive
  - Enhance the rail transport system & procure rail wagons
  - Later construct NG pipelines
- Investing in developing mobile units for partial filling to increase consumer access

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CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

5.0 ADVANTAGES OF LNG OVER LPG

- Safety
- Cost
- Trade

5.0 CONCLUSION

Increased demand for modern cooking fuels can be met readily by today's energy system, however it will require some additional infrastructure, especially in Africa.

Tanzania and Mozambique – home to East Africa's largest natural gas reserves and with a combined capacity of nearly 157 trillion cubic feet (TCF) – must quicken their pace as the race for supply contracts accelerates.

- EA benefits from convenient geography, with the coastline acting as a springboard to market rising demand in the Middle East, India, China, Southeast Asia and Northern Europe
- Transportation of NG by pipeline or as LNG takes a relatively high share of the delivered cost, making geographical proximity to resource-rich areas an important determining factor for affordability
- East Africa should take advantage of the vast NG reserves in Tanzania and Mozambique to make LNG a major source of fuel mainly in industry and domestic use as well as electricity production.
- To the benefit of the health of their populations as well as adaption of clean energy use towards clean cooking.

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CAPITALIZING ON NATURAL GAS AS AN ENERGY RESOURCE FOR SUSTAINABLE DEVELOPMENT IN EAST AFRICA - CLEAN COOKING

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SHAIDU NURU

BECOME A TRUE ENERGY COMPANY OR CHOOSE TO DIE IN THE POST - CARBON ECONOMY

TANZANIA PETROLEUM DEVELOPMENT CORPORATION

BECOME A TRUE ENERGY COMPANY OR CHOOSE TO DIE IN THE POST-CARBON ECONOMY

March 2025

Intro-The Oil and Its Benefits

- A barrel of oil = 4053 human hours
  - equivalent to 2 years of 40-hour work weeks
  - Taking labor rate of $20/hour, a barrel of oil is worth US$81,000

But we pay less and get more out of it….

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Intro-The Reality of NOCs Globally

- Are State-owned (with more than 50% government ownership)
- Primarily established to operate in the oil and gas industry
- A majority (developing states) do not prioritize investment in technology and innovation
- Are responsible for producing ~55% of the world's oil and gas, approximately 85 million barrels of oil equivalent per day
- Some NOCs contribute over 20% of their government's total revenues
- Many NOCs carry significant debt, sometimes exceeding 10% of their country's GDP
- Most employ primarily local citizens
- Two-thirds of NOCs demonstrate poor performance in public transparency.

The Energy Trilemma- Analysis

However, fossil fuels are currently challenged due to concerns about climate change

- Guess what?- the energy security is envisaged to remain the top priority for the next decade
- What do you think?
- About 700 million people have no access to modern energy and the billions need more energy

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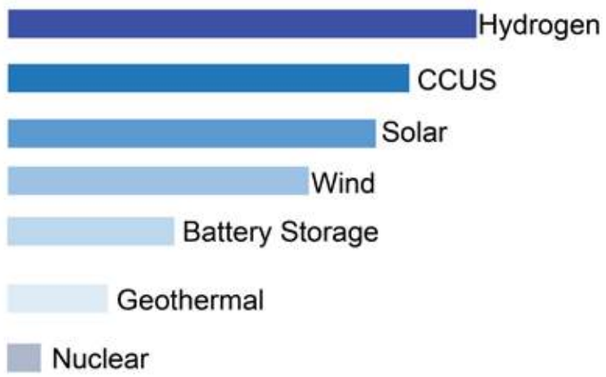
Current Petroleum Investment -Analysis

- North America's LNG export capacity (United States, Canada, and Mexico) is projected to increase from 11.4 billion cubic feet per day (Bcf/d) in 2023 to 24.4 Bcf/d by 2028 (*EC*)
  - Will fill the gap in the surging global demand
  - Will significantly alter contracting practices
- Long-term contracted LNG volumes will increase from 72.7 million metric tons per year in 2023 to 112 mmty by 2028 (*Bloomberg New Energy*)

The Energy Sources Explored- Analysis

- The reality reveals that most Oil Companies are exploring for alternatives
- So, where does your company fit?



Source: WECA,2023

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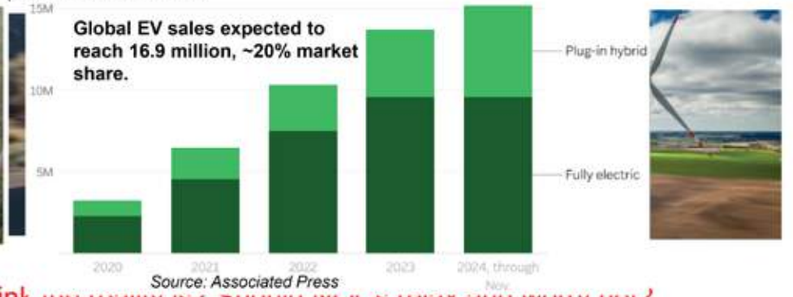
Post-Carbon Future

Definition:

- 'a world in which we are no longer dependent on hydrocarbon fuels, and no longer emitting climate-changing levels of carbon into the atmosphere' (Post Carbon Institute, ND)

https://www.progressturesolar.com/

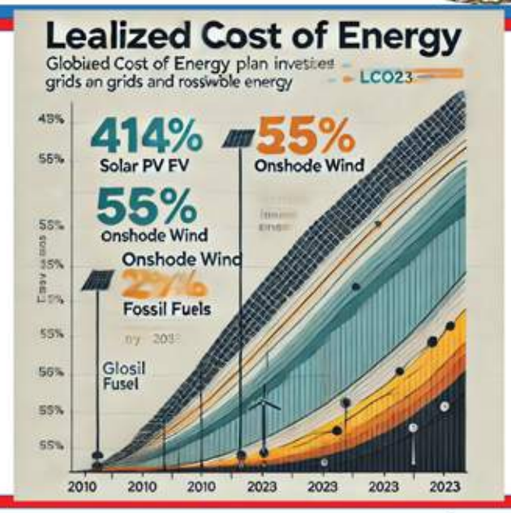


Source: Associated Press

How real do you think the reality is? Should NOCs relax and worry not?

The Pace of Renewables- Analysis

- Renewable energy generation is now highly cost-competitive, even as fossil fuel prices stabilize.
- Global utilities plan to invest more than $116 billion annually in grids and renewable



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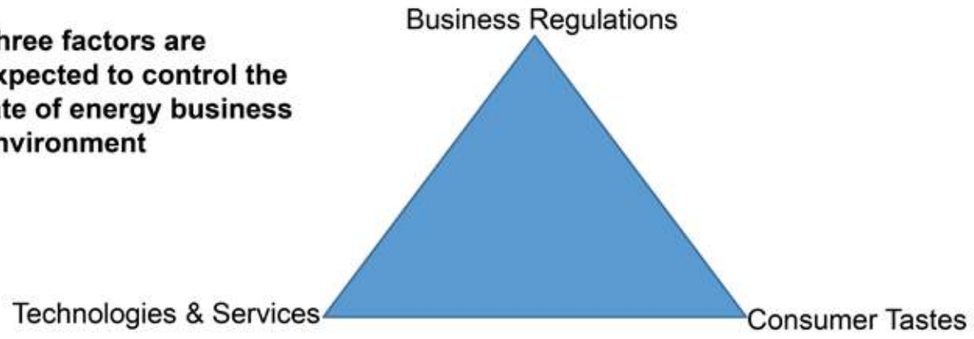
New Business Environment- Analysis

Three factors are expected to control the fate of energy business environment



Note: Several economic activities such as steel production, cement manufacturing, and powering airplanes, it's uncertain whether electrification is feasible.

9

What needs to be done?- Implications

- Enhance living standards and reduce the risk of price shocks, while creating a robust foundation for tackling climate change.
- Embrace Climate Justice
- Maximize the energy mix (including renewables)
- Invest more in CCS projects

Is your country a service economy, heavily industrialized, or under-industrialized?

10

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What needs to be done?- Implications

- Embark on Natural Gas Projects
  - CNG, LNG, and shale gas but with improved extraction tech.

  Natural gas produces about half the CO2 of coal
- At a corporate level:
  - Broadening the view of corporate strategies (e.g., inclusion of geopolitics)
  - Future-proofing multinational organizations
  - Build a geopolitical functional group/unit
  - Establishing a crisis response playbooks

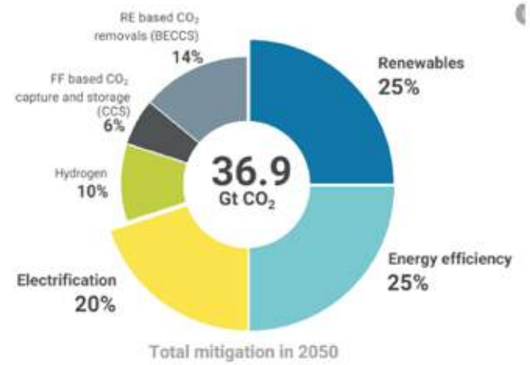
Key Enablers

- Centralized Energy System
- Suitable Infrastructure
- Well-Trained Workforce
- Innovation
- Shared Commitment

What needs to be done?- Implications

According IRENA, 2024

- Annual investments of $5.7 trillion until 2030, prioritizing long-term strategies
- $0.7 trillion in fossil fuel investments should shift to energy transition technologies
- Most funding is expected from the private sector



Reducing emissions by 2050 through six technological avenues

12

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Conclusion

- Enhance living standards and reducing the risk of price shocks, while creating a robust foundation for tackling climate change.
- Africans shouldn't stay in the dark to meet the global net-zero goals
- Maximize the energy mix
- Accelerate decarbonization by cutting methane leaks, electrifying oil and gas production, and advancing carbon capture.
- Embrace Climate Justice

13

THANK YOU

Growth Begins Where Comfort Ends

14

GAYLE MEIKLE

GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TOWARDS A CLOSING WINDOW

Introduction & Market Context

- Recent oil price stability = encouraging promotion of acreage
- E&P firms constrained global energy transition and decarbonisation
- No doubt licensing rounds critical for investment
- But direct negotiation still prevalent
- Hybrid models coming into play more and more
- A huge number of global licensing rounds taking place 2025/26
- With Africa contributing many ongoing and planned rounds in 2025
- Strategic execution by regulators to maximise opportunities

2

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GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TOWARDS A CLOSING WINDOW

Licensing Round Dynamics - Africa

- High profile licensing rounds are still the preferred method
- Incomplete legislation & bureaucracy have a big impact
- African direct negotiations yield better results in awarding acreage
- But mired by transparency issues/ lack of competitive bidding
- More open-door awards in West Africa - Senegal, Gambia, Sierra Leone, Liberia, Ghana, Gabon
- EQ G & Congo alternate between direct awards and bid rounds
- Hybrid models in Angola & Egypt combining both approaches
- Initiatives such as Egypt Upstream Gateway attractive to operators

3

Africa's Past 30 Licensing Rounds

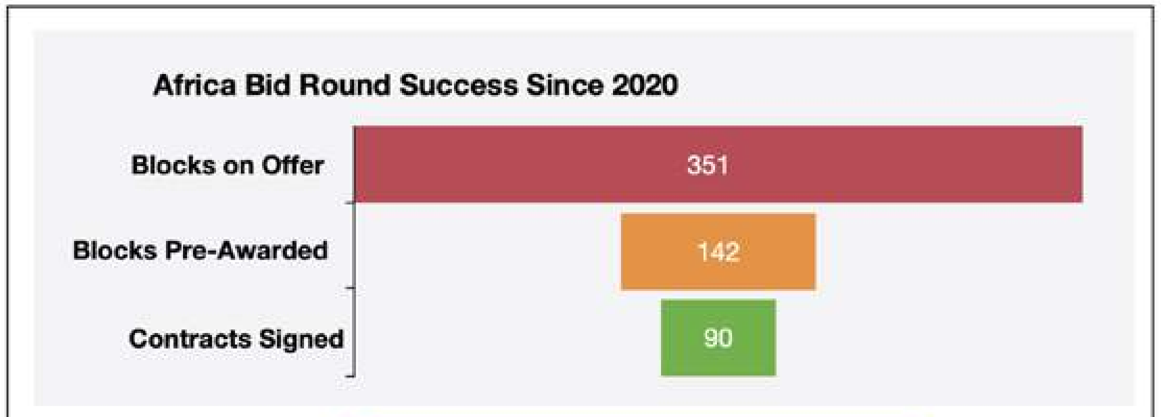

Figure 7 Success of Past 30 African Licensing Rounds Since 2018

Source: Global Licensing Round Report: Assets on the Block | Frontier/ Enverus 2025

4

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GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TOWARDS A CLOSING WINDOW

Sub-Saharan African Licensing Rounds 2025+

11 possible for this year alone in SSA

Table 3 Sub-Saharan Africa Bid Rounds

Licensing Round	Blocks On Offer	Start/Close Dates	Further Details
Zanzibar | 1st Licensing Round	8 offshore blocks	20/3/24 – 15/12/24	Bidding closed, results yet to be announced.
Tanzania | 5th Licensing Round	23 offshore and 3 onshore blocks	5 Mar 2025 launch	Revision of model PSA and Petroleum Act previously needed for bid round.
Congo | Licensing Round 2025	Open blocks	25 Mar 2025 launch	Onshore & offshore open acreage. Launching at Congo Energy & Investment Forum.
DR Congo | Restricted Bid Round 2025	Two onshore Albertine Graben blocks	Jun 2025 launch	Restricted to companies which registered interest in Jan 2025.
Angola | 2025 Limited Public Tender	5 to 9 offshore blocks (subject to direct negotiations)	H2 2025	Kwanza and Benguela basins. Restricted to pre-selected companies. Delayed from Q1 2025.
Nigeria | 2025 Licensing Round	Undeveloped fields & gas projects	2025	Offering discovered and undeveloped fields, fallow assets and prioritising gas developments.
Uganda | 3rd Licensing Round	Open blocks	2025	Albertine Graben acreage; delayed from 2024.
EQ Guinea | EG Ronda 2025	Open blocks	H2 2025	>20 candidate onshore and offshore blocks.
Mozambique | 7th Licensing Round	On/offshore open acreage	2025+	INP also inviting direct negotiations for blocks that failed to attract bids in earlier bid rounds.
South Africa | Future Licensing Rounds	Open offshore & onshore acreage (including shale gas)	2025+	South Africa changing from open-door to licensing rounds after passage of UPRDA.
Kenya | 1st Licensing Round	Up to 45 on/offshore blocks	2025 +	Possible in 2025 but further delays likely.

Source: Global Licensing Round Report: Assets on the Block | Frontier/ Enverus 2025

5

And 32 additional Licensing Rounds planned globally in 2025+

Source: Global Licensing Round Report: Assets on the Block | Frontier/ Enverus 2025

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GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TOWARDS A CLOSING WINDOW

Licensing Round Best Practices

- Solid frameworks and fiscal/ regulatory models
- Well-structured, transparent processes
- Efficient execution & strategic alignment
- Data and prospecting is key, the more data the better
- Long term sustainability considerations (CCUS can offer advantages)
- Global marketing & promotion best practices
- Offer a less arduous and costly process for diversity
- Enhance a worldwide and competitive participation
- Upstream stakeholder engagement

7

Conclusion & Key Takeaways

- Most of Africa's resources remain undiscovered
- Imperative they are explored and developed
- Urgency of the 'closing window' to maximise opportunities
- Building confidence in the country and the process offered
- Leveraging best practices in all areas
- A well-run licensing round will yield best results
- With direct negotiation for unique scenarios
- Busy global marketplace and need to compete
- The efficacy of the licensing round can shape the future

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ANNEX | LEGAL, FISCAL AND REGULATORY

GAYLE MEIKLE

GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TOWARDS A CLOSING WINDOW

ANNEX | LEGAL, FISCAL AND REGULATORY

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ANNEX | LEGAL, FISCAL AND REGULATORY

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GLOBAL LICENSING ROUNDS IN THE CONTEXT OF AFRICA: MOVING RAPIDLY TOWARDS A CLOSING WINDOW

MOSES EKANU

NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION

MOSES EKANU

NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION

PETROLEUM AUTHORITY OF UGANDA

1. INTRODUCTION

- **Decommissioning** ➡ Safe plugging and abandonment of wells, Disposal of installations and Site restoration

At infancy stage with limited country and company experience. Biggest risk is cost estimation and financing

UK& USA

Aust ralia

Historic asset owners retain decommissioning liability even long after transferring interest

Asset owners required to contribute to a sinking fund that is ring-fenced throughout an asset life cycle

New Zeala nd

Value

Decommissioning spending could cost nearly $ 100 billion globally by 2030

Decommissioning is an obligation of the operator. However, Governments take responsibility for failure by the licensee.

Duty

UAE / Qatar

No specific legislation addressing the allocation of risk for decommissioning

MOSES EKANU

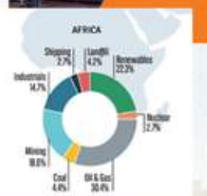
NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION

PETROLEUM AUTHORITY OF UGANDA

1. INTRODUCTION

Relationship between Decommissioning and the Energy Transition

- All viable options explored before decommissioning.
- oil infrastructure which would be decommissioned repurposed to contribute to generation of clean energy.
- Decommissioning also applies to renewable energy projects most of which have shorter lifespans than oil and gas e.g. wind turbines is 20-25 years, solar farms 30-40 years.
- The rushed global push for cleaner renewable energy could lead oil projects to be decommissioned earlier contributing to stranded assets requiring high decommissioning costs.
- This therefore necessitates heightened readiness for decommissioning in case of early ends projects



PETROLEUM AUTHORITY OF UGANDA

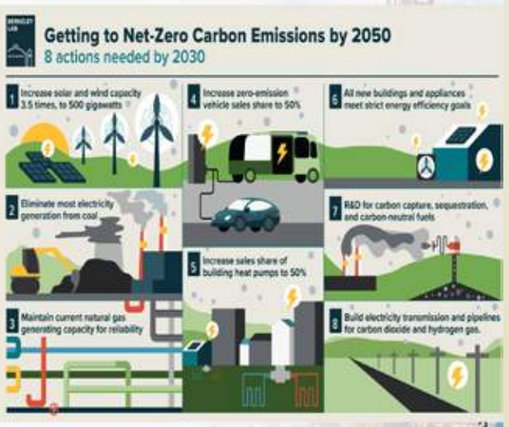
1. INTRODUCTION

Influence of the Energy Transition

Energy transition ➡ global shift from fossil-based energy systems of production and consumption to renewable energy sources like wind, solar and hydrogen.

Realities of the Energy Transition

- Guided by the aspiration of 2015 Paris Agreement
- Requires quadrupling clean energy investment to around US$ 5 trillion annually from $1.3 trillion in 2022
- France and UK already pledged to have only electric cars by 2030, while Denmark, Ireland and Spain have barred new petroleum exploration activities.
- Industry rebranding into energy companies and diversifying their investment portfolio.
- Renewable energy vis-à-vis lost business opportunity ; ***Drill Baby Drill***
- A just transition Vs. Rushed transition



PETROLEUM AUTHORITY OF UGANDA

2. PLANNING FOR DECOMMISSIONING

Legal Provisions related to submission of a Decommissioning Plan

- Decommissioning plans and obligations are included in contracts and national laws
- Key findings show that decommissioning plans in East Africa are required to be submitted at, or close to expiry of a licence

No	Country	Submission Period
1.	Uganda	Before a petroleum licence or licence to install and operate facilities expires or is surrendered; or before the use of a facility is terminated permanently.
2.	Tanzania	
3.	Kenya	Before a production permit to install and operate the facilities is issued.
4.	Rwanda	The production licensee submits a decommissioning plan to the Minister for approval.
5.	South Sudan	Before the applicable licence or petroleum agreement expires or is terminated or before use of the facility ceases permanently.
6.	Ghana	Not more than 5, not later 2 years, related to facility ceasing operations or expiry of the licence or petroleum agreement

MOSES EKANU

NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION

Petroleum Authority of Uganda

3. FINANCING DECOMMISSIONING

- Financing for decommissioning is provided for in any of the following ways.
  - **Soft options** such as self-funding or parent company guarantee.
  - **Third party guarantees** e.g. bank guarantee, letter of credit, surety bonds.
  - **Decommissioning Trust Funds (DTF).** Predetermined payments made into an escrow account before the decommissioning phase.
  - **Decommissioning Fund.** A financial provision set aside by, and managed by a company, to cover the costs of decommissioning.
  - **Orphan fund levy** for sites which do not have a legally responsible and/or financially viable party to deal with its responsibilities.
- Most countries in Africa under the PSA system have opted for a Decommissioning Fund.

May 29, 2025

Petroleum Authority of Uganda

3. FINANCING DECOMMISSIONING

Legal Provisions on when to commence depositing to the Decommissioning Fund

Uganda	When production has reached 50% or 5 years before the expiry of the license or on notice of surrender of license
Tanzania	Same as Uganda
Kenya	When production has reached 50% or 10 years before the expiry of the production permit
Ukraine	Within a period specified by the Minister
South Sudan	Immediately after the approval of a plan for development and operation or the granting of a licence
Ghana	To be Prescribed

MOSES EKANU

NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION

Petroleum Authority of Uganda

3. FINANCING DECOMMISSIONING

Selected Legal Provisions on How to Deal with the Excess Decommissioning Funds

Uganda	Tanzania	Kenya	Ukraine	South Sudan	Ghana
Funds shall accrue to Govt	Funds shall accrue to Govt	Distributed pro rata between the contractor and Govt	An Order of the Minister	Not Prescribed	To be Prescribed

Petroleum Authority of Uganda

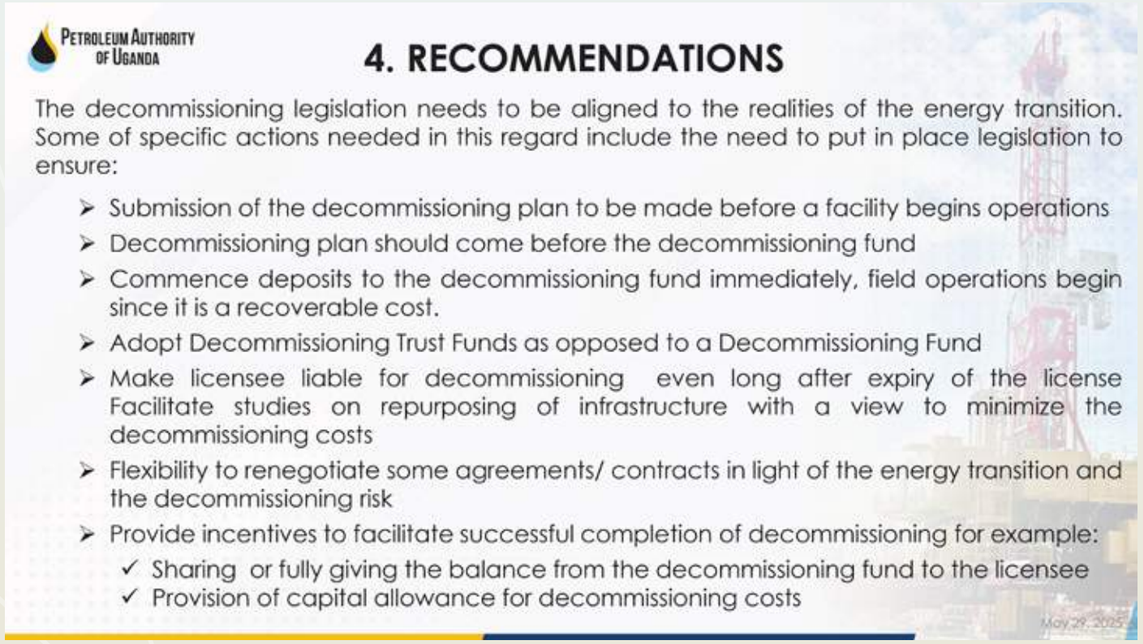
3. FINANCING DECOMMISSIONING

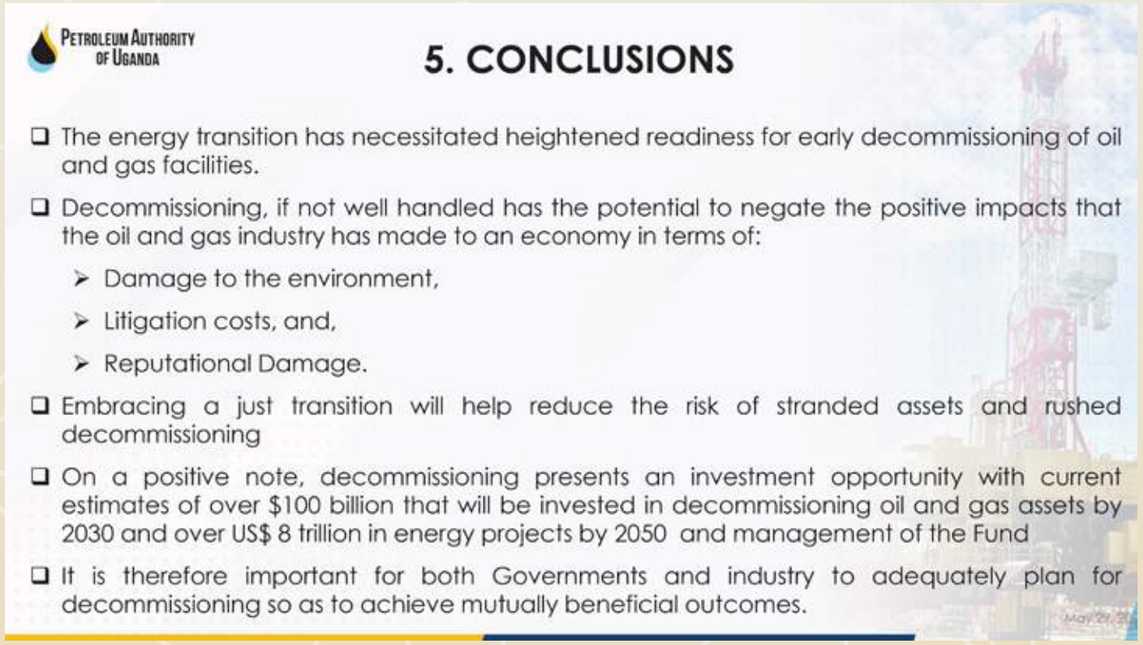
Issues with the current Decommissioning provisions

No	Issue	Challenge
1.	Commencement of deposits to the Petroleum Fund 5 – 10 years before expiry of the license.	Production Licences are usually 20 – 25 years. With new technology, it is possible for a company to deplete production in the field in 5 years which would mean before beginning to deposit funds
2.	When the petroleum production has reached 50% of the aggregate recoverable reserves	A company can quickly produce from the sweet spots and once they have recovered their investment, recommend decommissioning to meet net zero commitments
3.	To be prescribed.	This unclarity needs to be addressed early enough. It could take long getting consensus
4	Excess funds from the decommissioning fund to Govt	This does not give the licensees an incentive or impetus to complete the decommissioning activity.
5.	Submission of Decommissioning Plans towards or at the end of the project	Submission of plans at the end of the project is risky because approval of the decommissioning plan could take time hence delaying its commencement. The end could also come up abruptly due to the energy transition
6	Deposits to the Petroleum Fund without a Decommissioning Plan	This is a misalignment because the decommissioning plan should inform the financial projections for decommissioning

MOSES EKANU

NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION





ANNEX | LEGAL, FISCAL AND REGULATORY

MOSES EKANU

NEED TO ALIGN DECOMMISSIONING LEGISLATION TO THE REALITIES OF THE ENERGY TRANSITION

DANIEL MUWOOYA

KEY ECONOMIC FACTORS FOR CRUDE OIL REFINERIES IN SUB-SAHARA AFRICA

Key economic factors for crude oil refineries in Sub-Saharan Africa

DANIEL MUWOOYA
Head Commercial & Business Devt - UNOC

11TH EAST AFRICAN PETROLEUM CONFERENCE & EXHIBITION 2025 (EAPCE'25)
5 March 2025

SETTING THE STAGE

EVOLUTION OF OIL DEMAND *(2025 -2050)*

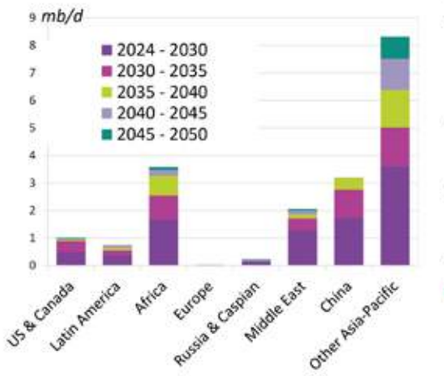


Fig 1: Showing distillation unit additions (2024 – 2045)

Sources: BP Energy Outlook (2024); OPEC World Oil Outlook (2023)

- Oil will retain a major share of primary energy demand by 2050 under all energy transition scenarios (taking current shifts in energy policy & ongoing technology evolution into consideration)
- Non-OECD countries are projected to see increases in demand for oil, driven by population and GDP growth. Oil demand in Africa to grow by ~3.8mm
- 90% of refinery capacity additions will be in non-OECD (dominated by India, China, and Asia Pacific regions).
- Industry/petrochemicals will play an increased role in oil demand

Key Message:

- **Opportunity for additional refinery capacity in Africa can be commercially viable**
- **Refinery project developers must be cognizant of changing trends in demand, regulation (emissions, specs).**
- **'Refinery of the Future' must incorporate Petrochem/industry.**

ANNEX | CRUDE OIL AND REFINED PETROLEUM PRODUCTS

DANIEL MUWOOYA

KEY ECONOMIC FACTORS FOR CRUDE OIL REFINERIES IN SUB-SAHARA AFRICA

REFINERY ECONOMICS IN AFRICA

- **Low utilization (<70% in SSA).**
  - technical obsolescence;
  - political issues (vandalism, corruption);
  - competition from mega refineries in the Middle East, India, Asia-Pacific; etc.

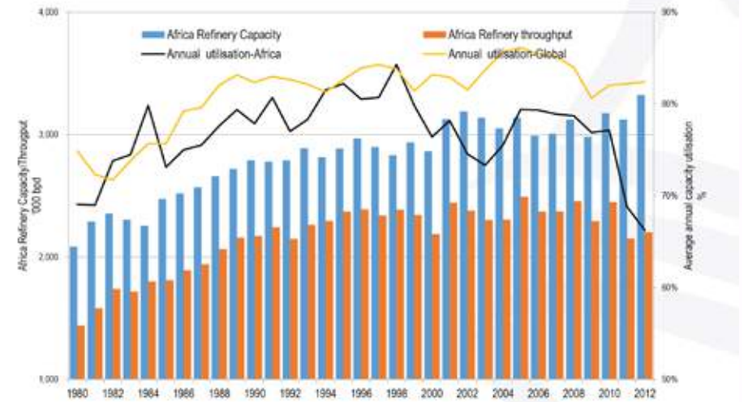
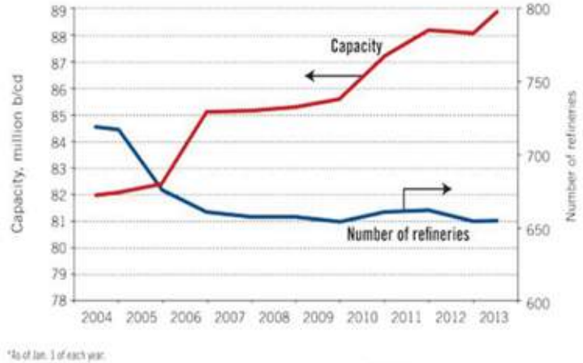


***Fig 2:** Refinery Capacity & Utilization in Africa (Data from EIA (2012) & BP (2013))*

REFINERY ECONOMICS IN AFRICA

- **Refinery size and technology (complexity)**
  - Larger complex refineries typically have lower unit costs
  - Note: ***Inland refineries located next to crude oil fields have export parity + import parity advantages***

- **Changing regulatory frameworks & tighter specifications**
  - Greenfield investments have opportunity to address emission & product spec requirements



*As of Jan. 1 of each year.

***Fig 3:** Refinery size trends (Source: Brelsford et al., 2013)*

DANIEL MUWOOYA

KEY ECONOMIC FACTORS FOR CRUDE OIL REFINERIES IN SUB-SAHARA AFRICA

CASE STUDY: 60kbopd INLAND REFINERY IN UGANDA

- **Smaller inland refineries (located close to inland oil fields) have opportunity to be more profitable than larger counterparts in major coastal refining centres:**
  - Because they have access to cheap high quality inland crude oil (e.g. Tilenga + KF crude oil obtained at export-parity prices (i.e. world price less pipeline transportation cost of US$ 12.77 per bbl.))
  - Because they can sell quality products at import parity prices (e.g. products in Uganda are sold at world price plus logistics costs from ME/India/Asia to >1000km from the coast)

ANNEX | CRUDE OIL AND REFINED PETROLEUM PRODUCTS

DANIEL MUWOOYA

KEY ECONOMIC FACTORS FOR CRUDE OIL REFINERIES IN SUB-SAHARA AFRICA

CASE STUDY: 60kbopd INLAND REFINERY IN UGANDA

- **Key considerations for smaller inland refineries**
  - Compliance with regulatory requirements on emissions and product specifications. This requires careful selection of the appropriate technology to address current and future requirements)
  - Refinery of the future. Integration of petrochemical/industrial products into the primary economic considerations of the refineries (rather than as by-products)
  - Innovative financing
    - Changes in the global financing landscape do not favour crude oil refineries in sub-Saharan Africa
    - Need for innovative solutions to financing refinery projects in SSA

ANNEX | CRUDE OIL AND REFINED PETROLEUM PRODUCTS

DANIEL MUWOOYA

KEY ECONOMIC FACTORS FOR CRUDE OIL REFINERIES IN SUB-SAHARA AFRICA

ANNEX: Economics of inland refinery located next to quality inland oil fields

$$GRM_{inland} = P_{prod} + C_{prod} + C_{oil} - P_{oil} \quad \text{---------- I}$$

Where; $P_x = P_{oil} - C_{oil}$, $P_m = P_{prod} + C_{prod}$, P_m = *Import Parity Price,*

P_x = Export Parity price, P_{oil} = World market crude price, P_{prod} = Product Prices in the inland country, C_{oil} = Logistics cost to export crude from the landlocked country, C_{prod} = Logistics cost to import refined products into the landlocked country

GRM = Gross Refining Margin

This can be contrasted with the GRM of a refinery at a major refining centre which is the difference between P_{prod} and P_{oil}.

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REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

Petroleum Authority of Uganda

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REGULATING TRANSBOUNDARY INFRASTRUCTURE:
A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

EAPCE 25

Naboth Mugyerwa - Petroleum Authority of Uganda

Gerald Maganga - Energy and Water Utilities Regulatory Authority

Petroleum Authority of Uganda

OUTLINE

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1. Introduction
2. Regulating EACOP SYSTEM
3. Regulatory Tools
4. Memorandum of Understanding
5. Why do we regulate
6. Conclusion

March 5, 2025

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REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

Petroleum Authority of Uganda

1. INTRODUCTION

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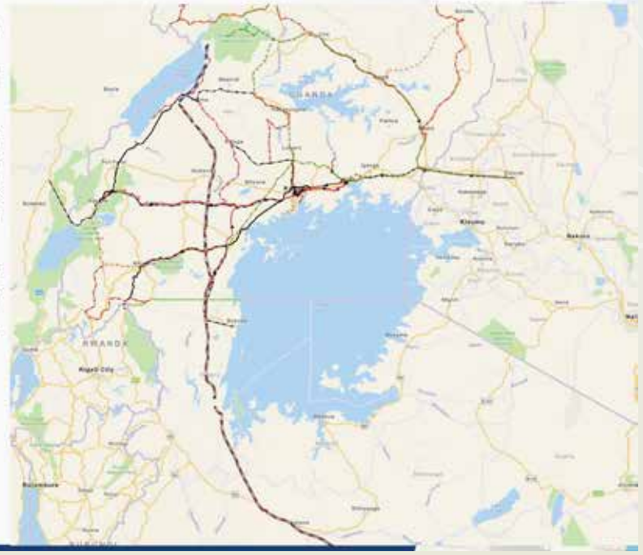
- There are many linear infrastructures worldwide that are transboundary in nature.
- These include roads, powerlines, fibre optic cables, oil and gas pipelines, etc.
- Countries traversed by such infrastructure must have in place necessary legal tools to facilitate their cooperation and coordination regarding the development, maintenance, and regulation of such infrastructure.
- This is mainly because an issue on the infrastructure in one country could have a ripple impact on the other state which could be detrimental to the health, safety, and environment and very costly to correct.



Petroleum Authority of Uganda

1. INTRODUCTION

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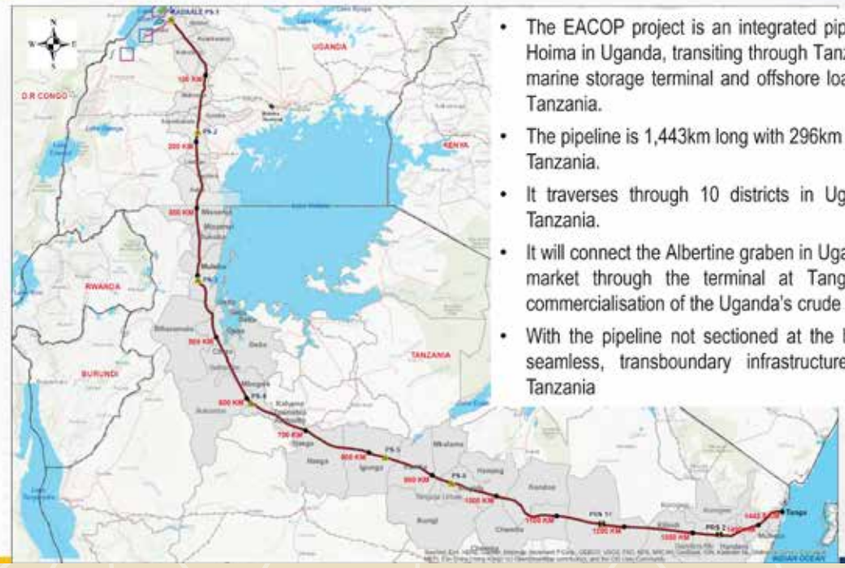

- The EACOP project is an integrated pipeline project starting from Hoima in Uganda, transiting through Tanzania, and terminating at a marine storage terminal and offshore loading facilities at Tanga in Tanzania.
- The pipeline is 1,443km long with 296km in Uganda and 1,147km in Tanzania.
- It traverses through 10 districts in Uganda and 22 districts in Tanzania.
- It will connect the Albertine graben in Uganda to the international oil market through the terminal at Tanga, hence facilitating the commercialisation of the Uganda's crude oil.
- With the pipeline not sectioned at the border, it is a continuous, seamless, transboundary infrastructure between Uganda and Tanzania

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REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

2. REGULATING EACOP SYSTEM

Petroleum Authority of Uganda (PAU)

- Established as a statutory body under Section 9 of the Petroleum (Exploration, Development and Production) Act 2013
- Monitor and regulate oil and gas activities in the Upstream and Midstream petroleum sectors in Uganda
- All activities of the EACOP in Uganda including design, construction, operation, national content, and health and safety among others are regulated by the PAU to ensure that system integrity, personnel safety, environment protection and maximised benefit to Ugandan nationals and companies.

Energy and Water Utilities Regulatory Authority (EWURA)

- An autonomous multi-sectoral regulatory authority established by the EWURA Act Cap 414-2006 of the laws of Tanzania and its amendments EWURA Act – R.E 2006, Amendment Act No. 16 of 2007, Amendment Act No. 13 of 2008, Amendments No.6 of 2019 and Amendment Act No. 5 of 2022.
- Responsible for technical and economic regulation of the electricity, petroleum, natural gas and water sectors in Tanzania pursuant to Cap 414 and sector legislation.
- The technical and local content activities of the EACOP Project in Tanzania is regulated by EWURA to ensure system integrity and maximum benefit to Tanzanian nationals and companies.

Given the transboundary nature of the EACOP System, and similarities in the roles of the two Authorities, its paramount that they coordinate in the regulation

3. REGULATORY TOOLS

LEGAL AND REGULATORY ASPECTS FOR UGANDA

- **The National Oil and Gas Policy, 2008**
- **The Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013.**
  - The Petroleum (Refining, Conversion, Transmission and Midstream Storage) Regulations, 2014.
  - The Petroleum (Refining, Conversion, Transmission and Midstream Storage) (National Content) Regulations, 2014.
  - The Petroleum (Refining, Conversion, Transmission and Midstream Storage) (Health, Safety and Environment) Regulations, 2014
- **The East African Crude Oil Pipeline (EACOP) (Special Provisions) Act, 2021**
- **Project Agreements**
  - Uganda – Tanzania Inter-Governmental Agreement (IGA)
  - Uganda Host Government Agreement (HGA)

LEGAL AND REGULATORY ASPECTS FOR TANZANIA

- **The National Energy Policy, 2015**
- **The Petroleum Act, 2015**
  - The Petroleum (Local Content) Regulations, 2017; GN 197
  - The Petroleum (General) Regulations, 2011, GN 163
  - The Petroleum (Pipeline Operations) Rules, 2015, GN 477
- **EWURA Act,2006**
- **Other laws of Tanzania including the labour laws (work permits and residence-related matters)**
- **Project Agreements**
  - Uganda – Tanzania Inter-Governmental Agreement (IGA)
  - Tanzania Host Government Agreement (HGA)

March 5, 2025

ANNEX | CRUDE OIL AND REFINED PETROLEUM PRODUCTS

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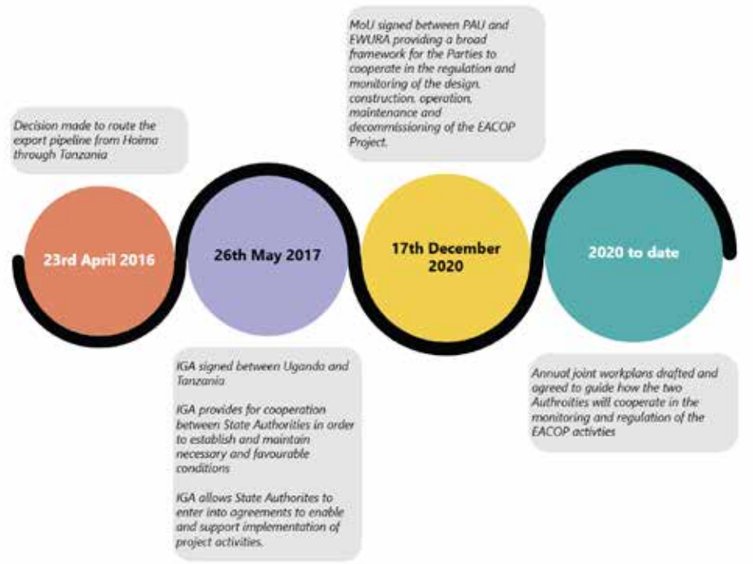
REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

4. TIMELINE TO COORDINATION



5. MEMORANDUM OF UNDERSTANDING

Major areas of cooperation

i) cooperate in the regulation of the design, construction, operation, maintenance and decommissioning of the EACOP.

ii) develop a joint action plan for conducting supervisory activities and coordinating regulatory action.

iii) conduct joint inspection and monitoring of the EACOP Project activities

iv) Undertaken individual inspections in the other State

v) promote the sharing of all documentation related to the project

vi) cooperate in the development of a common information sharing platform

vii) establish closer and more regular contacts and promote cooperation in activities related to the EACOP

viii) enhance cooperation in promoting a harmonised regulatory framework for the EACOP Project

ix) jointly develop capacity building programmes

x) enhance cooperation and strategies in order to effectively and efficiently monitor the performance of the Project Company

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REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

Petroleum Authority of Uganda

5. MEMORANDUM OF UNDERSTANDING

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IMPLEMENTATION OF THE MEMORANDUM OF UNDERSTANDING

i) Develop joint workplans as well as country-specific plans for monitoring of the EACOP project activities every Financial Year

ii) Developed a guidelines for the joint monitoring and auditing of the EACOP project

iii) Regular engagements held to share project information and lessons learned, assess the project progress and challenges, and evaluate measures to facilitate the project implementation.

iv) Undertake joint inspection of the EACOP project activities to ensure the project comply with the laws, approved standards and best industry practices.

v) Undertake joint reviews of the technical studies/designs to ensure they comply with the laws, approved technical standards and best industry practices

vi) Collaborate in participation in the project design activities and witnessing FATs

vii) Benchmark from each other on how the Project is undertaking several initiatives like livelihood restoration programs for the PAPs and construction of replacement houses

March 5, 2025

Petroleum Authority of Uganda

6. WHY DO WE REGULATE

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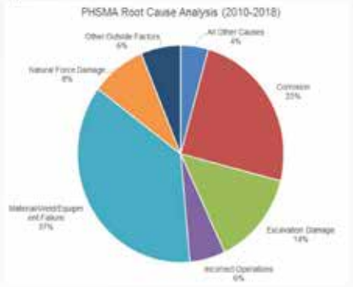
1. Risk associated with pipelines

- Hydrocarbons are highly flammable substance transported across country at high pressure often close to centers of high population or through environmental sensitive areas
- Risks include Jetty fire, pool fire, toxicity, oil spills,

2. Pipeline threats



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REGULATING TRANSBOUNDARY INFRASTRUCTURE: A CASE OF THE EAST AFRICAN CRUDE OIL PROJECT (EACOP SYSTEM)

Petroleum Authority of Uganda

6. WHY DO WE REGULATE

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3. Ensure Health and Safety aspects

- Occupational health and safety at workplaces – (injury/fatality of workers)
- Health and safety of residents in the project areas/regions- (Disturbance/injury of residents)
- Process safety: safety of facility operations (damage or loss of facility, production etc)

4. Prevent Pollution of the environment

- Air quality- Gas emissions (SOx, NOx, CO2, PM)
- Water quality (surface and underground water bodies), Wastewater (Effluents) discharges
- Solid and liquid wastes
- Soil contamination
- Noise and vibration
- Odor

Petroleum Authority of Uganda

6. WHY DO WE REGULATE

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5. Natural Environment

- Disturbance/Damage to Ecosystem (wildlife: Flora, Fauna)
  - Loss of habitant
  - Degraded environmental conditions of habitants
- Damage/Change of hydrology (River, lakes, Streams)
  - Current/volume of water, water quality
- Change of topographic features
- Global warming, Climate change

6. Social Environment

- Loss of land property/use and resettlement of the residents - Due to acquisition of project sites
- Change of living and livelihood of the people in the project areas/ regions
- Change of landscape/Scenery
- Damage of historical and cultural heritage

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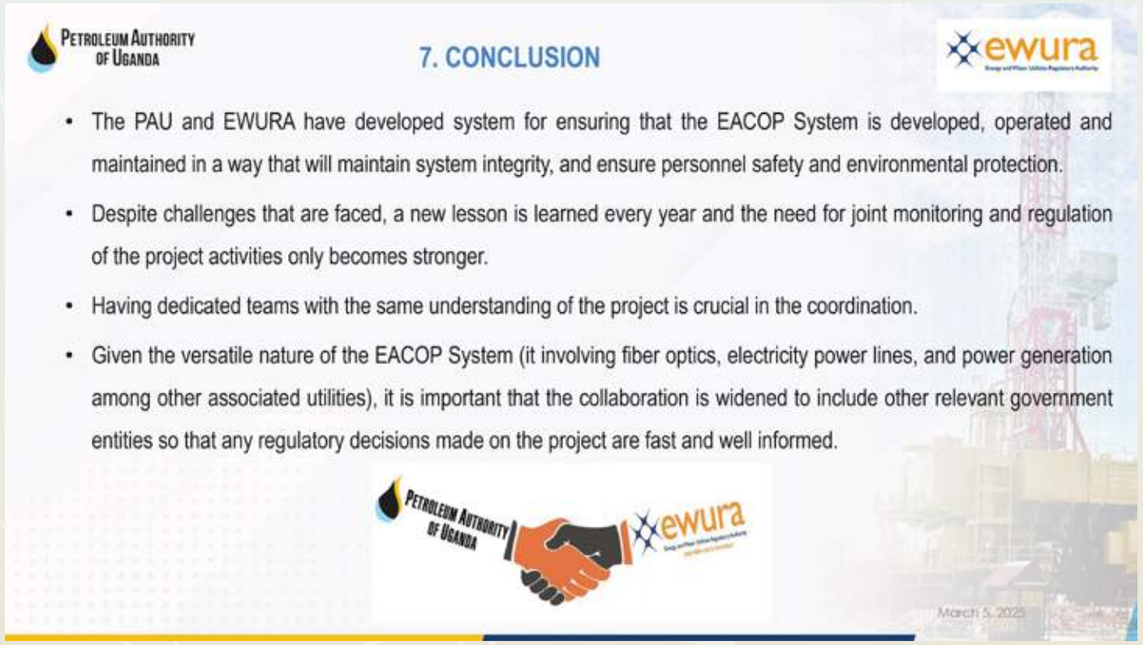

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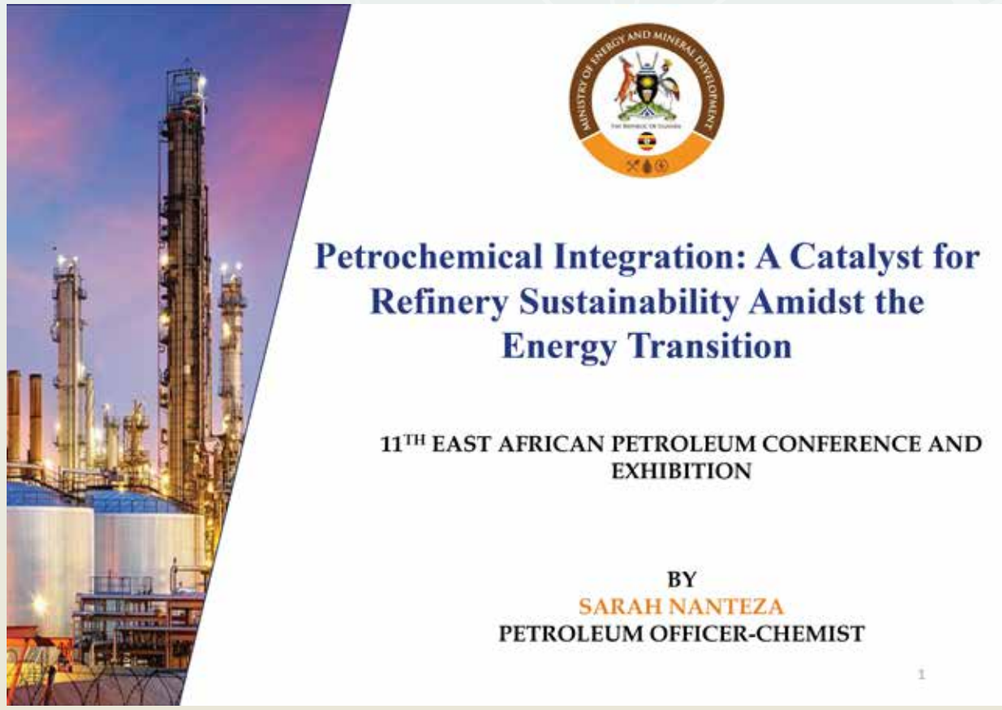
PETROCHEMICAL INTEGRATION: A CATALYST FOR REFINERY SUSTAINABILITY AMIDST THE ENERGY TRANSITION



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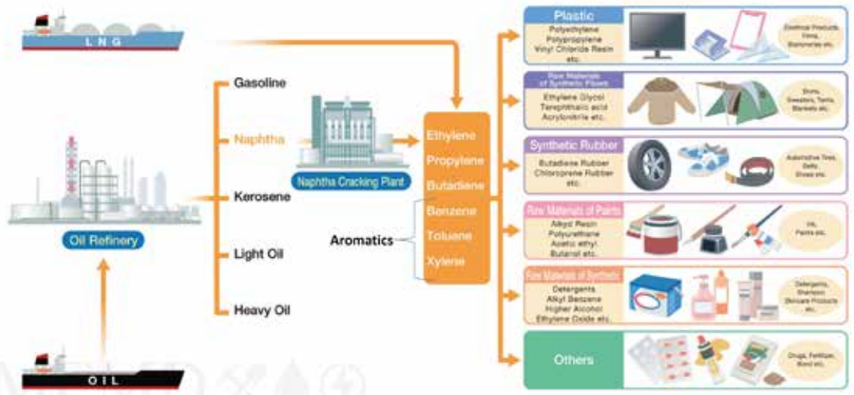
2.0 Why Petrochemical Integration?

- ❖ Shared feedstock with fuels such as LNG, LPG, Naphtha, and Gas oil
- ❖ Steadily increasing local and global market demand.
- ❖ Uneven pace of the energy transition i.e. the demand for jet fuel and bunker fuel is stable.



3.0 Methodology

Focusing on Aromatics Integration

1. Develop a superstructure for Aromatics integration

- Identify all processes in refineries from which Aromatics can be produced and purified along with fuels

2. Develop a mathematical model for the superstructure

- Determine the required variables for process selection and mass balance
- Identify the operating parameters for each process in the superstructure.
- Determine the costs for the raw materials, desired products, utilities, and capital investment.
- Formulate the objective function and the Constraints

Objective Function; Maximize
Total Product Revenue − [Total raw material cost + Total operating cost + Total Annualised Capital cost]

Crude oil Details	Case 1	Case 2
Origin	Angola	Al Shaheen (Qatar)
Type	Naphthenic	Paraffinic
Density @ 15°C (g/cc)	0.8763	0.879
API Gravity @ 60° F	29.9	29.5
Sulphur Content (% Wt)	0.33	2.31

3. Implement the developed model in the software to obtain an optimal solution

- Input the model in software-General algebraic modeling system (GAMS)
- Solve the model using data of crude oil samples with different properties to obtain results
- Conduct sensitivity analysis on changes in demand for fuel products.

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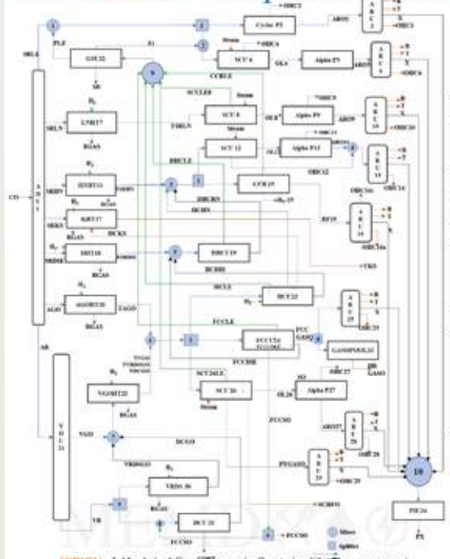
4.1 Results - Superstructure Optimization



Feedstock	Process selected Cases 1&2	Products
Light Ends & Light Naphtha	Steam cracking + Alpha processing	Aromatics (BTX)
Heavy Naphtha	Continuous catalytic reforming	Aromatics (BTX)
Atmospheric Gas oil	Fluid Catalytic cracking (FCC)	Fuel (Gasoline)
Vacuum residues	Delayed coking	Gas oil + coke

Feedstock	Process selected	Products	Process selected	Products
	Case 1- Naphthenic crude		Cases 2- Paraffinic crude	
Vacuum Gas oil	Hydrocracking + Catalytic reforming	Aromatics (BTX)	Fluid Catalytic cracking (FCC)	Fuel (Gasoline)

Observations

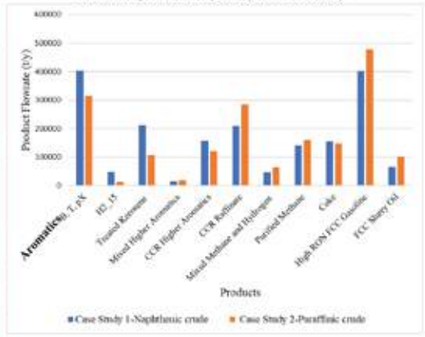
- ➢ Not ideal to directly extract Aromatics from the FCC unit

4.2 Results – Process Optimization

Economic Analysis Summary

			CASE 1- Naphthenic	CASE 2 Paraffinic
Total Product Revenue ($/y)			1,588,307,235.94	1,473,691,325.38
EXPENSES				
	Flowrate (t/y)	Unit Cost ($/t)	Total ($/y)	Total ($/y)
Crude Oil	2,000,000	584.5	1,169,000,000	1,169,000,000
TOC	72,560,200.00			52,893,463.88
TACC	2,610,726.70			2,813,710.43
Economic Potential				
Economic Potential ($/y)			344,136,309.67	248,984,150.57

Products produced by integrated Refinery



Observations

- ➢ Petrochemical (Aromatics) integration with refinery operations is profitable
- ➢ Profit of 23.96 USD per barrel for Naphthenic crude oil and 17.40 USD per barrel for Paraffinic crude.
- ➢ Petrochemicals have higher value therefore generate more profit

6

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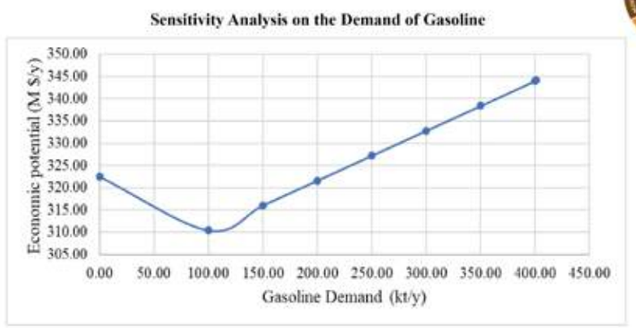
4.3 Results – Decline in fuel Demand



- A decline in gasoline demand leads to a decrease in economic potential
- The impact is minimal (9.8%) as the refinery compensates by maximizing aromatics production.
- Purifying the mixed higher aromatics can overcome the decline,
- At very low gasoline production levels, refiners should instead concentrate aromatics production.

5.0 Impacts & Conclusion

Integrated refineries can sustain economic viability amidst the energy transition by maximizing petrochemical production as fuel demand declines

Petroleum Industry

- Integrated refinery configuration development.
- Maintain and enhance gross refining margins amidst the transition.
- Identify operational synergies.
- Industrialization and investment opportunities for petro-based industries

Academia

- Addresses the academic gap for modeling and optimization for Petrochemical (aromatics) integration with refinery operations

Policy Implication

- Incorporating petrochemical integration into the policy will maximize value addition and reduce reliance on imported petrochemical products.
- Aligning policies with global energy trends and commitments will attract investors.

Environment

- Promotes sustainable Utilisation of resources and potentially a circular economy

ANNEX | CRUDE OIL AND REFINED PETROLEUM PRODUCTS

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Thank You
--Asante Sana--

For More Information, Please contact
Sarah Nanteza
s.nanteza@petroleum.go.ug

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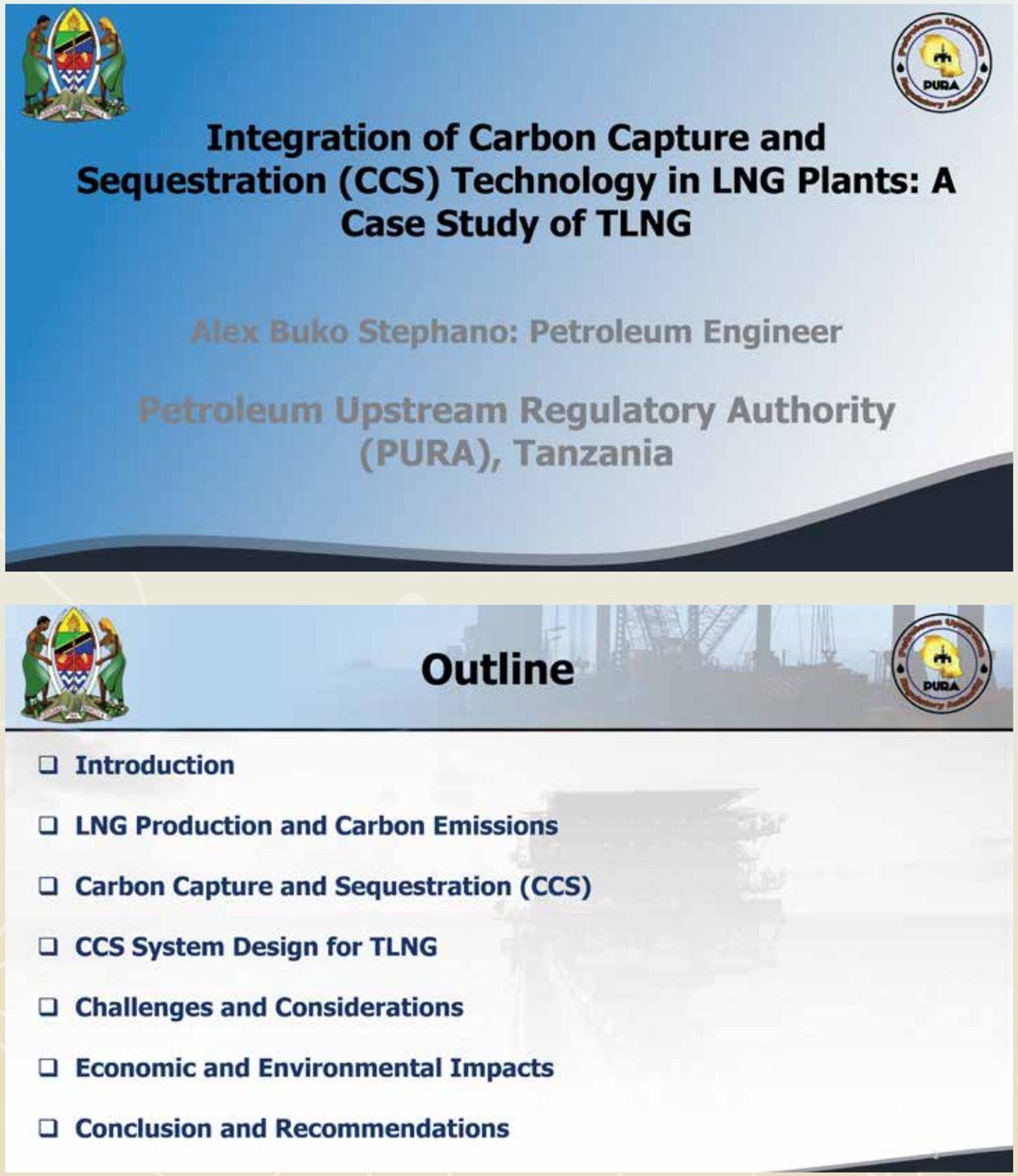

ANNEX | NATURAL GAS PROCESSING, TRANS. AND DISTR

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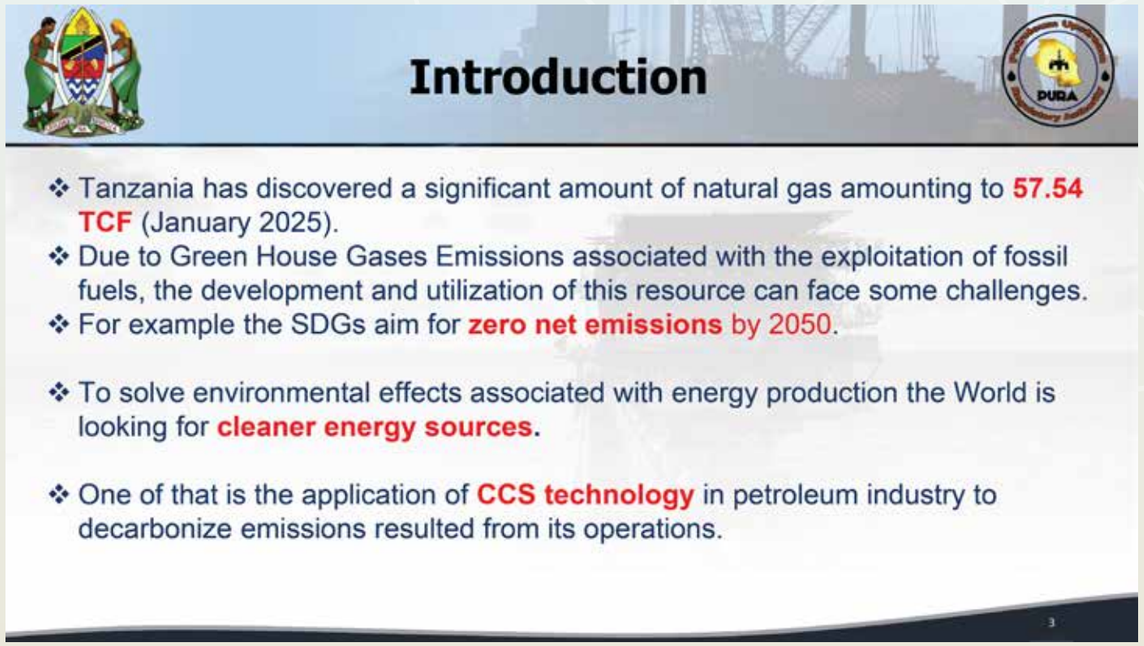

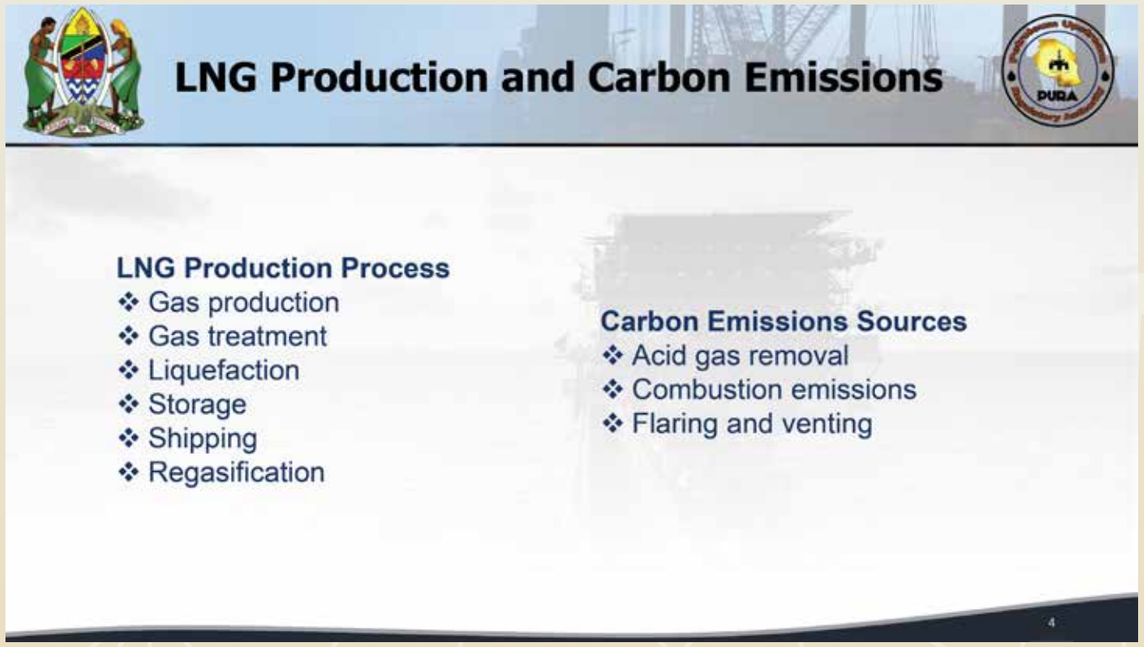

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Carbon Capture and Sequestration (CCS)

- Capture
  - *Pre-Combustion*
  - *Post Combustion*
  - *Cryogenic*
- Transport
  - Pipeline
  - Ship
- Sequestration
  - Oil/gas reservoir
  - Saline aquifer
  - EOR

5

CCS System Design for TLNG

- Site Characteristics and Existing Infrastructures
- *System Design*
  - *Capture Technology*
    - *Amine Based Adsorption – acid gas removal*
    - *Membrane separation – post-combustion emission*
    - *Cryogenic capture – flue gases*
  - *Compression and transportation – compressed to supercritical state 100-150 bar*
  - *Storage site selection*
    - *Depleted gas reservoir*
    - *Saline aquifer*

6

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Challenges and Considerations

- Technical Challenges
  - *Reduction of plant efficiency by 10 - 15%*
  - *Retrofitting existing LNG facilities*
- *Economic Considerations*
  - *High initial costs*
  - *Operational costs*
- *Regulatory and Environmental Issues*
  - *Robust monitoring, verification and reporting system*
  - *Compliance with local and international regulations*

7

Economic and Environmental Impacts

- Cost Benefit Analysis
  - *CAPEX $500*
  - *OPEX $20 – 30 per tonne of CO_2*
  - *Revenue opportunities*
    - *Carbon credit market*
    - *EOR*
- *Environmental Benefits*
  - *Emission reduction*
  - *Climate impact*
  - *Local environment benefits*

8

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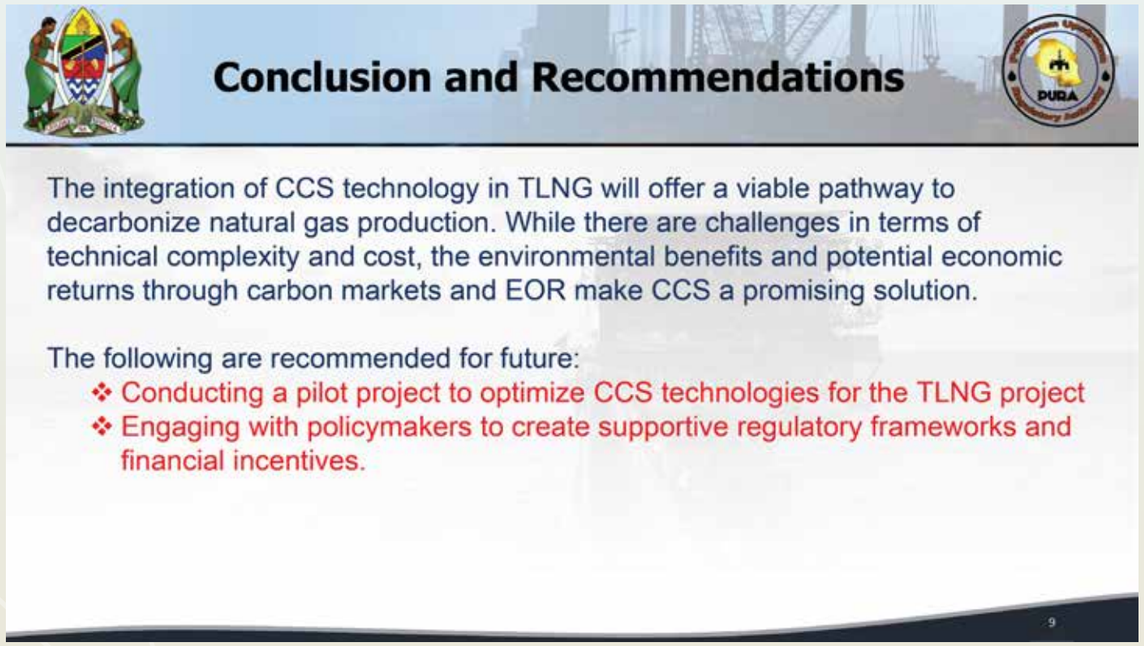
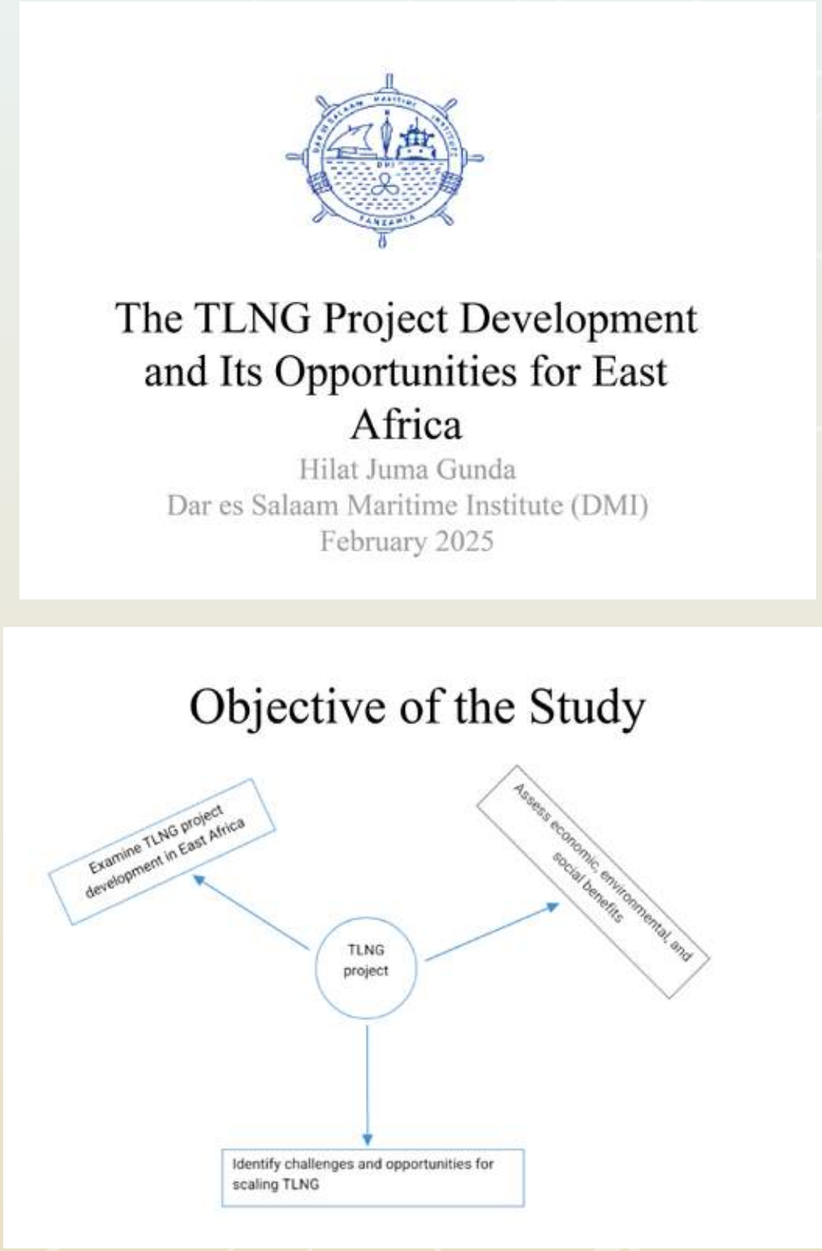


HILAT JUMA GUNDA

THE TLNG PROJECT DEVELOPMENT AND ITS OPPORTUNITIES FOR EAST AFRICA



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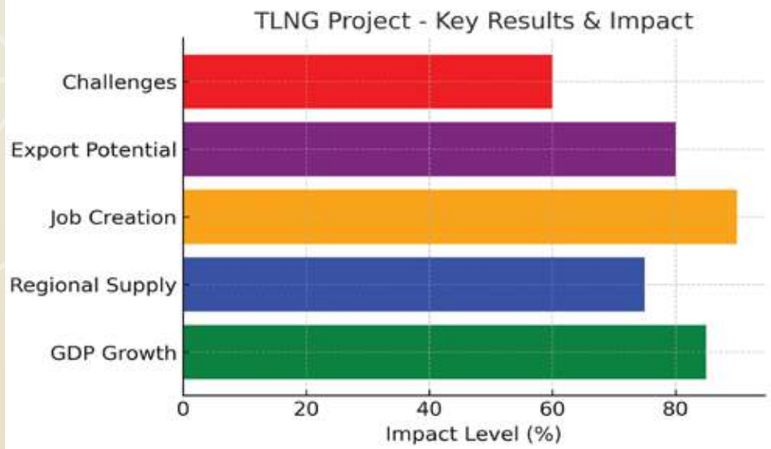
THE TLNG PROJECT DEVELOPMENT AND ITS OPPORTUNITIES FOR EAST AFRICA

Methodology Adopted

- This study is based on secondary data analysis using, News articles, Industry reports (TPDC, PURA, international agencies) Government & corporate publications and Academic and journal articles.
- The data was analyzed to identify key trends, challenges, and opportunities for TLNG development in East Africa.

Results Obtained



ANNEX | NATURAL GAS PROCESSING, TRANS. AND DISTR

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THE TLNG PROJECT DEVELOPMENT AND ITS OPPORTUNITIES FOR EAST AFRICA

Conclusion (Academia)

- TLNG is a game-changer for Tanzania and East Africa, offering economic growth, energy security, and job creation.
- Despite challenges, strategic policies, investment incentives, and infrastructure development can unlock its full potential.
- The need for collaboration between the government, private sector and international partners is the key to the successful of the given project.

Policy Implication (Government)

- Fast-track project negotiations.
- Introduce clear and stable fiscal policies.
- Prioritize local content policies.
- Invest in infrastructure development.
- Establish regional partnerships.

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THE TLNG PROJECT DEVELOPMENT AND ITS OPPORTUNITIES FOR EAST AFRICA

Business Opportunity (Private Sector)

Investment in transportation, storage, and distribution networks.

Opportunities for local manufacturing and services.

Private companies can invest in gas-fired power plants for reliable electricity.

Businesses can partner with global traders to secure international LNG contracts, Companies can export LNG to neighboring countries like Kenya, Uganda, and Rwanda.

MERCY KAMUNTU

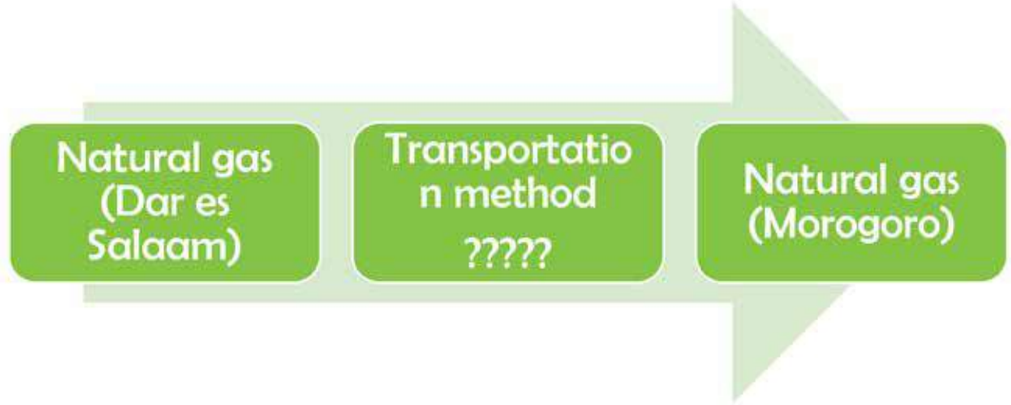
ANALYSIS OF VIRTUAL PIPELINE(CNG AND LNG) AS NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: CASE STUDY MOROGORO REGION

ANALYSIS OF VIRTUAL PIPELINE (CNG AND LNG) AS NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: A CASE STUDY MOROGORO REGION

Author: Mercy Kamuntu
Institution: University of Dar es Salaam

EAPCE'25: UNLOCKING INVESTMENT IN FUTURE ENERGY 1

Problem statement



EAPCE'25: UNLOCKING INVESTMENT IN FUTURE ENERGY 2

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ANALYSIS OF VIRTUAL PIPELINE(CNG AND LNG) AS NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: CASE STUDY MOROGORO REGION

Objectives

- Main objectives
  - ✓To determine an effective method of transporting natural gas
- Specific objectives
  - ✓Estimation of natural gas volume required in Morogoro.
  - ✓Technical analysis of CNG and LNG
  - ✓Economic analysis of the two methods.

Methodology

- Demand estimation and forecasting
  - Excel linear forecast method
- Plant design and simulation
  - Aspen Hysys
- Economic analysis
  - CAPEX, OPEX, NPV, IRR, and payback time

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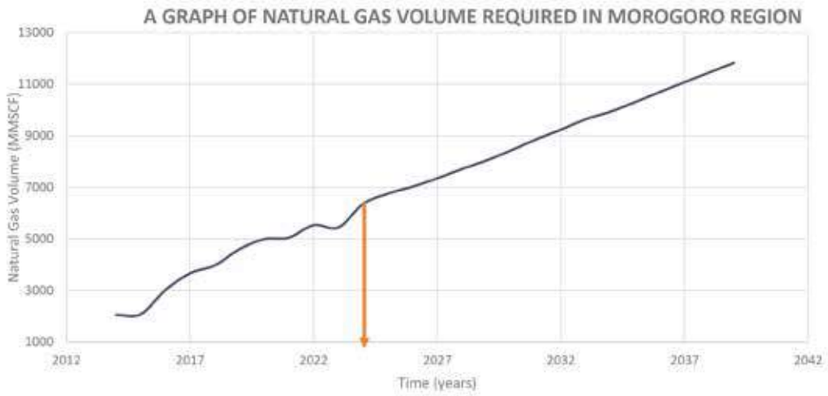
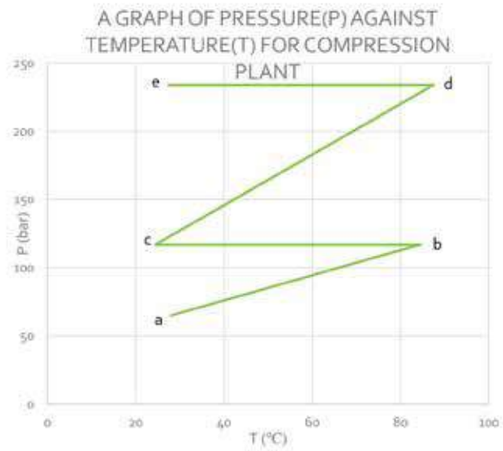
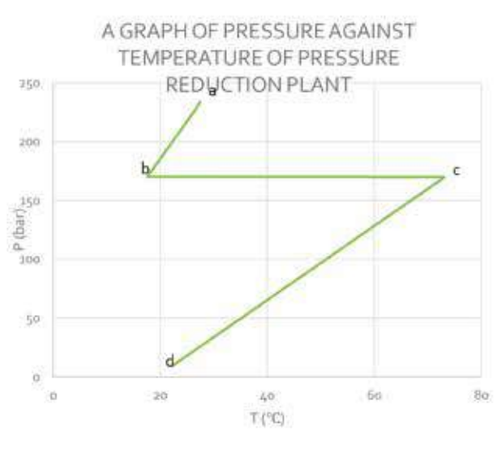
Results and discussion



Compression Station and PR plant





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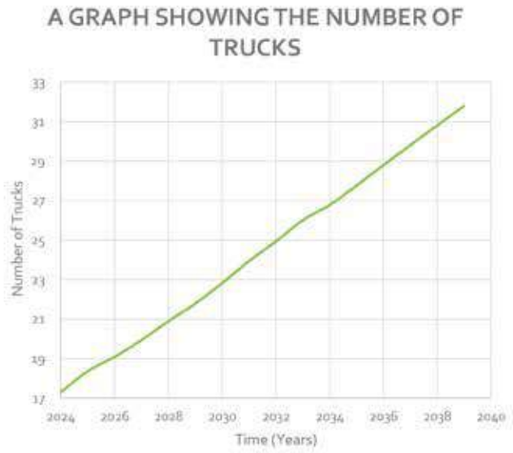
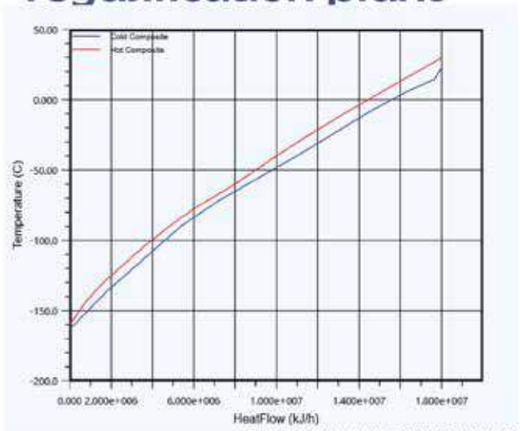
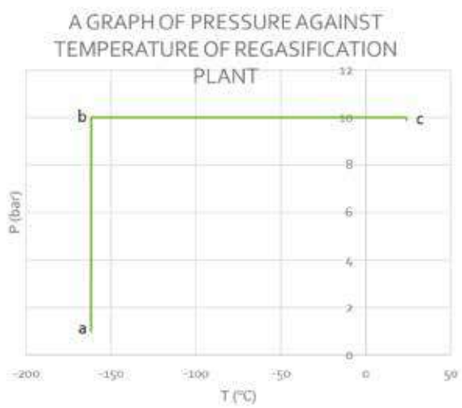
ANALYSIS OF VIRTUAL PIPELINE(CNG AND LNG) AS NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: CASE STUDY MOROGORO REGION

CNG Transportation



LNG exchanger performance and regasification plant





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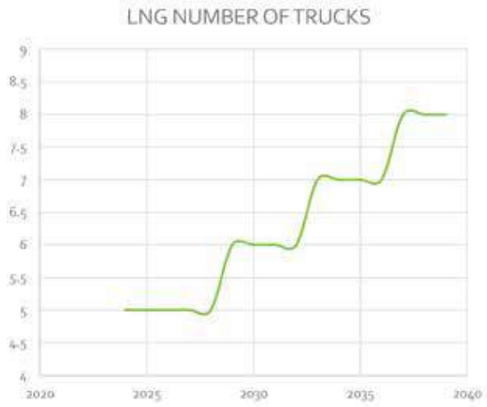
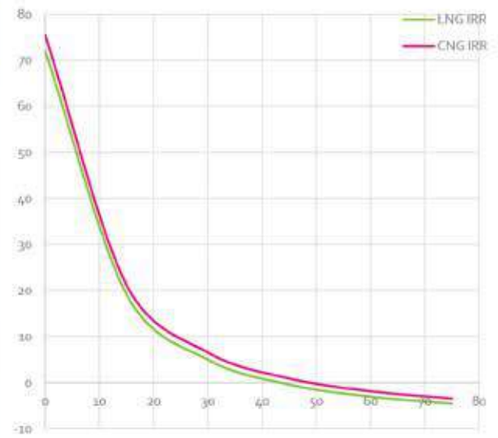
LNG Transportation



Economic comparison

Parameters	LNG	CNG
CAPEX (MMUSD)	9.95	9.24
OPEX (MMUSD)	4.60	4.00
NPV at 8% (MMUSD)	34.64	36.93
IRR(%)	43	49
Payback time	2.6	2.5



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ANALYSIS OF VIRTUAL PIPELINE(CNG AND LNG) AS NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: CASE STUDY MOROGORO REGION

Conclusion

- CNG involves the utilization of a few Components in compression and regasification as compared to LNG hence CNG is marked as more feasible to transport natural gas.
- CNG is the best natural gas transportation method because it has NPV, IRR, higher than LNG, while CAPEX, OPEX and Payback time less than that of LNG natural gas transportation method.

Recommendation

- The CNG should adopted as a natural gas transportation method to the Morogoro region since it can not only used in normal natural gas form but can also utilized for natural gas vehicles.
- The sensitivity analysis can be performed on both methods to find how the change in natural gas price will affect the profitability yardsticks.

ANNEX | NATURAL GAS PROCESSING, TRANS. AND DISTR

MERCY KAMUNTU

ANALYSIS OF VIRTUAL PIPELINE(CNG AND LNG) AS NATURAL GAS TRANSPORTATION METHODS IN TANZANIA: CASE STUDY MOROGORO REGION

THANK YOU

NEEMA MDEGELLA

ENGINEERING CRITICAL ASSESMENT OF ALPHATIC POLYKETONES

GAS COMPANY (T) LTD (GASCO) GASCO

ENGINEERING CRITICAL ASSESMENT OF ALPHATIC POLYKETONES

Eng. NEEMA MDEGELLA

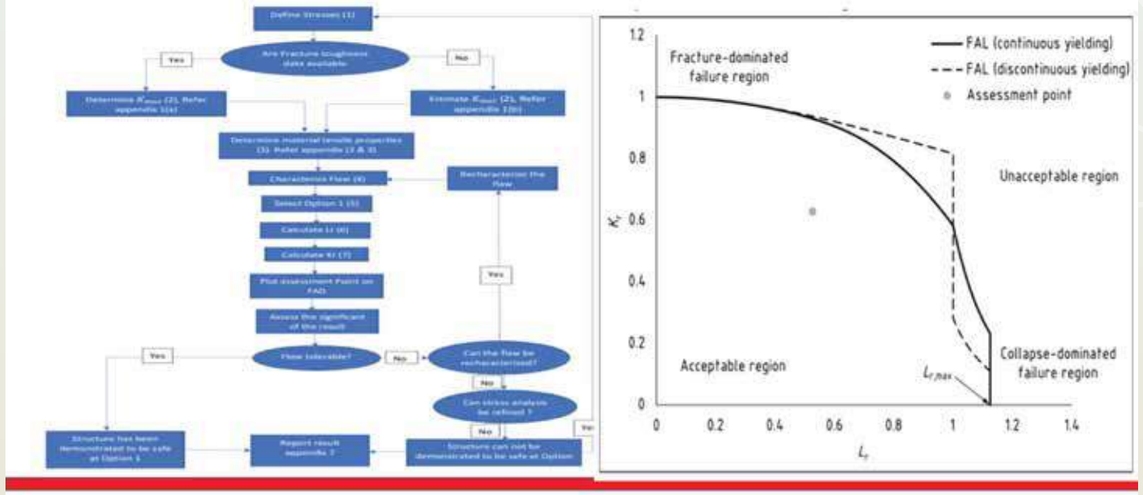
OUTLINE GASCO

1. Background
2. Objectives
3. Methodology
4. Key Findings
5. Proposed ECA Methodology for Aliphatic Polyketones
6. Conclusion and Recommendation
7. Policy Implication and Business Opportunities

NEEMA MDEGELLA

ENGINEERING CRITICAL ASSESMENT OF ALPHATIC POLYKETONES

Proposed ECA Methodology for Aliphatic Polyketones GASCO



Conclusion and Recommendation

- Understanding material properties and failure mechanisms is key for effective assessment and usage in engineering applications.
- ECA methodology tailored for aliphatic polyketones offers a pathway to improve their engineering and structural design application.
- The research contributes to the body of knowledge in the literature by proposing a methodology for plastic ECA
- Validation of proposed methodology through experimental studies
- Exploration of further polymer-specific adaptations to ECA

NEEMA MDEGELLA

ENGINEERING CRITICAL ASSESMENT OF ALPHATIC POLYKETONES

Policy Implication and Business Opportunities

Policy Implication

- Developing National standard for assessing the fit for purpose of the facility used in oil and gas
- Establishing National Standards for Polymer Performance in the Oil and Gas Sector
- Creating a Uniform Framework for Polymer Evaluation and Compliance
- Facilitating Sustainable Polymer Selection Through Standardized Environmental and Safety Guidelines

Business Opportunities

- Experts can Provide failure analysis services for plastic materials used in oil and gas operations
- Material Selection and Design Consulting depending on the application area
- Plastic Company can Develop Advanced Composite Materials

-END-

GASCO

Thank you

LAURA ROBINSON

PETROLEUM PROJECT COST MONITORING AND AUDITING

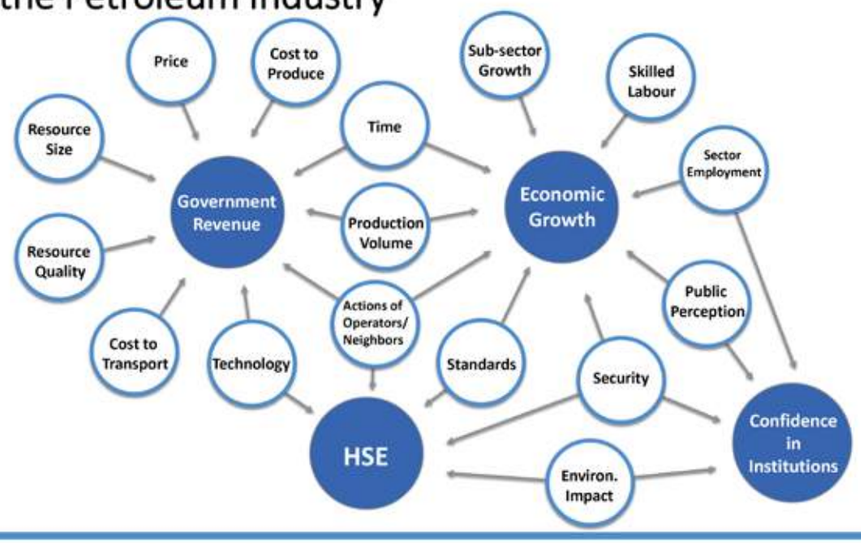
Petroleum Project

Cost Monitoring and Auditing

11th East African Petroleum Conference & Exhibition
EAPCE '25

6 March 2025

The Impact of Uncertainty on Government Objectives in the Petroleum Industry



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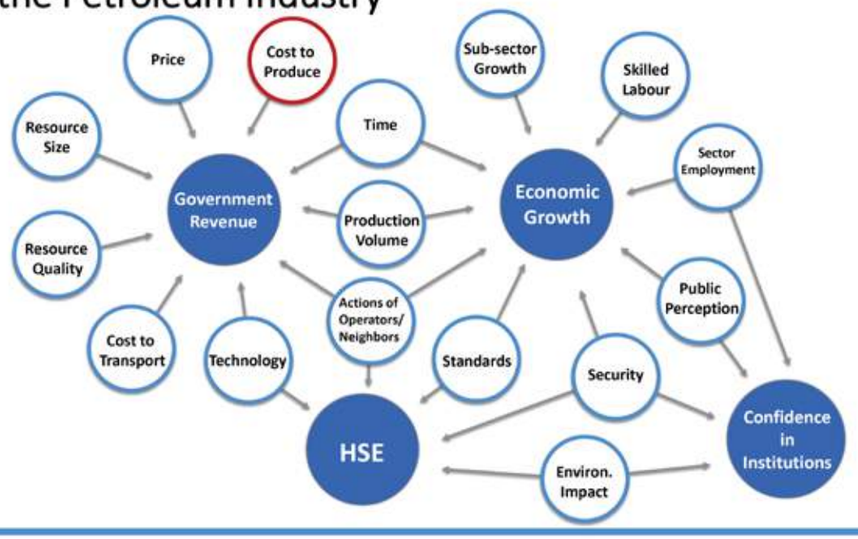
PETROLEUM PROJECT COST MONITORING AND AUDITING

The Impact of Uncertainty on Government Objectives in the Petroleum Industry



PSCs, Rights, and Obligations

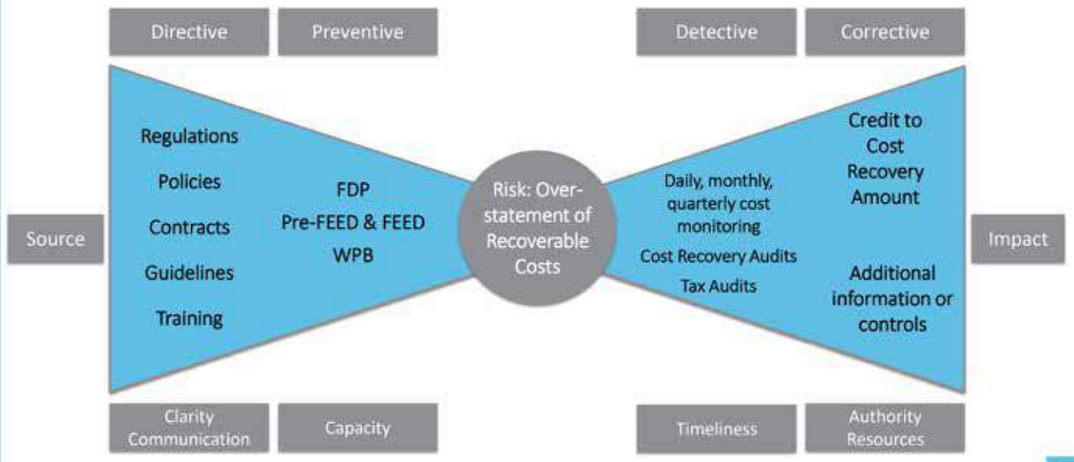
- PSCs establish a partnership between Governments and Contractors toward established goals – extracting petroleum toward optimal recovery and maximum value.
- PSCs establish rights and obligations of the Government and the Contractor, allocating risk to each party to meet the market requirements at the time of signing.
- Governments transfer financial and technical risk to the Contractor in exchange for allowing the Contractor to recover costs dollar for dollar.
- PSCs assume optimal execution of rights and obligations, including oversight rights.
- However, Performance executing rights and obligations by both parties is uncertain.

LAURA ROBINSON
PETROLEUM PROJECT COST MONITORING AND AUDITING

Costs and the Risk of Overstatement

- PSCs establish the obligation for Contractors to plan Petroleum Operations and (often) the right for Governments to approve the plan through the Work Programme and Budget review and approval process.
- Contractors make assertions as to costs through reporting
  - Cost Recovery Statements – Asserting costs and credits are accurate, compliant, and eligible for recovery
  - Tax Statements – Asserting costs and credits are accurate, compliant, and deductible under the tax regime
  - Lifting and Sales Reports – Asserting that explicit and implicit costs and discounts appropriately reduce sales amounts
- Overstated costs can impact total government take through reductions in:
  - Profit Oil
  - Tax Revenue
  - Royalty
  - Domestic supply obligation pricing
  - Lifting and Sales Reports – Asserting that costs appropriately reduce sales amounts
- The risk that costs will be overstated are managed through a cost management control framework.

The Control Framework



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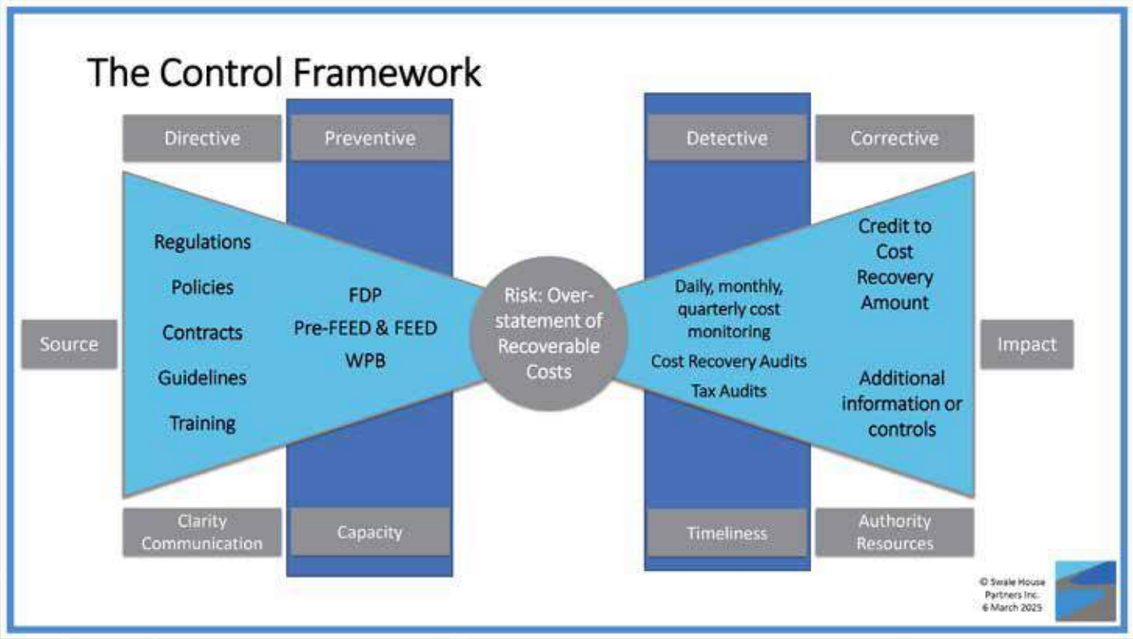

Enhancing Cost Monitoring in the Near Term

- Cost monitoring starts with understanding the connections between the directive controls, Petroleum Operations, and cost.
- Cost monitoring can be done by Governments any time they have access to cost data.
- Expertise is under development in the first 20 years of petroleum activity in a country, but "questioning competence" can be increased in the near term.
- Preventive and detective cost monitoring competence can be enhanced through a combination of data, expectations, and discussions with the Contractor.
- Expectations can be enhanced through:
  - Risk assessments
  - Integrated evaluation (technical, finance, legal)
  - Use of cost estimation tools and market rate databases
  - Subject matter experts
- Engaging effectively with the Contractor on cost monitoring is critically important – BEFORE the money is spent.

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ANNEX | RESOURCE REVENUE MANAGEMENT

LAURA ROBINSON
PETROLEUM PROJECT COST MONITORING AND AUDITING

Cost Recovery Audits

Cost recovery audits are designed to provide assurance to Government stakeholders that the assertions made by the Contractor as to recoverable are **compliant** with the rules established by the government (law, regulations, contract, additional guidance) and **accurate** and supported by evidence.

Common enforceable findings include:

- Overallocation of costs to productive blocks
- Inappropriate categorization of costs
- Inclusion of costs not approved by the Minister
- Duplication of costs
- Costs without evidence
- Inclusion of disallowed costs
- Forex calculations
- Discounts and credits not booked
- Understatement of produced volumes
- Discounts to sales values

Cost recovery audits are not the ideal time to identify differing interpretations of certain Accounting Procedures or to identify issues that could have been identified and discussed through timely and detailed cost monitoring.

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Conclusion

- There is significant uncertainty in the cost required to explore for and produce petroleum.
- PSCs establish the obligation for the Contractor to plan and incur the costs and the right for the Government to oversee the costs.
- Understanding the link between directive controls and cost provides a critical basis for cost monitoring and cost recovery audits.
- Cost monitoring can be executed through a combination of data, expectations, and engagement with the Contractor.
- The goal of cost recovery audits is maximum assurance that the costs are accurate and compliant with the rules established by the Government, NOT that there are maximum exceptions.
- Engaging with the Contractor from the outset reduces administrative friction, improves the relationship with the Contractor, and creates and protects the value of the resource.

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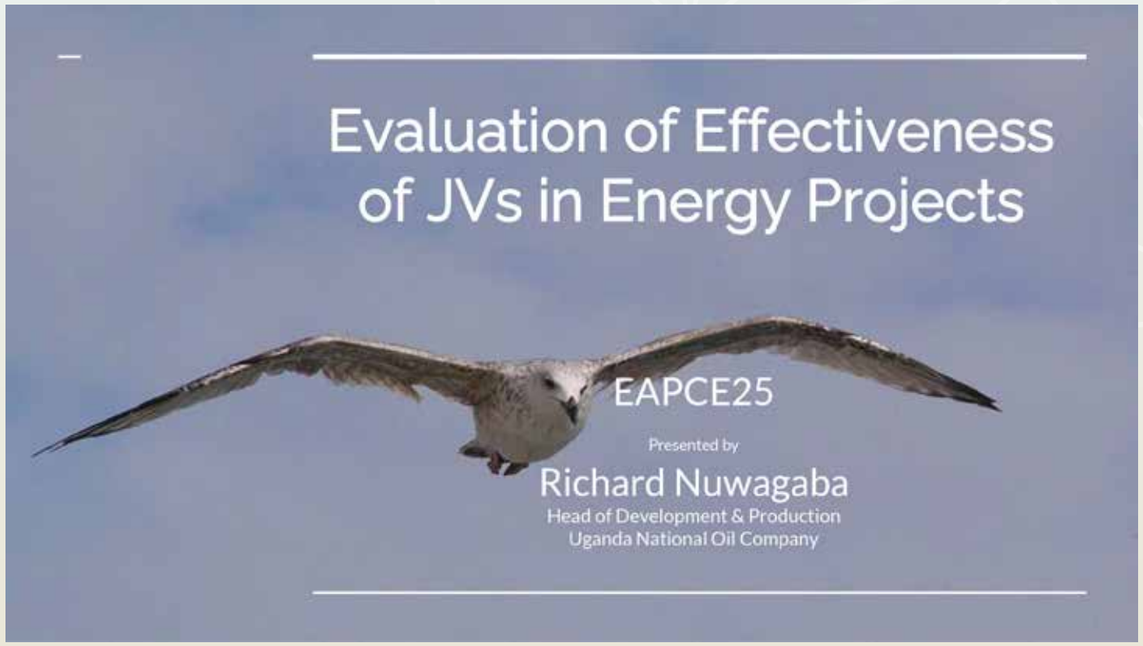
PETROLEUM PROJECT COST MONITORING AND AUDITING

RICHARD NUWAGABA

EVALUATION OF EFFECTIVENESS OF JVs IN ENERGY PROJECTS



RICHARD NUWAGABA

EVALUATION OF EFFECTIVENESS OF JVs IN ENERGY PROJECTS

What, How & Why a JV

What

Business arrangement - parties pool resources to accomplish a specific task

How

- Incorporated (Company structure/Limited Liability Partnership)
- Non-incorporated
  - General Partnership
  - Contractual Structure

Reasons to Enter Joint Venture

ANNEX | RESOURCE REVENUE MANAGEMENT

RICHARD NUWAGABA

EVALUATION OF EFFECTIVENESS OF JVs IN ENERGY PROJECTS

Measurement! Key Enablers.

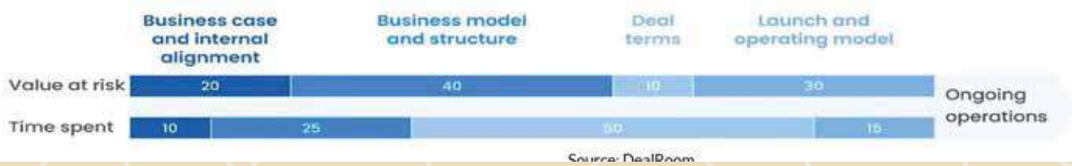
- Planning Phase
- Formation
- Operation
- Exit

Planning Phase

- Internal JV Governance framework
  - Selection Criteria,
  - Appraisal Criteria,
  - Approval Process
- Asset contribution and equity stake of the participants
- Scope definition
- Strategy and business plan development,
- Exit plans

Companies spend more time on steps where less value is at risk and less time on steps where more value is at risk.

% of total time spent on each stage of joint-venture development



Source: DealRoom

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EVALUATION OF EFFECTIVENESS OF JVs IN ENERGY PROJECTS

Formation Phase

- Operational planning,
  - Operated/no-operated
- Parent company service agreements,
- Definition of management and decision rights/obligations
- Dispute mechanism design

Operations Phase

- Integration and/or setup of functional areas (HR, IT, etc.
- Capital management,
- Management decision making and governance
- Capturing of synergies.

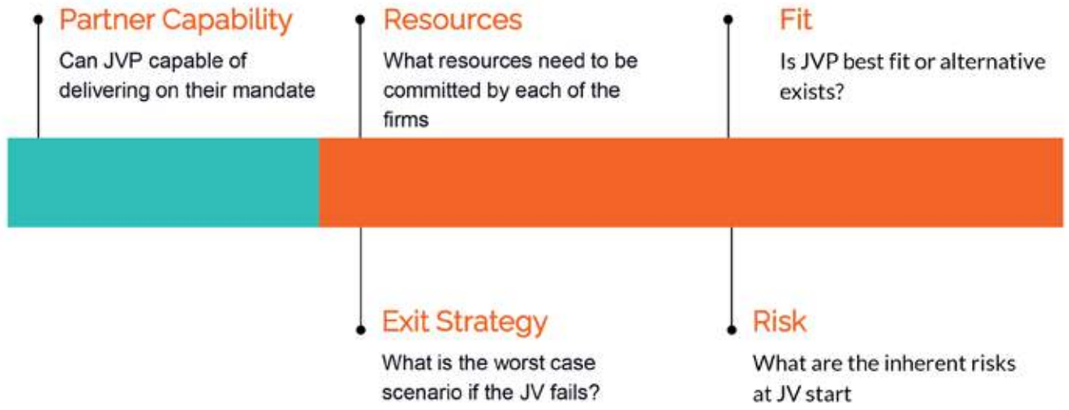
ANNEX | RESOURCE REVENUE MANAGEMENT

RICHARD NUWAGABA
EVALUATION OF EFFECTIVENESS OF JVs IN ENERGY PROJECTS

Exit Phase (plan at JV Onset...But)

- Valuation of the JV,
- Resolution of any outstanding issues,
- Buyer selection
- JV deal structuring

Conclusion - Factors to consider b4 a JV

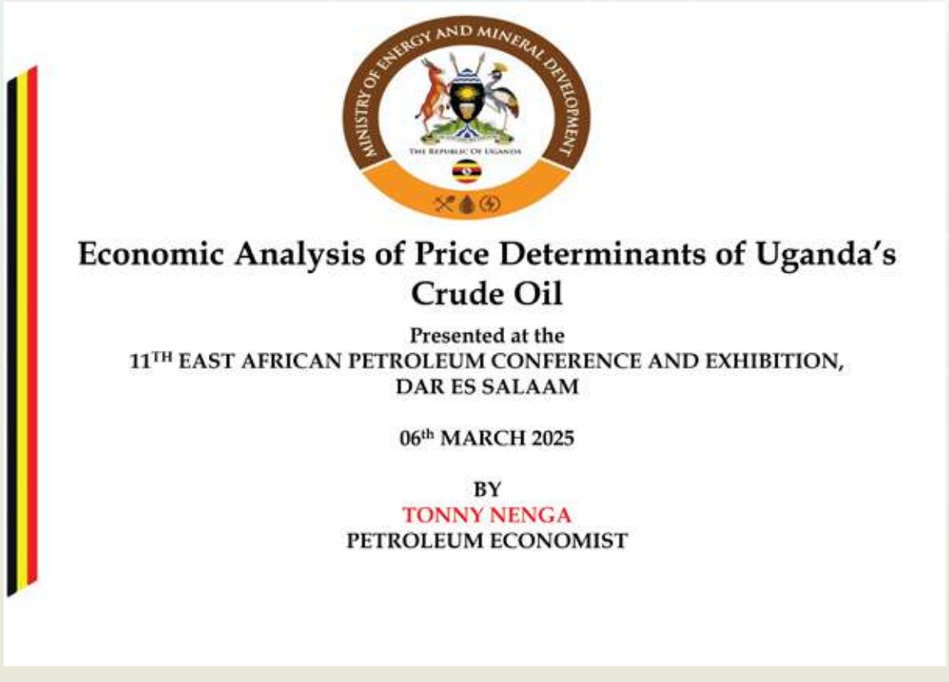


RICHARD NUWAGABA

EVALUATION OF EFFECTIVENESS OF JVs IN ENERGY PROJECTS

TONNY NENGA

ECONOMIC ANALYSIS OF PRICE DETERMINANTS OF UGANDA'S CRUDE OIL



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ECONOMIC ANALYSIS OF PRICE DETERMINANTS OF UGANDA'S CRUDE OIL

1.0 OBJECTIVE

To assess the broader economic effects of crude oil price determinants on Uganda's economy.

2.0 METHODOLOGY

- Analyzed **historical price trends** and **future projections (2011 – 2055)**.
- Compared **Uganda Blend crude** to global **Brent benchmarks**.
- Examined **transport costs and netback values**.
- Adjusted for **inflation** to assess long-term **investment stability**.

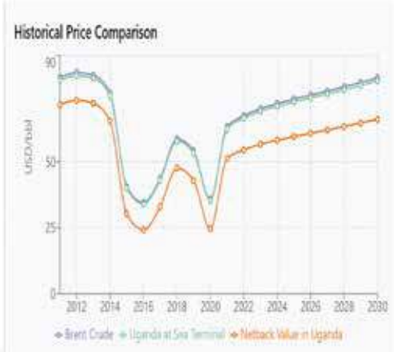
TONNY NENGA

ECONOMIC ANALYSIS OF PRICE DETERMINANTS OF UGANDA'S CRUDE OIL

3.0 RESULTS AND FINDINGS

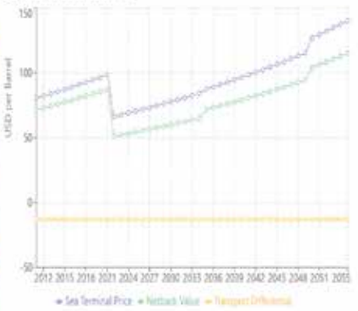
Uganda Blend trades at a small discount to Brent (appr. -1.4%)

Prices are projected to steadily increase with inflation



3.0 RESULTS AND FINDINGS...

Consistent transportation tariff of $12.77 per barrel.



TONNY NENGA

ECONOMIC ANALYSIS OF PRICE DETERMINANTS OF UGANDA'S CRUDE OIL

4.0 CONCLUSION

4.1 Investment attractiveness in Uganda's crude oil

- Consistent growth in petroleum pricing
- Transparent long-term economic projections
- Predictable transport costs

4.2 The Government may adjust taxation to remain competitive in global markets.

VISION: A Model of Excellence in Sustainable Management and Utilisation of Energy and Mineral Resources

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For more information, please contact;

Ministry of Energy and Mineral Development

psmemd@energy.go.ug
memd@energy.go.ug
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