

OPPORTUNITY FOR A REGIONAL DOMESTIC MARKET FOR OIL AND GAS

EASTERN AFRICA REGION



AFREC
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Commission

Opportunity for a regional domestic market for oil and gas

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The African Energy Commission (AFREC) is a specialised energy agency of the African Union (AU), mandated to develop the African energy sector through the facilitation, coordination, harmonization, protection, conservation, development, promotion of rational exploitation, commercialization, and integration of energy resources in Africa.

It engages actively with a broad network of experts and partners in the 55 AU member states, ensuring that all energy initiatives align with the future development of the energy sector in Africa and the pursuit of building ‘the Africa We Want’.

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Foreword

By the Regional Champion of the Report

The development of the oil and gas sector represents a critical opportunity for the Eastern Africa region to accelerate economic transformation, industrialisation, and energy security. As nations across our region continue to make important discoveries and investments in this sector, it is imperative that we complement these upstream efforts with a deliberate focus on growing and integrating our domestic markets.

In Uganda, we are committed to harnessing our petroleum resources not only for export but also to power our industries, support job creation, and improve the livelihoods of our people. Infrastructure projects such as the East African Crude Oil Pipeline (EACOP), the planned refinery, and distribution networks are foundational to this vision. However, we recognize that sustainable growth depends on strong collaboration across borders, enabling us to create economies of scale, attract investment, and build resilient value chains in the spirit of the East African Community (EAC) and Africa Continental Free Trade Area (AfCFTA).



This report, “*The Study on the Opportunity for Domestic Market for Oil and Gas in Eastern Africa*,” provides timely and insightful analysis into the key enablers of a robust regional market ranging from regulatory harmonisation and infrastructure development to LPG promotion and private sector participation. It is a call to action for all stakeholders, governments, industry, and civil society to work together toward a shared vision of inclusive energy-led growth and Uganda is happy to be a champion for this cause.

The report also comes at a time when Africa needs to define an inclusive, fair, and just transition which will leave no one behind. This means the discovered oil and gas resources in the region must be utilised to not only provide energy security but also spur economic diversification including financing the renewable energy projects for a concerted effort to bridge the energy demand gap on the continent.

I, therefore, commend the authors and contributors to this report for their in-depth research and strategic foresight. May it serve as a guiding resource in our collective efforts to build a vibrant and self-reliant energy future for Eastern Africa.

Hon. Ruth Nankabirwa Sentamu

*Minister of Energy and Minerals Development & Champion of the Report
Republic of Uganda*

Foreword

By the Executive Director, African Energy Commission of the Africa Union

The Eastern Africa region stands at a pivotal moment in its energy journey. With recent discoveries and ongoing developments in oil and gas exploration, resource appraisal and infrastructure development, the potential to transform national economies, enhance energy security, and drive industrial growth has never been greater. Yet, realizing this potential hinges not only on extraction and export but also on building resilient and inclusive domestic markets for the benefit of the people within the region.

This report, *“The study on the Opportunity for Regional Domestic Market for Oil and Gas in Eastern Africa,”* presents a comprehensive analysis of the region’s current landscape, challenges, and opportunities in leveraging its hydrocarbon resources estimated at 4.7 billion barrels of crude oil reserve and over 70 trillion cubic feet of natural gas reserves to meet domestic energy needs in fifteen (15) countries. It explores the strategic importance of developing local infrastructure, promoting intra-regional trade, and fostering regulatory environments that encourage investment and support sustainable growth.

The report analyses the regional demand outlook and identifies the oil and gas supply opportunities divided into the short-, medium- and long-term development roadmap meant to achieve self-sufficiency. This requires key enablers driven by various factors namely market transparency, infrastructure development, carbon emission reduction, regulatory framework optimisation, and regional security.

Market transparency, driven by the identification of supply and demand nodes, will lay the foundation for a more interconnected and efficient market. Infrastructure development, particularly pipeline and distribution networks, along with refining and storage infrastructure, is essential to optimise logistics, minimise costs, and improve regional trade connectivity.

As the region works toward diversifying its economies and reducing reliance on imported fuels, strengthening the domestic oil and gas market offers a pathway to increased energy access, job creation, and economic resilience. This report offers data-driven insights and policy recommendations that can guide governments, investors, and stakeholders toward realizing these shared goals.

I hope that the findings within will inform thoughtful dialogue, inspire collaboration, and support practical actions that advance the region’s energy aspirations in a responsible and inclusive manner.

Rashid Ali Abdallah

Executive Director

African Energy Commission (AFREC)



Acknowledgements

This report, “*The Study on the Opportunity for a Regional Domestic Market for Oil and Gas in Eastern Africa*”, is a comprehensive analysis of the Oil and Gas Opportunities in Eastern Africa and provides guidelines on strengthening resource exploitation, infrastructure and regulatory environment to increase trade of crude oil, refined petroleum products, and natural gas within the region. It was made possible through the valuable contributions and active engagement of numerous individuals and institutions.

The report was prepared under the leadership of Rashid Ali Abdallah, Executive Director at AFREC, and the coordination of Yagouba Traore. Felix Bob Ocitti tirelessly supervised the technical output of the study while Awa Cheikh and Beza Syum together supported all stakeholders throughout the project.

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EXECUTIVE SUMMARY

This report explores the Eastern Africa region's potential to leverage its significant oil and gas resources to achieve regional climate objectives, energy security, sustainable development and economic growth through promoting intra-regional trade and ensuring a just energy transition. The focus countries for this region are the following: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania, and Uganda. By developing reserves and promoting intra-regional trade via strategic investments in infrastructure, the region can reduce reliance on global markets, promote industrialisation, and build a self-sufficient, integrated energy market, while aligning with international sustainability commitments.

Eastern Africa's Oil and Gas Landscape

Eastern Africa's oil and gas industry operates through an integrated value chain comprising of the upstream, midstream, and downstream sectors. The upstream sector focuses on exploration and production of crude oil and natural gas, while the midstream ensures efficient transportation and processing of these resources. The downstream sector delivers refined petroleum products, natural gas and liquid petroleum gas to end-users, supporting industrial, residential, and commercial needs. Together, these sectors drive regional energy access, economic growth, and industrialisation, positioning Eastern Africa for sustainable development and integration.

Crude Oil and Refined Petroleum Products

Eastern Africa holds 4.7 billion barrels of proven crude oil reserves across four (4) of the Member States, representing 0.3% of global and 4% of African reserves. Despite the ample proven reserves in Eastern Africa, only South Sudan and Sudan are currently producing crude oil, contributing to 189 thousand barrels per day equating to 0.2% of global and 3% of African production. Despite this, all fifteen (15) Eastern African countries remain net importers of refined petroleum product due to insufficient local refining capacity. To unlock the full value of the regions oil resources, the countries must invest in refining infrastructure and enhance regional collaboration to shift from dependency toward energy self-sufficiency and industrial growth.

Eastern Africa's midstream petroleum sector reveals a total refining capacity of 263.4 thousand barrels per day, however only 26.4 thousand barrels per day is utilised capacity resulting in a production of 19.8 thousand barrels per day. This production rate currently covers only 5% of the regional refined petroleum demand of 416 thousand barrels per day, resulting in heavy reliance on imports. If the underutilised capacities in Kenya, South Sudan, and Sudan were fully exploited, additional regional production could meet up to 36% of the regional demand, with Eritrea and Madagascar adding a further 7%. These additional capacities therefore provide the opportunity for the production of refined petroleum product to shift from the current 5% coverage of regional demand to a potential coverage to 48%.

In the downstream sector, the region consumes 416 thousand barrels per day of refined petroleum products and 3 451 tonnes per day of liquefied petroleum gas, with Kenya, Sudan, and Tanzania as the largest consumers. Addressing regional challenges, such as import dependency, underutilised infrastructure, and limited refining capacity, requires significant investment in infrastructure, regional collaboration, and supportive policies to achieve energy self-sufficiency and promote economic growth.

Natural Gas

The region holds 70 769 billion cubic feet of proven natural gas reserves, representing 1% of proven global reserves and 11% of proven African reserves, with Tanzania as the largest contributor. Regional production is concentrated in Tanzania and Rwanda, totalling 74.65 billion cubic feet per year, which accounts for 0.1% of global output and 1% of African outputs. Despite this, none of the Eastern African countries are net exporters or importers of natural gas, reflecting a balanced but underutilised resource landscape.

The midstream sector of Eastern Africa's natural gas industry shows strong potential, with four (4) processing facilities in Tanzania providing 171.55 billion cubic feet of natural gas per year, covering 232% of the regional demand. While this accounts for just 0.07% of global and 1.8% of African capacity, it highlights a surplus that remains underutilised due to geographical concentration. Expanding infrastructure beyond Tanzania through investment and regional cooperation is key to unlocking broader energy and economic benefits.

The downstream sector highlights limited regional natural gas consumption, totalling 74 billion cubic feet per year or 0.1% of global consumption and 1.3% of the African consumption, with Tanzania and Rwanda as the only consuming countries. Expanding natural gas infrastructure, including refining, transportation, and distribution, will be critical to leveraging these resources for economic growth, industrialisation, and energy diversification across the region.

Trade

Despite abundant resources, the region heavily relies on imports for refined petroleum products and liquefied petroleum gas due to limited refining and production capacities, highlighting the importance of intra-regional trade in crude oil, natural gas, refined petroleum products and liquefied petroleum gas within the Eastern Africa region to enhance energy security, economic growth, and regional integration. South Sudan and Sudan are key players in crude oil trade, while no Member States trade in natural gas.

The role of regional trade agreements, such as African Continental Free Trade Area and partnerships with Regional Economic Communities like the Common Market for Eastern and Southern Africa, the East African Community, the Community of Sahel-Saharan States, the Economic Community of Central African States, the Intergovernmental Authority on Development, and the Southern Africa Development Community, facilitates collaboration and reduces dependency on global markets. Strategic projects like EACOP and the Djibouti crude oil pipeline aim to improve infrastructure and trade connectivity, while government-led initiatives in Kenya, Tanzania, and Uganda are promoting more efficient energy supply chains and policy frameworks.

The efforts by countries like Ethiopia, Madagascar, and Djibouti enhance energy trade, infrastructure and cross-border collaborations. By leveraging trade agreements and infrastructure development, Eastern Africa is working toward achieving greater energy self-sufficiency, reducing import dependency, and promoting sustainable economic integration across the region.

Governing Laws, Regulations, and Policies

Regulatory disparities have frequently been cited as a major obstacle to intra-regional trade and investment. This section provides an overview of the existing laws and regulations governing the oil and gas industry across Member States and provide examples of disparities.

Inventory Analysis

While most countries have established foundational legislative frameworks, gaps remain, particularly in public-private partnership regulations and the liquefied petroleum gas market. The region has made strides in harmonising regulations through regional communities like the East African Community and the Common Market for Eastern and Southern Africa, but further attention is needed to unify hydrocarbon codes, investment regulations, and public-private partnership frameworks to create a more integrated and investment-friendly environment.

Eastern Africa has made progress in establishing regulatory frameworks, with ongoing efforts to harmonise hydrocarbon, investment, and public-private partnership regulations to support cross-border oil and gas projects. However, the region lacks specific liquefied petroleum gas regulations, which are crucial for market development, investment attraction, and safety compliance. Introducing clear policies on storage, distribution, and pricing could enhance liquefied petroleum gas adoption as a cleaner energy alternative. Additionally, while all Member States require Environmental Impact Assessments, there is limited evidence of mandated decarbonisation technologies amongst the Eastern African countries in the oil and gas sector. Implementing such regulations could improve investment attractiveness, align with global climate goals, and position Eastern Africa as a leader in sustainable energy development.

Public-Private Partnership Legal Framework Analysis

Public-private partnerships are essential for financing, constructing, and operating oil and gas infrastructure in Eastern Africa, facilitating private investment in capital-intensive projects such as pipelines and refineries. These partnerships help distribute risks, reduce governance financial burdens, and ensure project efficiency while integrating environmental, social, and governance standards. Standardised public-private partnership frameworks enhance transparency, accountability, and regional cooperation, making them a critical tool for developing a domestic oil and gas market.

To evaluate public-private partnership governance five (5) key areas are considered namely, the existence of dedicated public-private partnership laws, definition and general provisions, project evaluation requirements, procurement processes, and contract management.

Eastern African countries exhibit diverse public-private partnership governance frameworks, with over two-thirds having dedicated public-private partnership laws, reinforcing structured private-sector participation in infrastructure projects. Ethiopia, Kenya, Rwanda, Tanzania, and Uganda demonstrate mature systems with dedicated public-private partnership units, while others rely on ministries, particularly the Ministry of Finance or the Office of the President, for oversight.

Project evaluation required in Eastern African public-private partnership laws vary significantly, impacting the viability and success of oil and gas projects. These requirements generally cover five (5) key areas namely, identification assessment, feasibility and economic viability, environmental impact assessment, value-for-money assessment, and fiscal affordability assessment. Ethiopia, Kenya, Rwanda, Tanzania, and Uganda have detailed public-private partnerships, ensuring rigorous project evaluation, while Burundi, Somalia, and Sudan have broad public-private partnership approaches potentially leading to gaps in sustainability and cost-effectiveness. Djibouti, Madagascar, and Mauritius fall in between, covering key aspects but lacking depth in some areas. Standardised and thorough evaluation frameworks are crucial for ensuring trust, establishing project readiness, and ensuring sustainable infrastructure development in the region.

Procurement processes in Eastern African public-private partnership laws balance competition and flexibility, with open competitive tendering as the dominant method, mandated in six (6) countries and preferred in five (5). Alternative approaches, such as restricted tendering, two-stage tendering, and competitive dialogue, are selectively applied, while direct procurement and open tendering is permitted in all countries with dedicated public-private partnerships under strict regulations.

Contract management frameworks emphasise high-level approvals, with cabinet or finance ministry oversight, and contracting authority assigned to public bodies. Local law governs contracts in nearly all jurisdictions, and dispute resolution favours arbitration, with limited judicial recourse. Overall, gaps in procurement flexibility, contract standardisation, and term regulation may impact investor confidence and the efficiency of oil and gas public-private partnerships in the region.

Comoros, Eritrea, Seychelles, and South Sudan lack dedicated public-private partnership laws or units, relying instead on general investment frameworks, national agencies, or direct government negotiations to facilitate public-private collaboration in the oil and gas sector. These non-specialised approaches create challenges in managing complex projects, leading to uncertainty in risk-sharing, dispute resolution, and project oversight. The absence of clear guidelines hampers investor confidence, reducing private sector participation and slowing infrastructure development.

Domestic Utilisation of Oil and Gas

The downstream oil and gas sector in the Eastern Africa region is shaped by a mix of supportive and restrictive regulations affecting domestic utilisation. While tax incentives, pricing regulations, infrastructure support, streamlined regulations, energy access and domestic supply security, and environmental and sustainability incentives promote domestic utilisation, environmental restrictions, promotion of alternative energy sources, high taxation and import duties, lack of downstream support, infrastructure and regulatory gaps, and focus on foreign exchange saving restricts domestic utilisation. The region's regulatory variations create disparities in energy access, underscoring the need for harmonised policies to balance sustainability goals with domestic oil and gas sector development.

Examples of Disparities Hindering Regional Cooperation

Regional disparities in diesel sulphur content, petrol sulphur content, petroleum pricing mechanisms, public procurement policies, liquefied petroleum gas regulation and taxation, and light-duty vehicle emissions standards create barriers to oil and gas trade integration in Eastern Africa. While countries like Kenya, Uganda, Tanzania, Burundi, South Sudan, Comoros, Mauritius, Seychelles, and Rwanda have adopted low-sulphur diesel, others, such as Eritrea, Somalia and Djibouti, have higher limits, complicating cross-border trade. Similarly, countries like Burundi, Rwanda, Tanzania, Kenya, Uganda, South Sudan, and Mauritius have adopted low-sulphur petrol however, policies on the sulphur content in petrol are underregulated when compared to the regulations governing sulphur content in Diesel. Varying fuel pricing mechanisms, with Uganda using market-based pricing and Kenya and Tanzania applying cost-plus models, lead to arbitrage risks and supply chain inefficiencies. Public procurement inconsistencies, such as Kenya's government to government petroleum procurement versus Uganda and Tanzania's open tendering procedures, can create trade inefficiencies, making it challenging for suppliers and investors to navigate different regulatory landscapes. Additionally, while the East African Community is working toward harmonised Euro 4 vehicle emission standards, regulatory gaps persist across the region. Addressing these disparities through coordinated policies would enhance trade efficiency, attract investment, and establish deeper regional economic integration.

Investment

Eastern Africa's oil and gas sector holds significant potential but faces challenges in attracting sustained investment. Historical investment trends reveal fluctuating participation, with notable peaks in 2007 and 2014, and notable dips in 2010, 2015 and 2016 followed by a steady decline from 2017 to 2023. Barriers to investment include political instability, regulatory uncertainty, infrastructure gaps, and environmental concerns, which discourage both domestic and international investors. However, the region's untapped oil and gas reserves, present opportunities for future growth, particularly with infrastructure development like pipelines and refineries.

To overcome these challenges, Eastern Africa must implement policies that align with international best practices, offer clear incentives, and reduce risk associated with political instability. Developing regional infrastructure frameworks and leveraging sovereign wealth funds can attract both domestic and international capital. Additionally emphasising low carbon energy technologies like carbon capture and storage can appeal to environmentally conscious investors, positioning the region as a leader in sustainable energy development.

Funding / Financing Opportunities

Eastern Africa's oil and gas sector requires innovative financing strategies to attract investment amid global decarbonisation shifts. Historical financing mechanisms such as grants and subsidies government financing, sovereign wealth fund, development finance, project finance, and public-private partnerships remain essential. Institutions like the African Development Bank and Islamic Development Bank play a key role in de-risking projects and attracting private capital. Regional coordination through bodies like the East African Community can further enhance project bankability and energy security.

Case studies demonstrate the success of tailored financing models, such as EACOP, which combined project finance, development finance, blended finance, and public-private partnerships, and Zimbabwe's Cabora Bassa gas project, which leveraged sovereign wealth funds and capital markets. However, Kenya's LAPSET corridor, highlights the need for stable regulatory environment and adaptable financial strategies to drive sustainable development.

Decarbonisation Technologies

Eastern Africa must integrate advanced decarbonisation technologies to develop its oil and gas markets while aligning with global climate goals. Innovation such as carbon capture, utilisation and storage, methane emissions reduction, hydrogen and low emission electricity integration, and biofuels and fuel blending will allow the region to responsibly use its fossil fuel resources while minimising environmental impacts. These technologies also support equitable economic development, addressing energy poverty and promoting industrial growth in rapidly expanding economies.

Key technologies include methane emissions reduction through advance detection systems like Gas Mapping Leak Detection and Repair and satellite detection, as well as carbon capture innovations like titanium-based direct air capture materials which offer efficient carbon dioxide sequestration. Carbon storage methods such as geological storage, enhanced oil recovery, and mineralisation also provide critical pathways for long-term emissions management. Additionally, carbon utilisation technologies are being explored, turning carbon dioxide into valuable products like e-methanol and e-kerosene, despite economic challenges.

To complement these efforts, Eastern Africa can benefit from integrating low-emission electricity sources and electrification technologies across its oil and gas infrastructure. Using renewable energy for upstream operations and electrifying compression systems and refinery processes will significantly reduce emissions. Hydrogen integration in pipeline operations can further enhance decarbonisation by transporting cleaner energy, thus helping the region move towards a more sustainable and responsible energy future while continuing to meet its growing energy needs.

Finally, Biofuels and fuel blending present a strategic opportunity to support decarbonisation while enhancing regional energy security.

Demand Outlook

The 2023 consumption of oil and gas, in Eastern Africa, were estimated at 0.5 million barrels per day and 0.2 billion standard cubic feet per day respectively. However, this demand is expected to evolve based on projections from various energy outlooks. OPEC forecasts growth driven by population and urbanisation, while ExxonMobil highlights the region's effort to meet modern energy needs amidst rapid population growth. The IEA projects a slower growth trajectory due to climate policies and renewable energy integration, whereas BP's scenarios contrast between ongoing trends and aggressive decarbonisation efforts, offering a wide range of potential outcomes for the region's energy future.

Crude Oil and Petroleum Product

Oil demand in Eastern Africa is expected to follow broader African trends driven by population growth, urbanisation, and industrial development. Key projections from OPEC and ExxonMobil highlight significant demand growth, particularly in sectors like transportation, petrochemicals, and aviation. Despite growing renewable energy adoption, oil will remain essential to meeting immediate energy needs, particularly in sectors where viable alternatives are not yet available. OPEC anticipate the highest demand growth, while Exxon Mobil's baseline scenario aligns with projected increases in energy consumption as Africa's economies expand.

While BP's Net Zero scenario predicts a decline in demand due to decarbonisation efforts, ExxonMobil's baseline scenario is considered the most suitable for Eastern Africa. It forecasts the region's oil demand to grow from 0.47 million barrels per day in 2023 to approximately 0.85 million barrels per day in 2050. This outlook reflects the region's strong population and GDP growth, which will continue to drive energy needs, even as the transition to renewable energy progresses at a slower pace than in more developed markets.

Natural Gas

Natural gas demand in Africa is expected to grow significantly, driven by factors like population growth, urbanisation, and rising energy needs. As a cleaner alternative to coal and oil, natural gas is poised to play a key role in Africa's energy transition, supporting industrialisation, power generation, and addressing energy access challenges. Outlooks from GECF, OPEC, and ExxonMobil highlight the need for infrastructure investments, including pipelines and LNG facilities, to meet this growing demand. While GECF projects the most optimistic growth, challenges such as financial constraints and decarbonisation pressures could limit this trajectory.

ExxonMobil provides the most balanced and optimistic outlook for natural gas in Eastern Africa, projects steady growth due to its essential role in economic development and energy security. While BP anticipates a quicker shift away for gas due to policy and decarbonisation trend, ExxonMobil views natural gas as a long-term energy source, critical to the continent's growth well beyond 2050. This outlook suggests that natural gas will remain a cornerstone of Africa's energy mix, particularly in regions with limited access to cleaner energy alternatives.

Oil and Gas Supply Outlook

Eastern Africa's oil and gas supply outlook highlights current gaps in crude oil, refined petroleum products, liquefied petroleum gas, and natural gas. Planned and under-construction midstream infrastructure enhances supply chain efficiency, reduces import dependency, and supports sustainable regional development in Eastern Africa.

Crude Oil, Refined Petroleum Product, and LPG

The Eastern Africa region faces significant energy gaps across crude oil, refined petroleum products, and liquefied petroleum gas.

South Sudan and Sudan are the primary crude oil producers, maintaining surpluses that position them as key exporters in the region. However, several countries like Somalia, Madagascar, Uganda, and Ethiopia have substantial contingent resources that require infrastructure investment for development. While South Sudan and Sudan contribute to regional crude oil exports and refining, there is a clear need for further production capacity expansion to fully capitalise on the region's oil potential.

The refined petroleum products and liquefied petroleum gas sectors exhibit similar imbalances, with most countries relying heavily on imports.

Only two of the Eastern African countries, namely Sudan and South Sudan produce refined petroleum products. The region is therefore heavily reliant on imports to meet their consumption needs, however despite the imports of refined petroleum product, most of the countries in the region face refined petroleum product deficits. These deficits can be managed through the increase of refined petroleum product by refurbishing or upgrading refineries and establishing new refineries in the region. On the other hand, some countries namely Burundi, Djibouti, Mauritius, South Sudan, and Uganda manage to not only meet their consumption requirements through imports but establish a surplus of refined petroleum product. This surplus can be strategically managed through increasing storage capacity and enhancing trade through exporting refined petroleum product to neighbouring countries which face a deficit. Similarly, Rwanda and Somalia have effectively met their consumption requirements through imports, resulting in neither a deficit nor surplus of refined petroleum products.

Only one of the Eastern African countries, namely Sudan, produces liquefied petroleum gas, and parts of the region continues to face deficits in liquefied petroleum gas despite import efforts. Some countries, including Djibouti, Rwanda, South Sudan, Uganda, Somalia, Comoros, Seychelles, and Mauritius, manage their gaps effectively resulting in neither a deficit nor surplus in liquefied petroleum gas, while others, like Eritrea, Ethiopia, Kenya, and Madagascar, continue facing challenges. Strategic solutions to these deficits in liquefied petroleum gas include increasing local production and imports of liquefied petroleum gas.

The Eastern Africa region is undergoing significant developments in midstream infrastructure, focusing on pipelines, refineries, and ports / terminals, which are key to addressing energy challenges and promoting energy integration. With seven (7) operational inter- and intra-country pipelines, and several pipeline projects either planned or under construction, the region is poised to enhance its energy connectivity, reduce dependency on imports, and promote intra-regional trade. The Eastern Africa region has fifteen (15) refineries with a total capacity of 1170 thousand barrels per day. Only three (3) of these refineries are operational, with a refining capacity of 125 thousand barrels per day, while five (5) are non-operational or decommissioned and seven (7) are in planning or construction. Expanding refining capacity is critical for energy security, reducing reliance on costly imports, stabilising fuel prices, and driving economic growth through job creation and industrial development.

Port and terminal upgrades are essential to complement the growing pipeline and refining infrastructure, enhancing operational efficiency and boosting trade competitiveness. With increased capacity for exporting crude oil and refined petroleum products, particularly through key hubs like those situated in Kenya, Djibouti, and Tanzania, Eastern Africa can enhance regional energy security. The development of new ports and improvement to existing ones will support both regional energy access and global market connectivity. These infrastructure initiatives not only improve energy security but also create significant economic opportunities, promoting industrialisation, boosting job creation, and attracting foreign investment in key sectors like manufacturing and logistics.

Natural Gas

The Eastern Africa region possesses significant natural gas resources, with Rwanda and Tanzania currently producing enough to meet domestic needs but lacking mature export infrastructure. Untapped reserves in Ethiopia, Madagascar, Somalia, South Sudan, and Uganda present opportunities for increased production, however, the absence of regional natural gas trade results in underutilised surplus. Addressing this gap requires investment in upstream and midstream infrastructure, including pipelines, processing facilities, and liquefied natural gas terminals, to facilitate intra-regional trade and potential exports. Strategic development in these areas could enhance energy security, promote industrial growth, and position Eastern Africa as a key player in the global energy market.

Midstream infrastructure is evolving, with three (3) operational pipelines in Tanzania and four (4) planned or under construction pipelines spanning 3051 kilometres to enhance connectivity and equitable distribution. The region also has four (4) operational natural gas processing facilities and one (1) operational liquefied natural gas terminals, complemented by planned and under construction projects, which, if developed, can address regional production gaps and position Eastern Africa as a competitive liquefied natural gas exporter. Investments in infrastructure, including pipelines, processing facilities, and liquefied natural gas terminals, align with global energy transition goals and could attract international financing, promoting industrialisation, energy security, and economic resilience.

Short-, Medium-, and Long-Term Development Roadmap

The Eastern Africa region has vast underutilised reserves of crude oil and natural gas, presenting an opportunity to address growing energy demands and enhance energy security. Roadmaps for the development of the region's crude oil, refined petroleum products, and natural gas sectors were developed alongside strategic recommendations for liquefied petroleum gas development and key enablers for successful roadmap implementation.

Crude Oil and Refined Petroleum Products

The proposed strategic vision for the region is to transition from reliance on imported refined petroleum products to achieving energy independence by strategically increasing crude oil production, refining capacity, and regional collaboration. Currently utilised, underutilised, and planned refineries offer the region sufficient refining capacity to not only achieve self-sufficiency, but to become positioned as a net exporter of refined petroleum products. The roadmaps for crude oil and refined petroleum products lay the path for achieving this ambitious target.

In the short-term, exploration efforts will be focused on South Sudan to discover untapped reserves, while Ethiopia, Madagascar, Somalia, and Uganda are to conduct appraisal drilling to prove contingent resources. The medium-term will involve further exploration and the proving of at least 1.5% of the contingent resources, followed by expanded regional exploration to secure long-term energy independence. In the long-term, further development of proven reserves will be crucial (a minimum of a further 3%), with a focus on increasing production from emerging producers such as Ethiopia, Madagascar, Somalia, and/or Uganda. The region's crude oil production will need to expand significantly to meet increasing refining requirements, which will rise from 96.5 thousand barrels per day in the short-term to 1170 thousand barrels per day in the long-term. Key initiatives include bringing Uganda's proven reserves online, implementing enhanced recovery methods in South Sudan and Sudan, and ramping up production from underdeveloped reserves in Ethiopia, Kenya, Somalia, and Uganda. Simultaneously, exploration will continue across frontier basins to secure new reserves and ensure long-term sustainability of the region's energy sector.

For refined petroleum products, the region will focus on bringing underutilised refining capacity online and completing planned refineries. In the short-term, the priority will be to bring 30% of underutilised refining capacity online, while in the medium- and long-term, the goal is to bring the remaining 70% of underutilised refining capacity online and complete the construction of additional planned refineries. This expansion will allow the region to gradually reduce reliance on imported refined petroleum products, with self-sufficiency projected by the long-term, positioning the region as a potential net exporter of refined petroleum products. The region will need to increase imports of refined petroleum products in the short-term to meet rising demand, but by the medium-term, increasing domestic refining will displace a significant portion of imports. By the long-term, regional refined petroleum product production capacity, which is planned to be 1170 thousand barrels per day, will exceed expected long-term demand of 992.1 thousand barrels per day, achieving self-sufficiency and enabling the region to become a net exporter.

Natural Gas

The strategic roadmap for the natural gas market follows two scenarios: scenario 1 focuses on meeting projected demand based on Rwanda and Tanzania's production capabilities, while scenario 2 emphasises increasing utilisation through gas monetisation strategies. Key milestones across the short-, medium-, and long-term timeframes are derived from the natural gas demand and the influence of the reserves, production, imports, and exports.

Under scenario 1, to meet the growing demand, Rwanda and Tanzania will need to progressively increase production by 26.3 billion cubic feet per year in the short-term, 27.7 billion cubic feet per year in the medium-term, and 20.5 billion cubic feet per year in the long-term. This furthermore forms the basis for minimum production requirements under scenario 2. Under scenario 2 the goal is for Ethiopia, Madagascar, South Sudan, Somalia, and Uganda to explore natural gas monetisation and production opportunities, and for the region to expand on current processing,

liquefaction, and distribution infrastructure. The medium-term builds on the progress made in the short-term with regards to initiated production, revised master plans and the implementation of infrastructure to support gas monetisation. By the long-term, the intent is for production to be increased to meet demand, master plans to be revised, and infrastructure to be implemented for the support of gas monetisation where goals have not been achieved in the medium-term.

Strategic Recommendations for Liquefied Petroleum Gas Development

To support the development of the liquefied petroleum gas market in Eastern Africa, a comprehensive study should be conducted at a country level to identify key market players and improve transparency, while regulatory frameworks for storage, distribution, pricing, and safety must be prioritised. Standardised cylinder exchange procedures and regional cohesion will address service disparities, and safety education initiatives should promote proper handling and storage to boost consumer confidence and safe use and encourage a shift from traditional biomass fuels to liquefied petroleum gas across households, businesses, and industries.

Key Enablers for Roadmap Success

The success of developing a self-sufficient regional oil and gas market in Eastern Africa hinges on key enablers, primarily enabling trade and attracting investment. These key enablers are driven by various factors namely market transparency, infrastructure development, carbon emission reduction, regulatory framework optimisation, and regional security.

Market transparency, driven by the identification of supply and demand nodes, will lay the foundation for a more interconnected and efficient market. Infrastructure development, particularly pipeline and distribution networks, along with storage infrastructure, is essential to optimise logistics, minimise costs, and improve regional trade connectivity. Commitment to carbon emission reduction is crucial as Eastern Africa expands its oil and gas industry, offering a unique opportunity to adopt decarbonisation technologies and sustainable practices from the outset. This proactive approach could establish the region as a leader in decarbonisation efforts while balancing development with environmental responsibility. Optimising regulatory frameworks is vital for attracting cross-border investments and promoting regional cooperation. Harmonising investment codes, special economic zone regulations, and public-private partnership frameworks would enhance the ease of doing business and drive large-scale infrastructure development. Finally, ensuring the security of regional energy infrastructure through strengthened cooperation and clear legal frameworks will also be critical to sustaining trade and investment in the sector.



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Abbreviations

ACCES	African Clean Cooking Energy Solutions
ADGSM	Australian Domestic Gas Security Mechanism
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
AFREC	Africa Energy Commission
AGOA	African Growth and Opportunity Act
APS	Announced Pledges Scenario
AU	African Union
Bbbls	Billion barrels
BCG	Boston Consulting Group
Bcf	Billion cubic feet
BOT	Build-Operate Transfer
BP	British Petroleum
Bscf/d	Billion standard cubic feet per day
CAPEX	Capital Expenditure
CBDR-RC	Common but differentiated responsibilities and respective capabilities
CCGT	Combined Cycle Gas Turbines
CCSU	Carbon Capture, Storage, and Utilisation
CEN-SAD	Community of Sahel-Saharan States
CET	Common External Tariff
CEWARN	Conflict Early Warning and Response Mechanism
CHP	Combined Heat and Power
CNG	Compressed Natural Gas
CO ₂	Carbon Dioxide
COMESA	Common Market for Eastern and Southern Africa
DAC	Direct Air Capturing
DAP	Diammonium Phosphate
DFI	Development Finance Institute
E&P	Exploration and Production
EAC	East African Community
EACOP	East African Crude Oil Pipeline

EBA	Everything But Arms
ECCAS	Economic Community of Central African States
EIA	Environmental Impact Assessment
EOR	Enhanced Oil Recovery
E&P	Exploration and Production
EPSE	Ethiopian Petroleum Supply Enterprise
EREA	Energy Regulators Association of East Africa
ESG	Environmental, Social, and Governance
ESIA	Environmental and Social Impact Assessment
EU	European Union
EV	Electric Vehicle
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GECF	Gas Exporting Countries Forum
GHG	Greenhouse Gas
GML	Gas Mapping LiDAR
GSP	Generalised System of Preferences
G-to-G	Government to Government
GTL	Gas-to-Liquids
HDTL	Horizon Djibouti Terminals Limited
HFO	Heavy Fuel Oil
HGA	Host Government Agreement
IEA	International Energy Agency
IECs	International Energy Companies
IGA	Inter-Governmental Agreement
IGAD	Intergovernmental Authority on Development
IOC	Indian Ocean Commission / International Oil Company
IsDB	Islamic Development Bank
kbpd	Thousand barrels per day
kg	Kilogram
Ksh	Kenyan Shilling
kWh	Kilowatt-hour

LAPSSET	Lamu Port-South Sudan-Ethiopia Transport Corridor
LDAR	Leak Detection and Repair
LDV	Light-duty vehicles
LNG	Liquefied Natural Gas
LoS	Letters of Support
LPG	Liquefied Petroleum Gas
MMbbl	Million barrels
MMbbl/d	Million barrels per day
MoU	Memorandum of Understanding
MW	Megawatt
NDC	Nationally Determined Contribution
NERB	National Energy Regulation Board
NH ₃	Ammonia
OECD	Organisation for Economic Co-operation and Development
OFID	OPEC Fund for International Development
OGCI	Oil and Gas Climate Initiative
OGI	Optical Gas Imaging
OPEC	Organisation of the Petroleum Exporting Countries
OPEX	Operating Expenditure
OSBP	One-Stop Border Post
PAU	Petroleum Authority of Uganda
PCFV	Partnership of Clean Fuels and Vehicles
PCOA	Put-and-Call Option Agreement
PESTEL	Political, Economic, Social, Technological, Environmental, and Legal
ppm	Parts per million
PPP	Public-Private Partnership
REC	Regional Economic Community
RTA	Regional Trade Agreement
SADC	Southern Africa Development Community
SDG 7	Sustainable Development Goal 7
SEP	Société d'Entreposage Pétrolier
SEZ	Special Economic Zones

SIHD	Société Internationale des Hydrocarbures de Djibouti
SMR	Steam Methane Reforming
SOPEBU	Société Pétrolière du Burundi
STC	State Trading Corporation
SWF	Sovereign Wealth Fund
SWOT	Strengths, Weaknesses, Opportunities, Threats
t	Tonne
tcf	Trillion cubic feet
TOR	Terms of Reference
tpd	Tonnes per day
TPDC	Tanzania Petroleum Development Corporation
UAE	United Arab Emirates
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USA	United States of America
USP	Unsolicited Proposals
VAT	Value Added Tax
VFEX	Victoria Falls Stock Exchange
WTO	World Trade Organisation
ZDR	Zimbabwe Depository Receipts

Definitions

Reserves	Discovered, recoverable, commercial, and available for extraction.
Contingent resources	Estimated, but not yet commercially recoverable.
Utilised refining capacity	Portion of a refinery contributing to the active production of refined petroleum product.
Underutilised refining capacity	Portion of a refinery available for utilisation but not currently contributing to the production of refined petroleum product.
Planned refining capacity	Refineries which are not yet available for the production of refined petroleum product.
Refining capacity and refined petroleum production relation	1 kbpd of refining capacity = 0.75 kbpd of refined petroleum production.
Net Exporter	Export values exceed import values in the region / country.
Net Importer	Import values exceed export values in the region / country.
Crude Oil	A naturally occurring liquid fossil fuel, found in underground reservoirs, used as raw material for fuels and petrochemicals.
Refined petroleum product	Fuel or chemical, consisting of hydrocarbons, derived from crude oil that has been processed and transformed in a refinery.
Natural Gas	A naturally occurring gaseous hydrocarbon consisting mainly of methane.
Crude oil consumption	Crude oil used for industrial purposes or processed to refined petroleum product.
Refined petroleum production	The process in which crude oil is refined into a commercially usable product, through the use of refineries.



1

INTRODUCTION



Eastern Africa is endowed with considerable oil and gas reserves and undeveloped resources that can contribute to the region's economic growth if they are strategically developed. There is a need to clarify Eastern Africa's position and develop strategies for future supply adequacy, considering current uncertainties about energy supply, the key drivers of future demand, policies of focus countries (especially alternatives to oil and gas), and expected future economic growth and technological developments.

Of the fifteen (15) Eastern African focus countries, thirteen (13) have ratified the Paris Climate Accords, pledging to achieve net zero emissions by mid-century. It will be unavoidable that Eastern Africa adapts to this new world, but equitable policies, markets, and investments are needed to avoid a growing divide between the developed and the developing worlds.

Figure 1 illustrates the Eastern African carbon emissions per capita, with thirteen (13) of the Eastern African countries emitting less than 1.125 tonne ("t") of carbon per capita, one (1) country emitting between 2.25 and 3.375 t of carbon per capita, and one (1) country emitting between 3.375 and 4.5 t of carbon per capita (Ritchie & Roser, 2024). This highlights the overall low carbon emissions per capita in the Eastern Africa region, when compared to the global average of 4.7 tonne of carbon emissions per capita (Our World in Data, 2023).

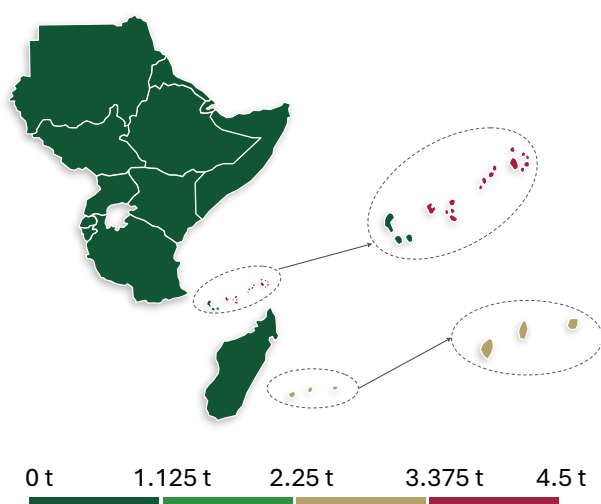


Figure 1: Eastern Africa carbon emissions per capita

In contrast to the major emitting economies (China, United States, India, EU27, Russia, and Japan) which contribute a total of 67% to the global emissions, the Eastern Africa region, contributes only 0.253%, as presented in Figure 2 (Global Carbon Projects, 2023). The Eastern African fossil fuel carbon emissions are much lower than the global average primarily due to lower industrialisation and energy consumption, with economies largely based on agriculture and limited fossil fuel use. Additionally, slower development of carbon-intensive infrastructure contributes to the region's relatively small carbon footprint. Eastern Africa faces unique challenges when global climate legislations are implemented in a uniform or punitive manner. These measures often assume a level playing field across countries, focusing on reducing emissions without fully accounting for existing disparities in carbon emissions and developmental needs.

However, one of the key principles of the United National Framework Convention on Climate Change ("UNFCCC") is the concept of "Common but Differentiated Responsibilities and Respective Capabilities" ("CBDR-RC"), which acknowledges that while all countries share a common responsibility to address climate change, the extent of their obligations should be differentiated based on their historical contributions to emissions, capabilities, and developmental needs.

The Eastern Africa region stands at a critical juncture in its energy development journey, with abundant opportunities to harness its crude oil and natural gas resources for sustainable growth. The region's historically low contribution to global carbon emissions creates a unique opening for a just energy transition that prioritises the development of its oil and gas industry. Unlike more industrialised regions, Eastern Africa can responsibly focus on maximising the economic and social benefits of its valuable resources without significantly increasing global emissions. This approach allows the region to align its development goal with its current low-carbon footprint providing a pathway to economic growth while maintaining global environmental commitments.

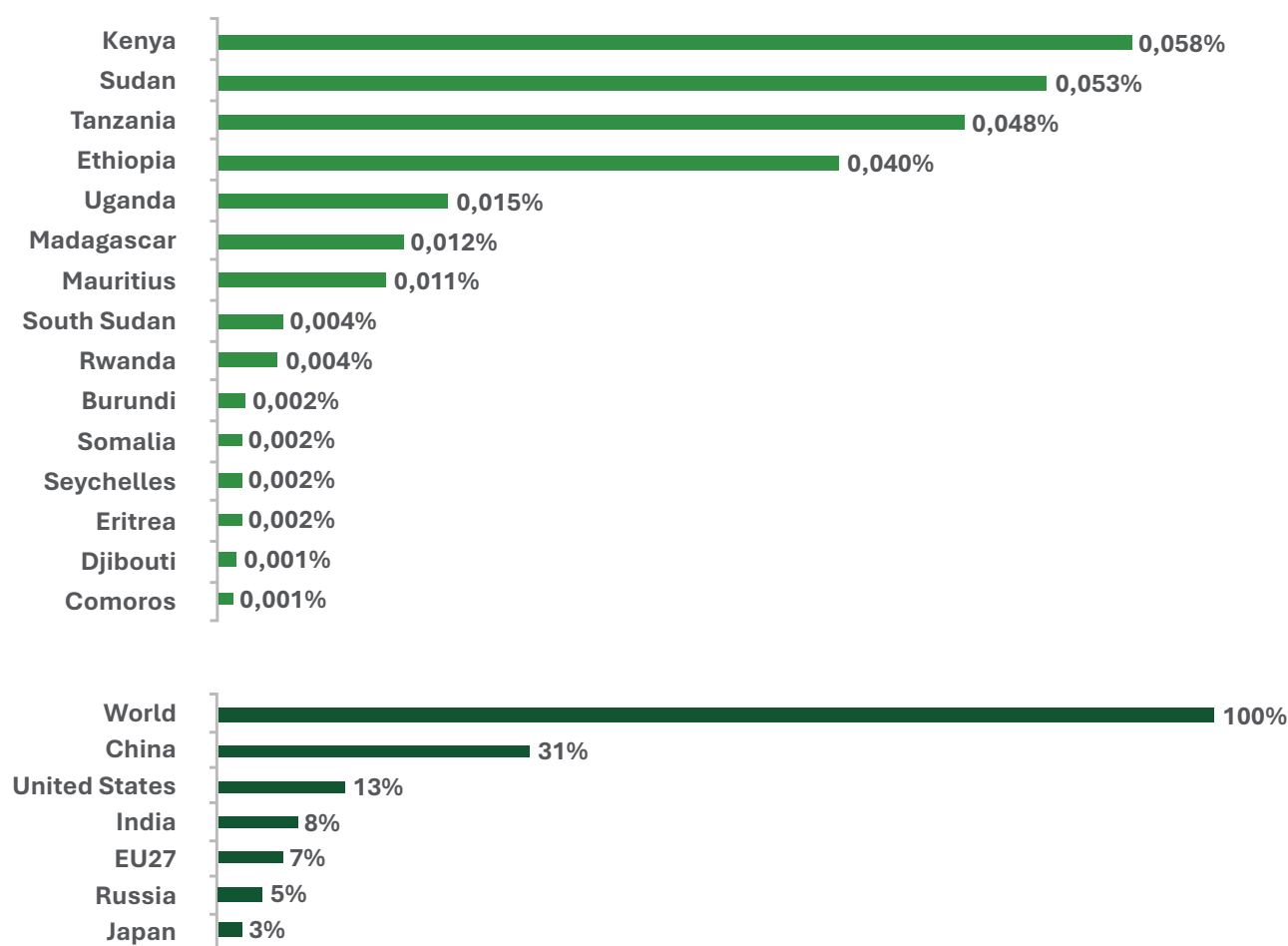


Figure 2: Contributions to global fossil fuel carbon emissions

The low emissions profile for the Eastern Africa region provides the region with the flexibility to pursue oil and gas market development as a cornerstone of its energy strategy, while remaining aligned with the just energy transition. This focus on crude oil, refined petroleum products, Liquefied Petroleum Gas (“LPG”), and natural gas enables the region to unlock the full value of its resources, addressing domestic consumption needs and promoting industrialisation, while presenting the opportunity for the region to become a global energy commodity export hub. Developing these resources is not only economically advantageous, but also a step toward reducing reliance on imported energy, which has historically left many countries vulnerable to global market fluctuations. By capitalising on its natural resources, the Eastern Africa region can build a resilient and self-sufficient energy sector that supports regional economic stability.

A significant opportunity lies in furthering intra-regional expansion and interconnectivity. The disparity in resource distribution across Eastern Africa presents a compelling case for collaboration among Member States. Resource-rich nations like Ethiopia, Kenya, Madagascar, Rwanda, Somalia, South Sudan, Sudan, Tanzania and Uganda, which possess significant crude oil and/or natural gas reserves, can supply neighbouring countries that lack these resources. Investments in regional infrastructure, such as pipelines, refineries, and processing facilities, can facilitate equitable distribution of energy products, creating a more integrated regional energy market. This interconnectedness would reduce the region’s dependence on global markets to meet consumption requirements, promoting economic independence and energy security.

Developing a regional energy network would also create efficiencies and economies of scale. Shared infrastructure can optimise

costs and reduce redundancy, making energy more affordable for businesses and consumers. Moreover, an interconnected market would allow countries to leverage their comparative advantages, such as proximity to reserves, refining capacities, or export terminals, supporting economic interdependence and promoting regional integration. Enhanced intra-regional trade in energy products would not only stabilise supply chains but also strengthen economic ties among countries in the Eastern Africa region.

The intra-regional expansion and connectivity among the Member States within the Eastern Africa region are facilitated through the established Regional Economic Communities (“RECs”). These RECs play a pivotal role in the development of a unified regional oil and gas market by promoting harmonised policies, cross-border infrastructure, and co-ordinated investment strategies. The RECs to which the Eastern African countries belong to is further discussed in Section 3.3.2 below.

1.1 STUDY OBJECTIVES

This study builds upon a 2022 analysis that examined selected countries from all five (5) African regions, covering a total of seventeen (17) countries. While that research provided valuable insights, it highlighted the need for a more complete analysis covering all countries within each of the African regions. This study addresses that gap by analysing each country within every region in greater detail, offering specific, actionable recommendations tailored to the unique challenges and opportunities of their oil and gas markets. The goal of this endeavour is to support regional self-sufficiency, enhance intra-African trade, and promote sustainable market development.

The study aims to assist stakeholders from the African Union (“AU”) Member States, regional institutions and sub-regional institutions with developing strategies, policies, and regulations, as well as a framework and action plan to achieve the following:

- Establishment of a clear view per Eastern African country with regards to oil and gas reserves, production, consumption, and export;

- Establishment of a clear view per Eastern African country of oil and gas infrastructure available, potential gaps, and needed investment to improve trade between countries in the region;
- Identification of the potential incremental production from upsides or contingent resources of oil and gas per Eastern African country and the investment needed;
- Identification of trading potential between countries within Eastern Africa with regards to oil and gas;
- Recommendations of strategies, policies, and regulatory frameworks for accelerating trade and collaboration between the Eastern African countries;
- Recommendations of strategies, policies, and regulatory frameworks for more self-sufficiency of the Eastern Africa region, and less dependency on global oil and gas markets; and
- Proposal of action plans and realistic timelines for developing the Eastern African domestic market for oil and gas in a short-, medium-, and long-term basis.

1.2 PURPOSE OF THIS REPORT

This report aims to deliver a concise analysis of the oil and gas sector in the Eastern Africa region. It focuses on proven reserves, production trends, and future forecasts, while also evaluating current infrastructure including pipelines, refineries, and petrochemical opportunities. Additionally, the study will assess the region’s demand and supply dynamics, as well as the legal and regulatory frameworks, to identify factors that may facilitate or impede the effective utilisation of oil and gas resources in the region.

This report further takes guidance from the findings of the Political, Economic, Social, Technological, Environmental, and Legal (“PESTEL”) and Strengths, Weaknesses, Opportunities, and Threats (“SWOT”) analysis, as presented in Appendix B. This allows for the analysis of the oil and gas industry in Eastern Africa to be developed and discussed based on the current standing within the Eastern Africa region.

2

APPROACH AND METHODOLOGY

2.1 FOCUS COUNTRIES

African nations have been divided into five (5) geographic regions, namely Northern, Eastern, Southern, Western, and Central Africa, which together constitute all fifty-five (55) countries of the continent. This study's scope focuses on an assessment of the Eastern African countries, namely Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania, and Uganda.

2.2 DATA COLLECTION

This study is based on publicly available data, as well as data provided by the Member States for the year 2023. The data presented in the report ranges from 2021 to 2023 based on the availability of data. This time frame forms the current view for the proven reserves, production, consumption, imports and exports

being used for the basis of this analysis. It is acknowledged that there may be updated information on infrastructure developments and product-specific data beyond 2023; however, to maintain consistency and comparability throughout the report, only data up to and including 2023 has been considered. These commodity metrics have been graphically illustrated, per country, in Appendix A, and provided as a breakdown of data in Appendix C.

2.3 DEMAND SCENARIOS

In accordance with the Terms of Reference ("TOR"), demand modelling was not included in the scope of this project. For an understanding of the future demand for crude oil, refined petroleum product, and natural gas in Eastern Africa, the project team consulted and utilised energy outlook scenarios from reputable sources as tabulated in Table 1 below:

Table 1: Energy Outlooks Utilised

Organisation	Energy Outlook	Edition	Considered for Oil Outlook	Considered for Gas Outlook
Organisation of the Petroleum Exporting Countries ("OPEC")	World Oil Outlook 2050	2024	✓	
Gas Exporting Countries Forum (GECF)	Global Gas Model	2024		✓
ExxonMobil	Global Outlook Our View to 2050	2024	✓	✓
International Energy Agency ("IEA")	World Energy Outlook	2024	✓	✓
British Petroleum ("BP")	Energy Outlook	2024	✓	✓

2.4 TIME PERIODS

The short-term period of interest for this study is the period between 2025 and 2030, the medium-term period is from 2031 to 2040, and the long-term period is from 2041 to 2050.

2.5 PROJECT LIMITATIONS

The scope of this study defines certain limitations on the depth and breadth of the analysis conducted:

- LPG was not within the scope of this study; however, given its significance to the region, selected aspects and insights on the development of an LPG market have been included to the benefit of the Member

States. Nonetheless, the primary focus of the study remains crude oil, refined petroleum products, and natural gas.

- The regional projection of future energy demand discussed in this report, relies on the top-down analysis of projections from reputable and widely recognised energy outlooks published by reputable organisations such as OPEC, GECF, BP, ExxonMobil, and IEA. These projections assume an equal alignment of each individual country to the energy outlooks developed from the continent, however the energy systems and macroeconomic profiles of each country in the region may be highly heterogeneous requiring an in-depth analysis and tailored bottom-up development of economic and energy models which falls beyond the scope and timeline of this project.
- This study is strategic in nature and does not offer the level of detail necessary for precise infrastructure sizing such as the throughput capacity of pipelines. Such a detailed analysis should be pursued in a subsequent project and/or study.
- This study excludes an in-depth analysis of storage facilities from the midstream infrastructure analysis due to insufficient reliable and correlated data on storage volumes. As storage capacity is critical for oil and gas situational analysis, this omission of an in-depth study is a key limitation of the report.





3

EASTERN AFRICA'S OIL AND GAS LANDSCAPE

The oil and gas industry is structured into three (3) interconnected sectors: upstream, midstream and downstream, as shown in Figure 3. Each sector plays a critical role in the lifecycle of energy products from exploration

and extraction to refining, distribution, and retail. Together these sectors form an integrated value chain that empowers economies and meets domestic and regional energy needs.

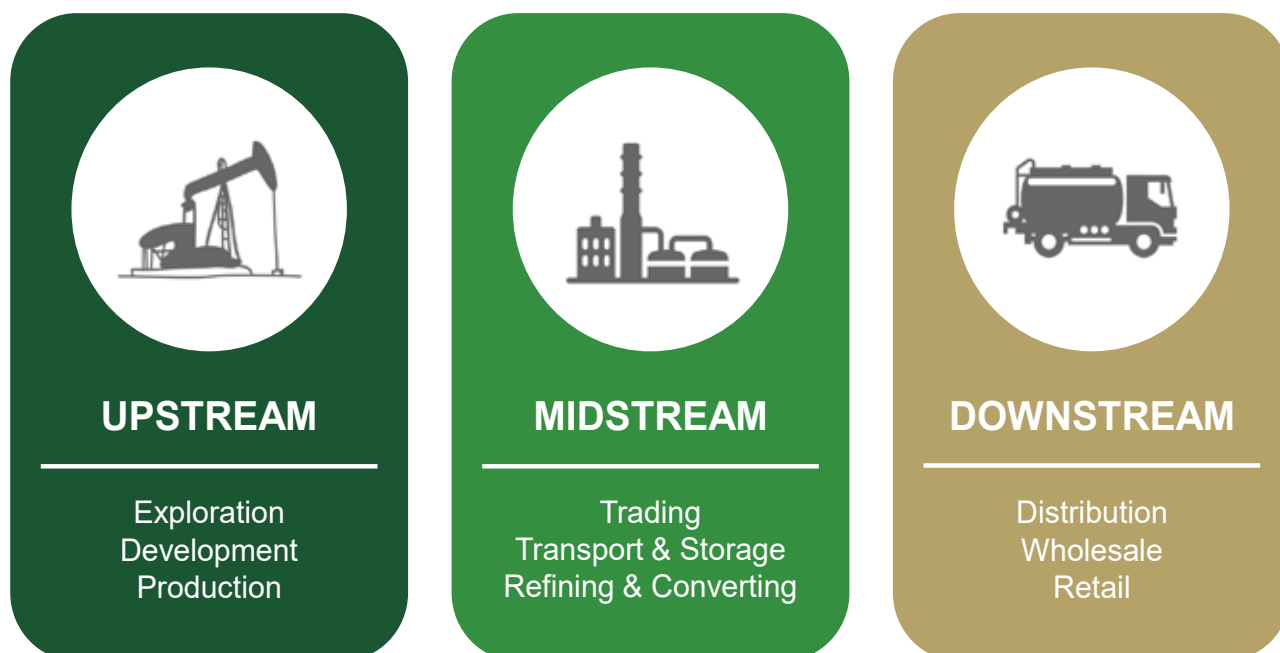


Figure 3: Value chain breakdown

Upstream Sector

The upstream sector, often referred to as the Exploration and Production (“E&P”) phase, encompasses activities related to locating and extracting natural resources such as crude oil and natural gas. For natural gas, the focus lies in identifying gas fields and ensuring their viability for commercial production. Similarly, crude oil exploration aims at tapping into reservoirs with optimal extraction methods for oil recovery.

Once resources are discovered, production begins, involving the extraction, separation, and initial processing of crude oil and natural gas. The upstream sector serves as the foundational stage of the value chain, providing raw materials required for the midstream and downstream operations.

Midstream Sector

The midstream sector bridges the gap between up- and downstream activities. For natural gas, this includes pipeline transporta-

tion, compression, and processing to remove impurities such as water, sulphur, and carbon dioxide. The processed gas may also undergo liquefaction to produce LNG or compression to produce Compressed Natural Gas for easier storage and transport.

In the case of crude oil, midstream operations involve transportation via pipelines, tankers, or rail systems to refineries, where it undergoes further processing. Refined petroleum products, including but not limited to gasoline, diesel, and jet fuel, also rely heavily on midstream infrastructure for refining and distribution to downstream markets. Refined petroleum products are produced through refining processes that include distillation, cracking, and blending. Refineries also play a key role in producing LPG by separating propane and butane during the refining of crude oil and natural gas. LPG is transported in pressurised tanks or pipelines, ensuring safe delivery to both industrial and residential consumers. Efficient midstream operations are critical for main-

taining the supply chain continuity and reducing bottlenecks.

Downstream Sector

The downstream sector focuses on distributing energy products to end-users through wholesale and retail channels. For refined petroleum products, distribution involves transporting products from refineries to storage terminals, wholesale buyers, and retail outlets using pipelines, tankers, and railways.

For LPG, distribution networks deliver the product to depots and retailers, with wholesale targeting industrial users and retail serving residential customers through gas cylinders and retail points. Similarly, natural gas is distributed via pipelines or as LNG to homes, businesses, and industries, with wholesale focusing on large energy consumers like power plants and retail meeting residential needs. Efficient distribution, wholesale and retail operations ensure energy products are accessible, reliable and available to support diverse market demands.

3.1 CRUDE OIL AND REFINED PETROLEUM PRODUCTS

This section provides an overview of the upstream, midstream, and downstream sectors of the crude oil and refined petroleum product industry in the Eastern Africa region. Each segment plays a crucial role in the overall value chain.

3.1.1 Upstream Sector

Globally there are 1 570 billion barrels (“Bbbls”) of proven reserves of crude oil (Statista, 2023), while Africa has a total of 125 Bbbls of proven crude oil reserves (Statista, 2021). Four (4) of the Eastern African countries have proven crude oil reserves, with a combined total of 4.7 Bbbls, making up 0.3% of the global reserves and 4% of the African reserves.

Eastern Africa is therefore endowed with crude oil reserves, presenting significant

potential for economic growth and development. However, crude oil in its raw form has limited practical application and economic value necessitating its conversion into refined petroleum products, which are essential for daily life and industrial activities. This highlights the critical need for robust refining capacity and value-addition to maximise the economic benefits of the continent’s resources.

The total global production of crude oil is 96 400 thousand barrels per day (“kbpd”) (Statista, 2023), while the total African production of crude oil is 7 200 kbpd (Statista, 2023). Two (2) Eastern African countries produce crude oil, namely South Sudan and Sudan. Crude oil production in these countries makes up 0.2% of the global production and 3% of the African production, with a total regional production of 189 kbpd. The regional proven crude oil reserves and production for the focus countries are shown in Figure 4.

Despite the crude oil net exporter status of the two (2) crude oil producing countries in the Eastern Africa region, all fifteen (15) countries in the region are net importers of refined petroleum products. This dynamic is illustrated in Figure 5. This reliance on imported petroleum products indicates the lack of sufficient refining capacity within the region, leading to economic leakage as countries spend valuable foreign exchange on imports to meet their energy demands.

This paradox of being resource-rich yet dependent on imports is emblematic of Africa’s broader challenge. Eastern Africa’s significant import reliance creates vulnerabilities to global price fluctuations and supply chain distributions while limiting the potential for job creation, industrialisation, and infrastructure development that could arise from local refining. Addressing this imbalance requires investment in refining capacity, infrastructure, and regional cooperation to transform Eastern Africa from a net importer to a more self-sufficient and economically resilient region in terms of petroleum product supply.

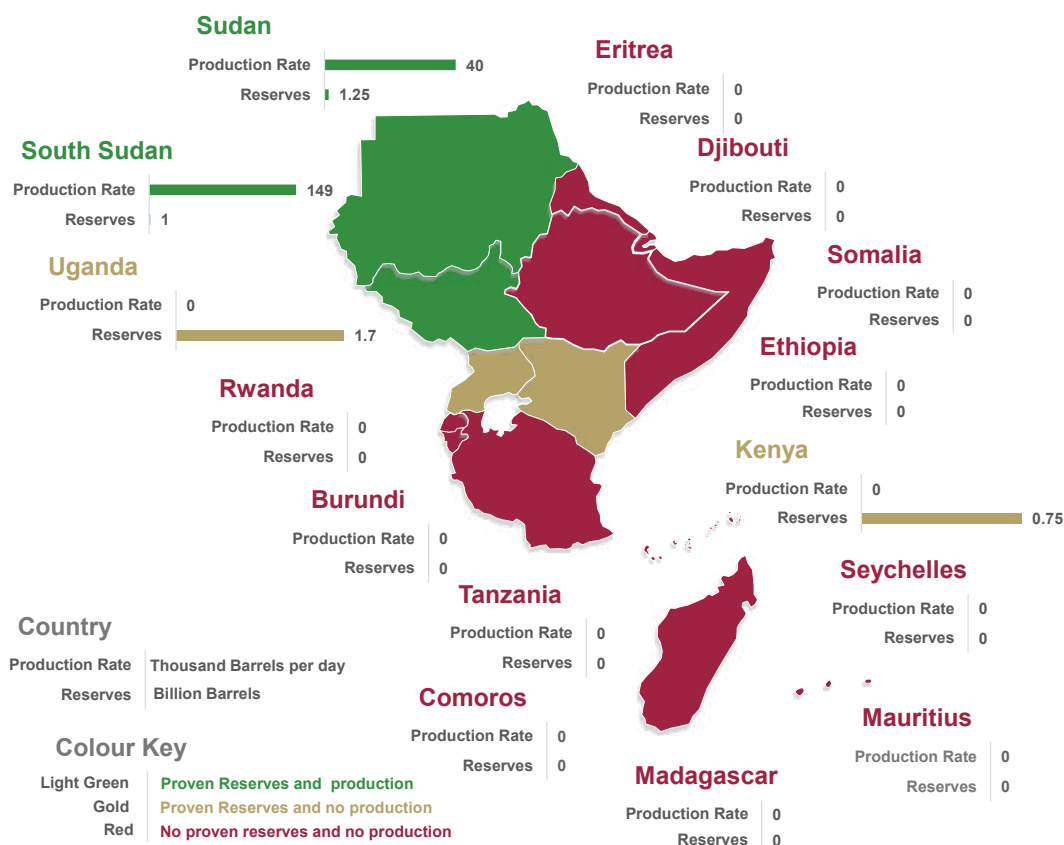


Figure 4: East African upstream oil landscape

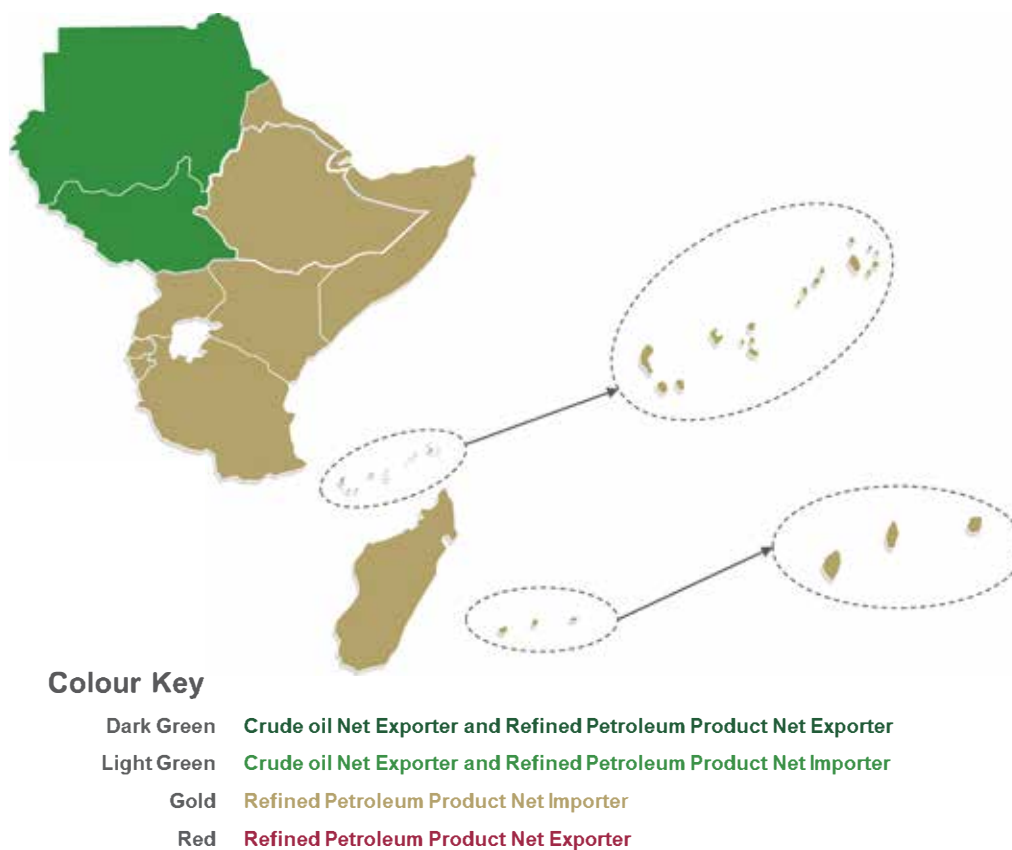


Figure 5: Eastern Africa crude oil and refined petroleum product net importers and exporters

3.1.2 Midstream Sector

Eastern Africa's midstream sector for refined petroleum products highlights a significant gap between regional capacity and demand. The region has a utilised refining capacity of 26.4 kbpd and an additional 237 kbpd of underutilised refining capacity. However, despite the potential created by the underutilised capacity, the utilised refining capacity contrib-

utes to the refined petroleum production of 19.8 kbpd, covering 5% of the total regional demand, which stands at 416 kbpd. This limited capacity to meet domestic demand results in a substantial shortfall that is filled through heavy reliance on imports. The utilised and underutilised refining capacities in Eastern Africa are presented in Figure 6.

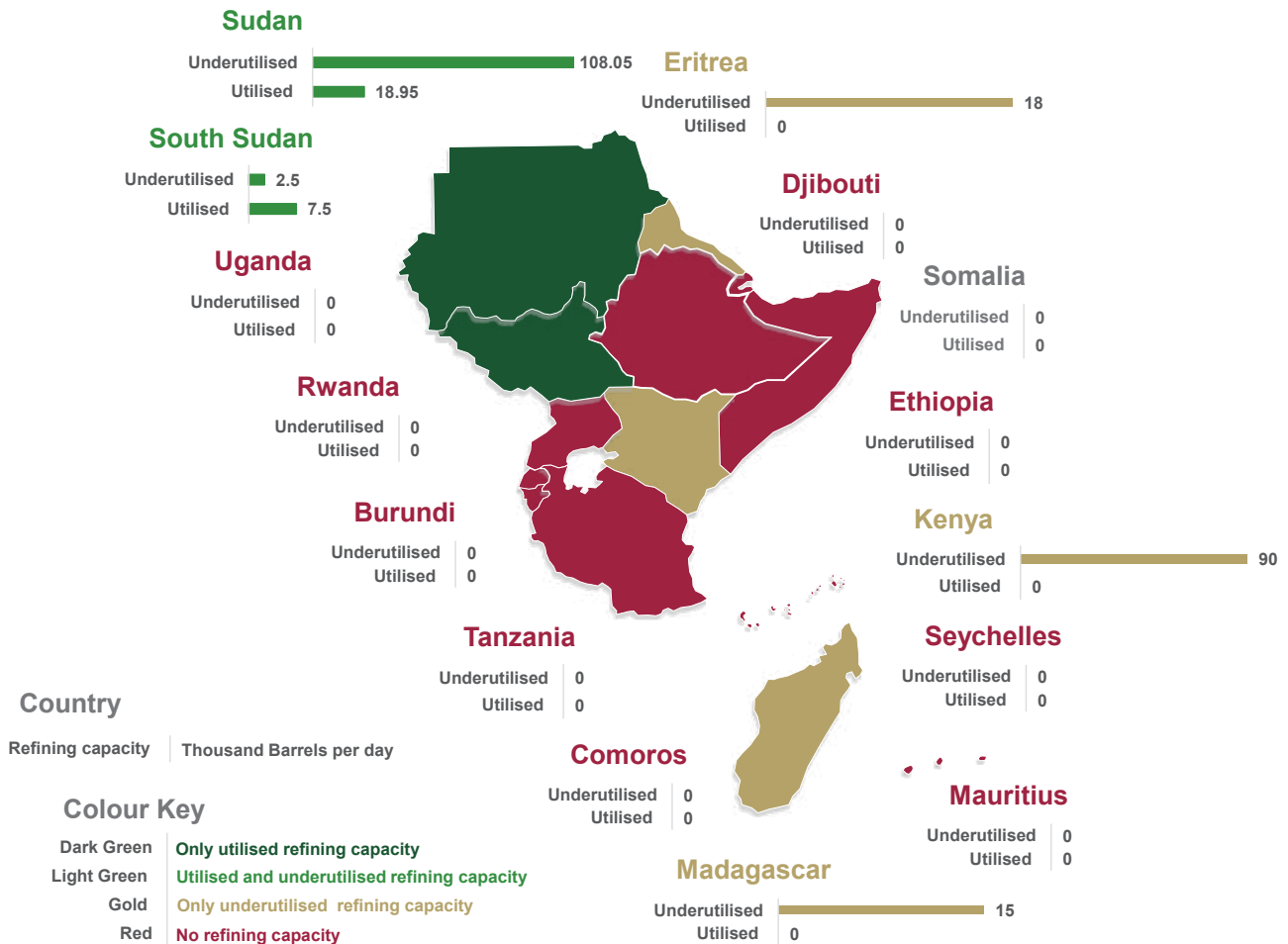


Figure 6: Eastern African utilised and underutilised refining capacity

This situation can be partially mitigated by utilising the infrastructure and resources that are available but not currently exploited. One (1) Eastern African country— Kenya possesses proven crude oil reserves and underutilised refining capacity but is neither producing crude oil nor refined petroleum products. Should the underutilised capacities of Kenya, South Sudan and Sudan be exploited, an additional 36% of the 416 kbpd of regional demand, could be met through regional production of refined petroleum rather than imports.

Eritrea and Madagascar have underutilised refining capacities with no proven crude oil reserves. Through regional cooperation and resource sharing, the utilisation of the refining capacities in these two (2) countries could cover a further 7% of regional demand. Therefore, the total refining capacities within the Eastern Africa region has the potential to cover 48% of the 416 kbpd of regional demand, compared to the current 5%. Detailed information on the midstream infrastructure for crude oil

and refined petroleum product is presented in Section 8.1.2 below.

Looking to the future, the current state of the midstream sector presents both challenges and opportunities. Addressing the underutilised refining capacity and leveraging existing proven crude oil reserves will require significant investment in infrastructure, modernisation of facilities, and the enhancement of supportive regulatory frameworks. Enhanced regional collaboration and market integration could also play a critical role in optimising resource utilisation and reducing the dependence on imports.

3.1.3 Downstream Sector

The global consumption of refined petroleum products is 101.89 million barrels per day (“MMbbl/d”) with the Eastern Africa region’s consumption of 416 kbpd making up 0.4% of this global consumption and 9% of African consumption of 4 479 kbpd (The Business Research Company, 2024) (Statista, 2023). The top consuming countries in the region are Kenya, Ethiopia and Tanzania. The contributions of the focus countries to the regional consumption are shown in Figure 7.

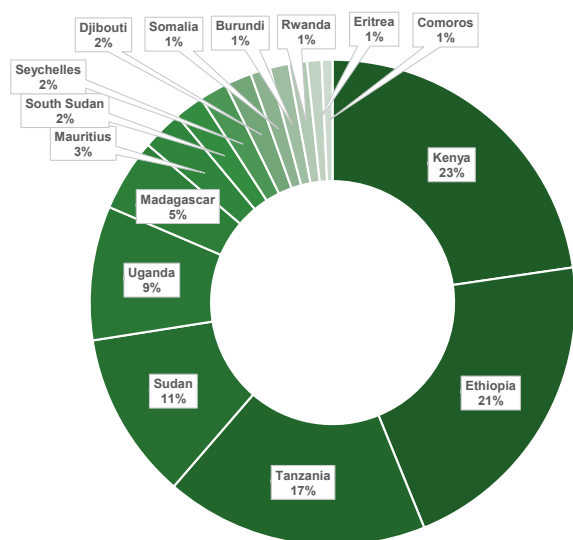


Figure 7: Consumption of refined petroleum products in Eastern Africa

The global consumption of LPG is 1 255 170 tonnes per day (“tpd”) (WLPGA, 2023), with the

Eastern Africa region making up 0.3% of this global consumption, with a total consumption of 3 451 tpd. This regional consumption further represents 9% of the total consumption in Africa, which stands at 38 356 tpd (ARDA, 2022). The top consuming countries in the region are Kenya, Tanzania, and Sudan. The contributions of the focus countries to the regional consumption are shown in Figure 8.

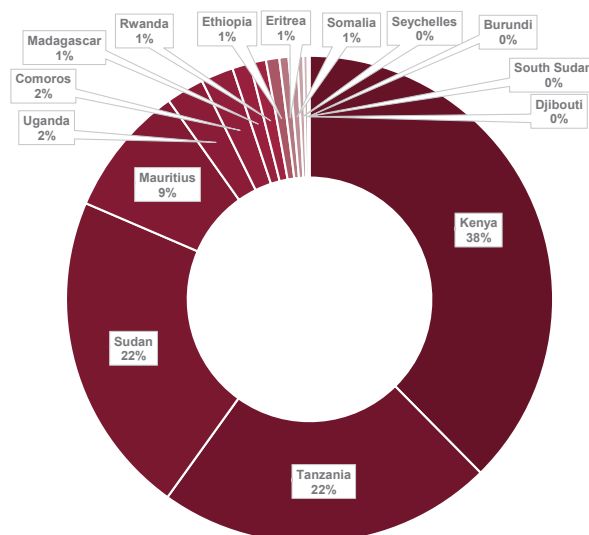


Figure 8: Consumption of LPG in Eastern Africa

3.2 NATURAL GAS

This section provides an overview of the upstream, midstream and downstream sectors of the natural gas industry in the Eastern Africa region.

3.2.1 Upstream Sector

Globally there are 7 371.3 trillion cubic feet (“tcf”) of proven reserves of natural gas (International Energy Agency, 2024). Seven (7) of the Eastern African countries have proven reserves, with one (1) major contributor, namely Tanzania. These seven (7) Eastern African countries have combined natural gas reserves of 70 769 billion cubic feet (“bcf”), making up 1% of the global reserves. The natural gas reserves within Eastern Africa contributes 11% of the natural gas reserves in Africa, standing at 625 600 bcf (LNG Industry, 2021).

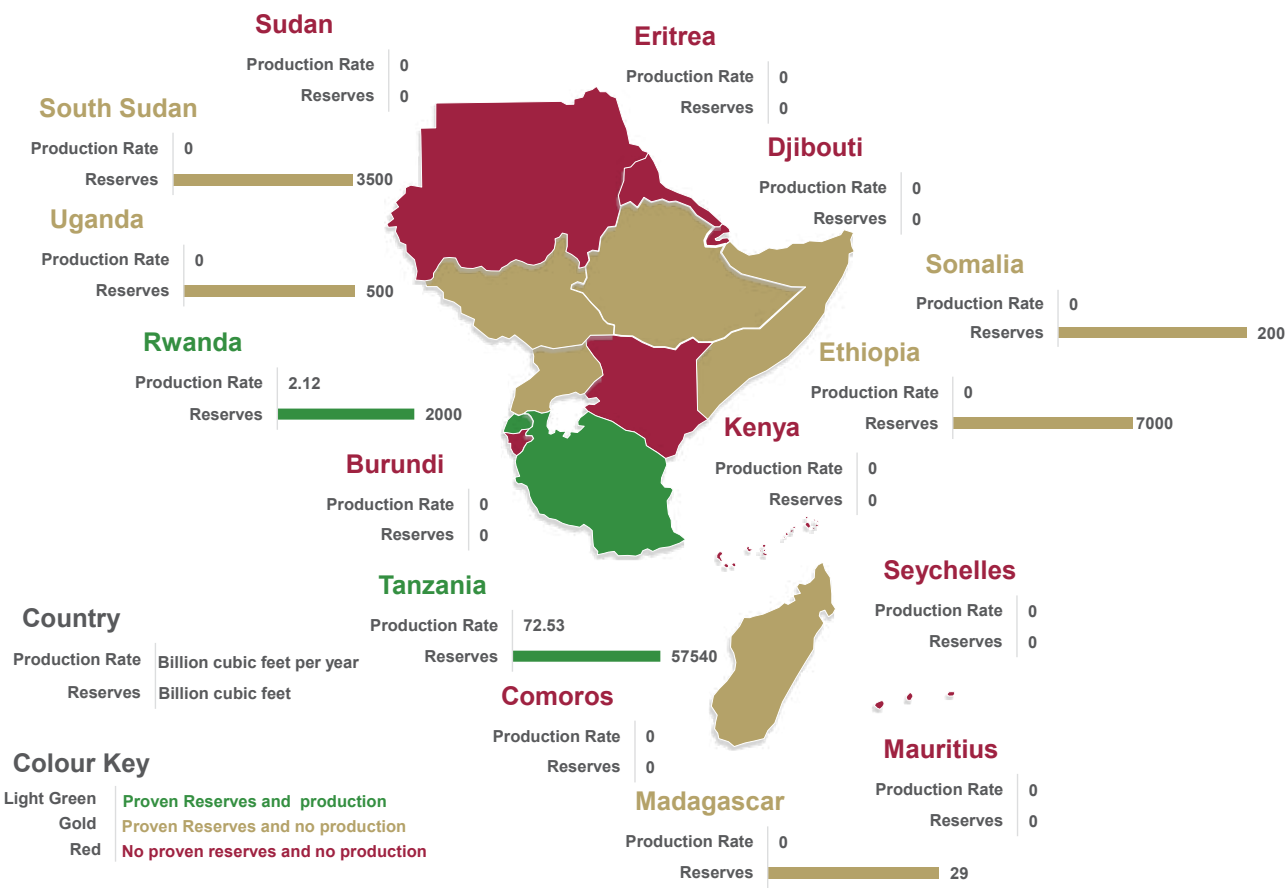


Figure 9: Eastern African upstream gas landscape

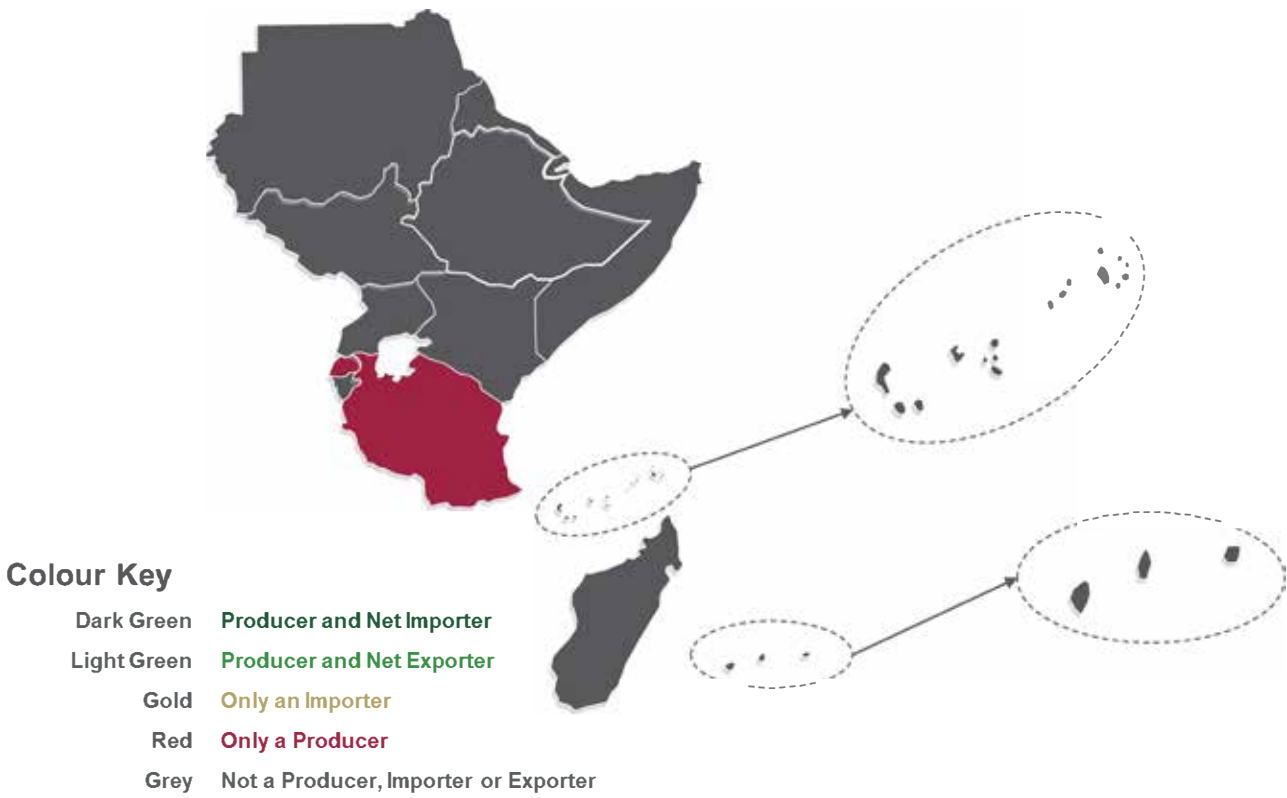


Figure 10: Eastern African natural gas producers, net exporters and net importers

The total global production of natural gas is 144 085 bcf (Statista, 2023). Two (2) Eastern African countries produce natural gas, namely Tanzania and Rwanda. Natural gas production in these countries makes up 0.1% of the global natural gas production, with a total regional production of 74.65 bcf. This regional production of natural gas further contributes to 1% of the 8 974.9 bcf of production in Africa (Statista, 2023). The regional natural gas reserves (bcf) and production (bcf per year) for the focus countries are shown in Figure 9.

As illustrated in Figure 10, none of the Eastern African countries are net importers nor net exporters of natural gas. It is therefore evident that the natural gas producing countries, namely Rwanda and Tanzania, produce natural gas solely for the purpose of local consumption.

3.2.2 Midstream Sector

The Eastern African natural gas sector shows signs of promise, with existing infrastructure indicating the potential for self-sufficiency and regional contribution. Currently, the region has four (4) operational natural gas processing facilities, located in Tanzania, with a total capacity of 171.55 bcf per year, which equates to 0.07 % of the 230 000 bcf of natural gas processing capacity per year globally and 1.8% of the 9 345 bcf per year in Africa (Statista, 2024) (Africa Energy Chamber, 2024).

This capacity exceeds current regional consumption by more than double, covering approximately 232% of regional demand. While this surplus presents a clear opportunity, all facilities are owned by one of the Eastern African Member States, highlighting the limited development and uneven distribution of natural gas infrastructure across the region. Detailed information on the midstream infrastructure for natural gas is presented in Section 8.2.2 below.

Looking to the future, Eastern Africa can significantly enhance its midstream natural gas infrastructure through strategic investment, regional collaboration, and policy support. Expanding processing capacity beyond Tanzania and developing cross-border transportation and distribution networks will be

critical to ensuring equitable access and unlocking the full economic value of the region's natural gas resources.

3.2.3 Downstream Sector

The global consumption of natural gas is 139 000 bcf per year (International Energy Agency, 2022) with the Eastern Africa region making up 0.1% of this global consumption with a total regional consumption of 74 bcf per year. This regional consumption of natural gas contributes 1.3% to the 5 745 bcf per year of natural gas consumed in Africa (Statista, 2022). The two (2) countries consuming natural gas in the region are Tanzania and Rwanda. The contributions of the focus countries to the regional consumption are shown in Figure 11.

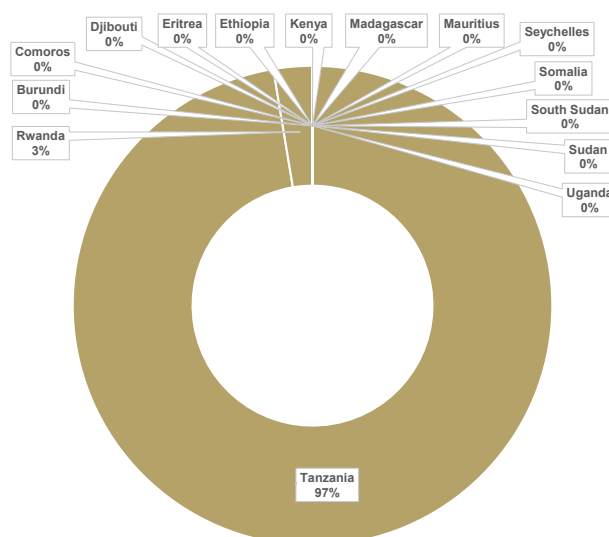


Figure 11: Consumption of Natural Gas in Eastern Africa

3.3 TRADE

By processing and consuming energy resources domestically, countries can develop local industries, create employment opportunities, and stimulate economic diversification. By leveraging the African Continental Free Trade Area ("AfCFTA") and focusing on intra-regional trade, Eastern Africa can transition from an import-intensive region to a more sustainable, self-sufficient region which will reduce vulnerability to global market dynamics.

Several Eastern African countries engage in intra-regional trade of crude oil, refined

petroleum products, and LPG, promoting sustainable commerce and reducing dependence on volatile global markets. This collaboration is facilitated by Regional Trade Agreements (“RTA” s), which aim to enhance economic integration among the Eastern Africa Member States. Such agreements enable Member State countries to plan collectively and leverage collaborative action for economic development.

3.3.1 Market Landscape for Trade

This section explores the dynamics of crude oil, refined petroleum products, LPG, and natural gas within the Eastern Africa region. As global energy markets evolve, understanding the intricacies of imports and exports in the area becomes increasingly important. The volumes of these energy commodities, origin of imports, and destinations of exports are identified and outlined in this section. This analysis provides valuable insight into the region’s energy landscape, highlighting its role in both regional and global markets, such as notable trade opportunity through Djibouti which forms a corridor between the Eastern African countries and the red sea, as currently utilised by Ethiopia.

Crude Oil

Sudan and South Sudan are key players in Eastern Africa’s crude oil trade, with Sudan engaging in both imports and exports to meet their energy needs and economic objectives, and South Sudan engaging primarily in export. The thirteen (13) other focus countries of the Eastern Africa region do not trade in crude oil. The crude oil import and export volumes are shown in Figure 12.

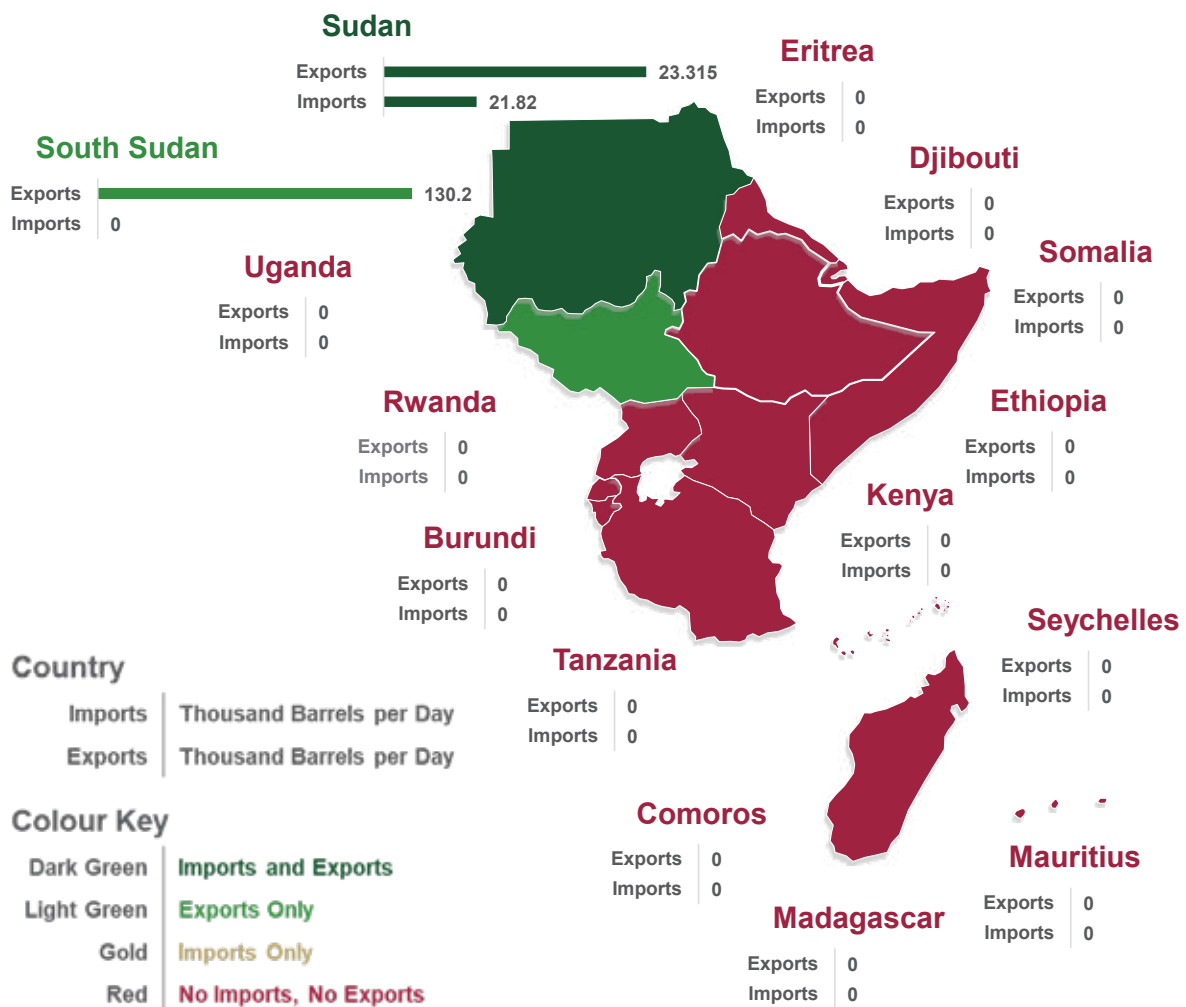


Figure 12: Crude oil imports and exports in Eastern Africa

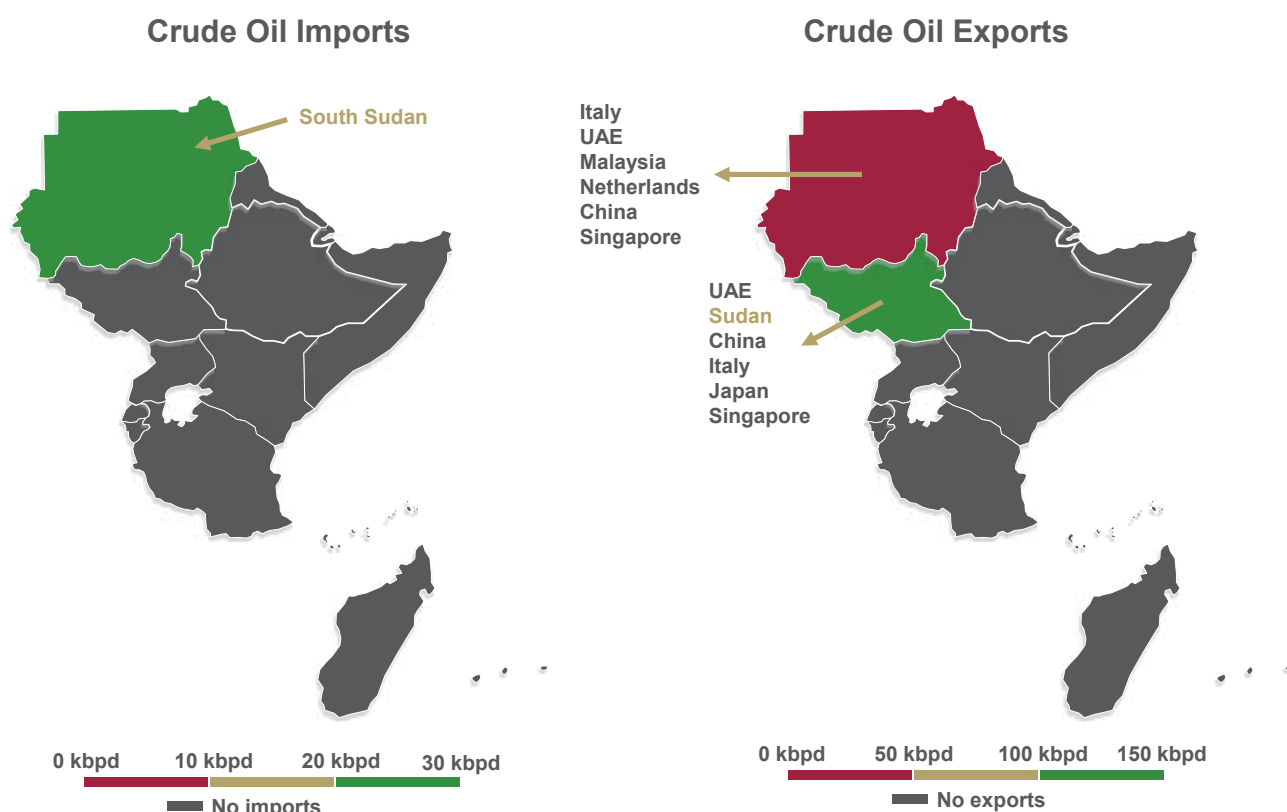


Figure 13: Crude oil import origin and export destination for the Eastern Africa region (including transit routes)

The import origins and export destinations of crude oil for the Eastern Africa region are presented in Figure 13 (The Observatory of Economic Complexity, 2025) (World Integrated Trade Solution, 2022). Sudan facilitates crude oil exports, originating from South Sudan, primarily to Asian, European and Middle Eastern markets. Despite being an exporter, Sudan also imports crude oil to meet domestic energy demands. South Sudan's economy is heavily reliant on crude oil exports, while the country imports minimal crude oil.

Sudan and South Sudan share critical crude oil infrastructure, with South Sudan's crude oil exports dependent on pipelines transversing Sudan to reach the Red Sea. This interdependence necessitates cooperation, as

disruptions can impact the economies of both countries. This can be seen in the recent conflicts in Sudan which temporarily halted South Sudan's crude oil exports, emphasising the importance of stable relationships and infrastructure maintenance.

Refined Petroleum Products

Eastern Africa's refined petroleum products market is characterised by significant reliance on imports due to limited domestic refining capacities. The total import and export volumes of refined petroleum products are presented in Figure 14. This dependency exposes the region to global market fluctuations and highlights the need for strategic expansion within the oil and gas sector.

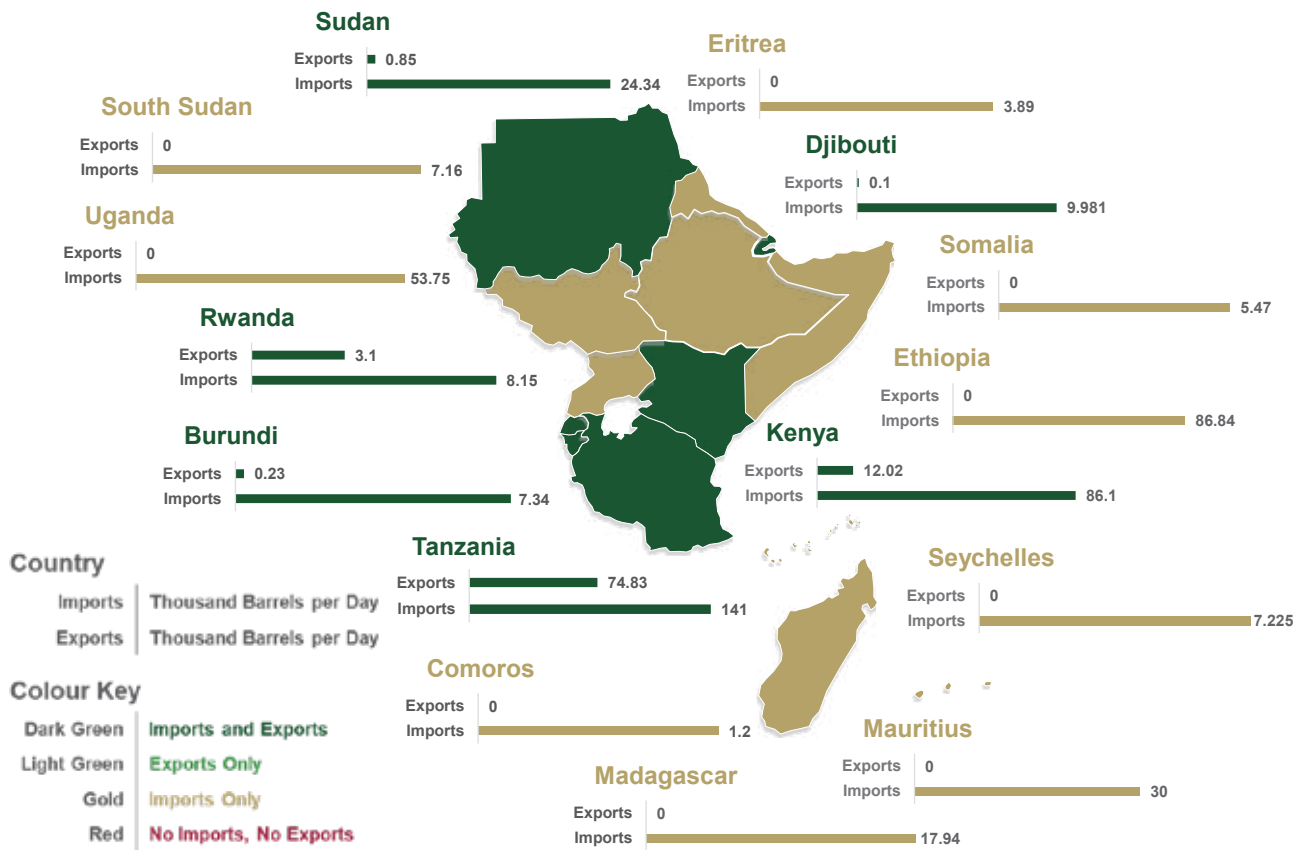


Figure 14: Refined petroleum product imports and exports in Eastern Africa

All the countries in the region are net importers of refined petroleum products, with only Burundi, Djibouti, Kenya, Rwanda, Sudan, and Tanzania engaging in both imports and exports of refined petroleum product. The major importers of refined petroleum in the region are Tanzania, Ethiopia, Kenya, and Uganda, sourcing primarily from international markets, with a portion of the imports being attributed to transit route imports, with Figure 15 illustrating the countries of origin and destination for refined petroleum product trade including transit routes (The Observatory of Economic Complexity, 2025) (World Integrated Trade Solution, 2022).

Eastern Africa's exports of refined petroleum products are minimal, reflecting the region's limited refining infrastructure. This imbalance results in trade deficit in petroleum products, impacting foreign exchange reserves and economic stability. Investing in refining capacity could reduce import dependency, create jobs, and enhance energy security. For example, Eastern Africa's refining resurgence is ongoing despite margin risks, indicating potential for regional development. Collaborative efforts under frameworks like the AfCFTA can facilitate intra-regional trade, optimising resource distribution and strengthening economic ties.

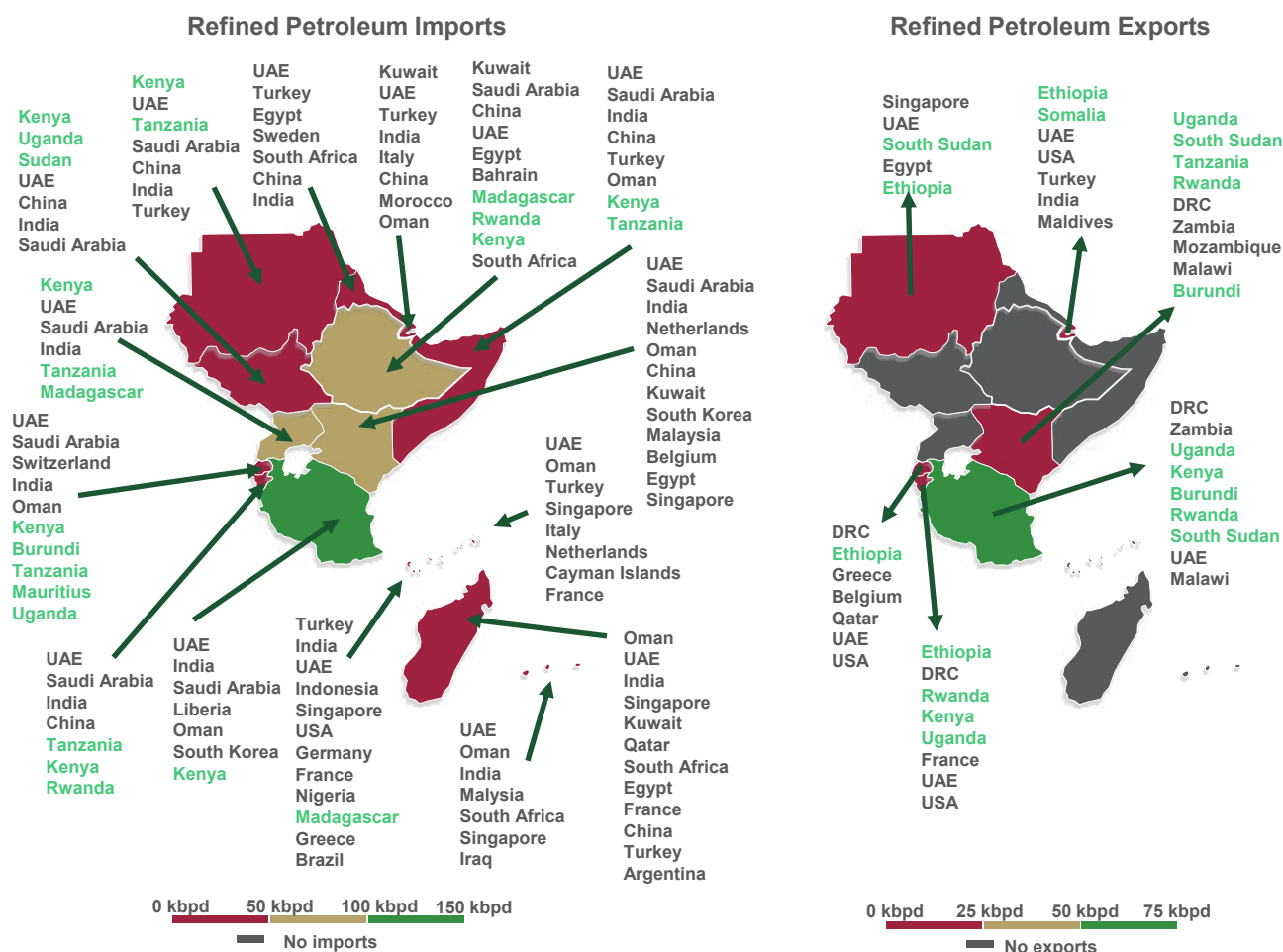


Figure 15: Refined petroleum product import origin and export destination for Eastern Africa (including transit routes)

LPG

Eastern Africa's LPG market is characterised by growing demand and a heavy reliance on imports due to limited domestic production. The imports of LPG in the Eastern Africa region are presented in Figure 16, while none of the Eastern African countries engage in LPG exports. This dependency on external sources exposes the region to global market fluctuations, impacting energy security and economic stability. As shown in Figure 17, the focus countries in the Eastern Africa region are reliant on international LPG imports for

consumption, with Sudan being the only producer of LPG which covers most of their consumption requirements (The Observatory of Economic Complexity, 2025) (World Integrated Trade Solution, 2022).

Uganda is positioning itself as a future exporter with the aim to start producing LPG through the development of the Tilenga and Kingfisher oil fields. The surplus LPG produced from these oil fields after domestic consumption will form the export potential to neighbouring countries in the region.

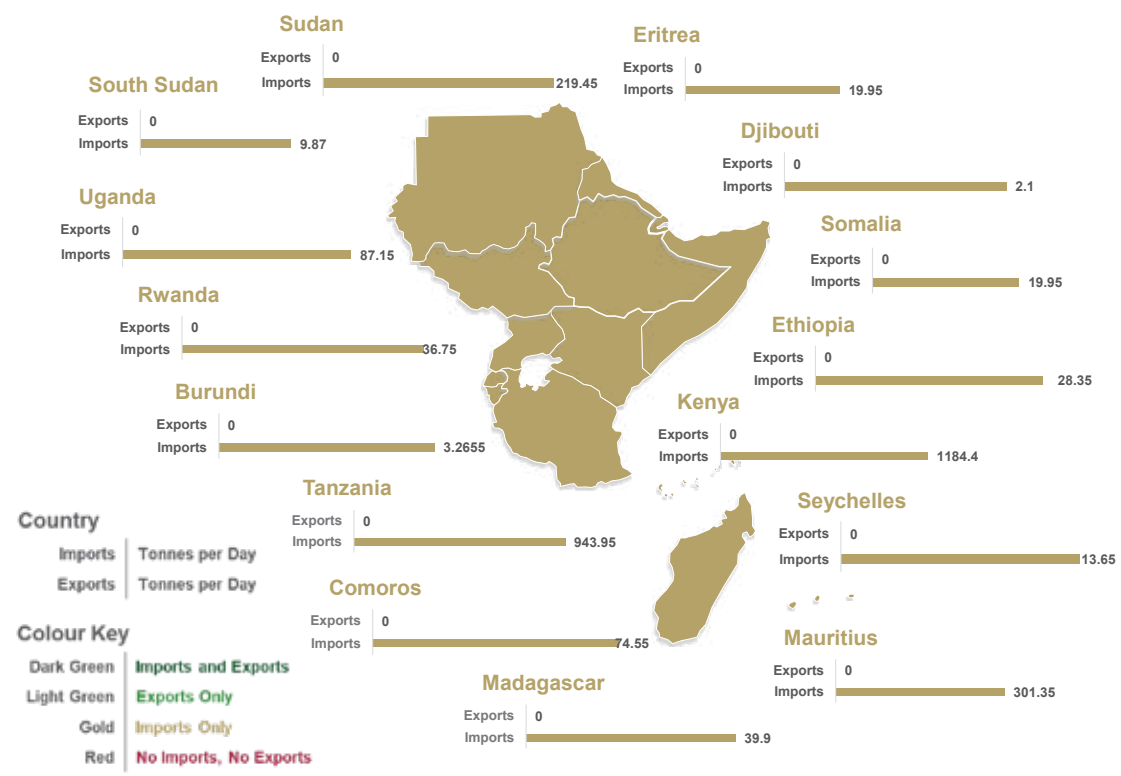


Figure 16: LPG imports in Eastern Africa

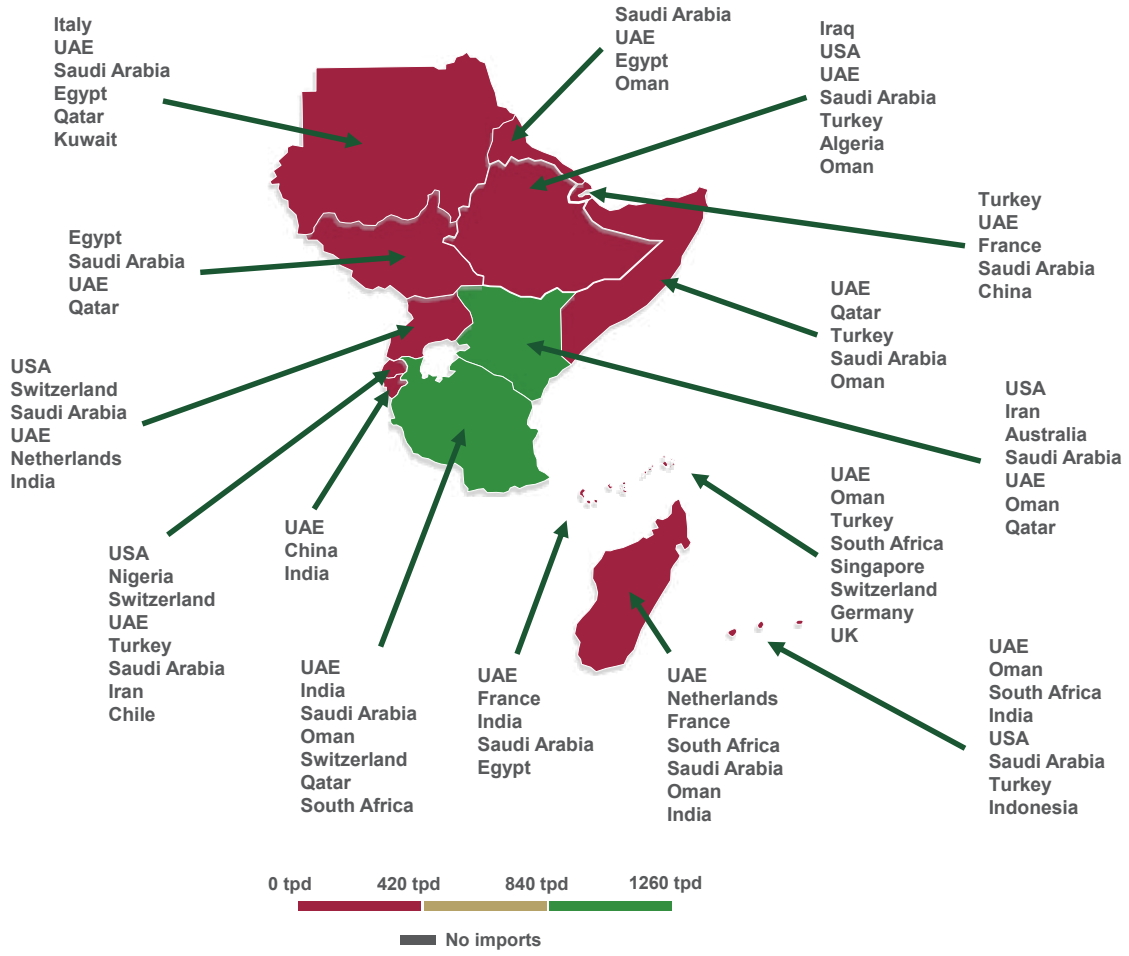


Figure 17: LPG import origins for the Eastern Africa region (including transit routes)

Natural Gas

Eastern Africa's natural gas industry is in a developmental phase, with significant reserves identified in Tanzania, as well as smaller amounts in Ethiopia, South Sudan, Somalia, Rwanda, Uganda, and Madagascar. Despite these discoveries, the region currently lacks substantial infrastructure for trading natural gas, resulting in no cross-border natural gas trade, as shown in Figure 18.

The absence of import and export facilities highlights the need for substantial investment in pipelines, LNG terminals, and processing facilities to harness and distribute natural gas resources effectively. Developing domestic natural gas production and distribution networks can reduce reliance on imported energy sources, enhancing energy security and supply in Eastern Africa.



Figure 18: Natural gas imports and exports in Eastern Africa

3.3.2 Regional Economic Communities

Eastern Africa's economic landscape is shaped by several Regional Economic Communities ("RECs") that promote integration and co-operation among Member States. There are six (6) RECs which the focus countries in the Eastern Africa region are members of,

namely the Common Market for Eastern and Southern Africa ("COMESA"), the Community of Sahel-Saharan States ("CEN-SAD"), East African Community ("EAC"), the Economic Community of Central African States ("ECCAS"), the Intergovernmental Authority on Development ("IGAD"), and the Southern Africa Development Community ("SADC").

There is a general tendency for Member States to belong to more than one (1) regional economic community for either historical, political, or economic considerations. Figure 19 illustrates the various combinations of overlapping memberships in the RECs across the region.

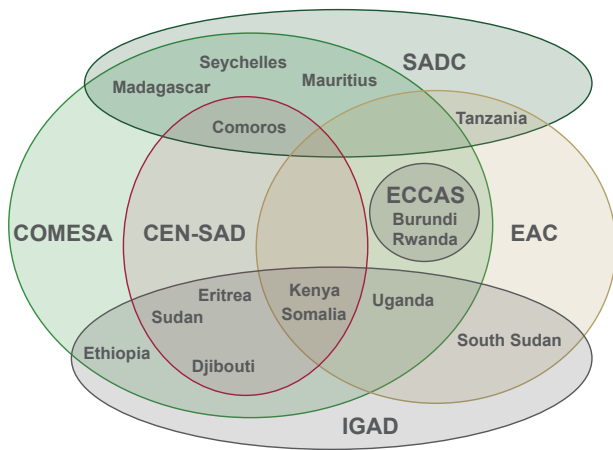


Figure 19: Regional economic communities within Eastern Africa

Throughout the six (6) RECs to which the Eastern African Member States belong, strong focus is placed on political cooperation and stability, transparent governance, economic resilience, education and skills development, environmental sustainability, conflict resolution, and technological advancements. Through the adherence to the objectives stipulated by these RECs the Eastern African Member States have the potential to strengthen and improve their overall political, environmental, social, technological, environmental, and legal standings which are currently considered to be moderate in accordance with the indicators evaluated in the PESTEL and SWOT Analysis.

COMESA

COMESA aims to promote economic integration through trade and investment by reducing trade barriers and establishing a customs union among its Member States, as well as political cooperation and stability. The following focus countries are Member States of COMESA: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Sudan, and Uganda.

Energy Programme

COMESA has recently launched an energy programme focused on enhancing regional co-operation in energy development, trade, and capacity building.

The initiative aims to align energy policies and regulatory frameworks by developing model policy and regulatory guidelines, as well as establishing a Regional Association of Energy Regulators for Eastern and Southern Africa. Additionally, the programme seeks to facilitate energy trade by creating harmonised standards (COMESA, 2025).

Regional Medium- to Long-Term Energy Master Plan

COMESA prioritises the development of regional energy infrastructure through the formulation of a medium- to long-term energy master plan, with a particular focus on power generation and transmission to strengthen electricity supply across the region.

CEN-SAD

CEN-SAD focuses on achieving economic unity and ensuring peace and security among its members primarily in the Sahel-Saharan region. The following focus countries are Member States of CEN-SAD: Comoros, Djibouti, Eritrea, Kenya, Somalia, and Sudan.

Adherences to the objectives of CEN-SAD will prove beneficial for the improvement of the current political and economic standings of these Member States, as determined in the PESTEL and SWOT analysis.

EAC

EAC seeks to enhance economic, political, and social integration among Eastern African countries, through supportive frameworks, aiming for a common market, a monetary union, and ultimately a political federation. EAC further promotes regional supportive frameworks with the “Regional Petroleum Product Procurement Process” which allows members to bulk procure refined petroleum products. The following focus countries are members of EAC: Burundi, Kenya, Rwanda, Somalia, South Sudan, Tanzania, and Uganda.

Article 101 of the Establishment Treaty

Article 101 of the Treaty for the Establishment of the EAC focuses on Energy. It outlines the commitment of Member States to collaborate in the efficient exploitation, development, joint research, and utilisation of various energy resources within the region. The article emphasises the promotion of least-cost development and transmission of electric power, efficient exploration and exploitation of fossil fuels, and the utilisation of new and renewable energy sources. Additionally, it highlights the importance of joint planning, training, research, and information exchange concerning energy resources. The article also advocates for the development of integrated policies on rural electrification, the establishment of inter-Partner State electrical grid interconnections, and the construction of oil and gas pipelines, all while considering environmental protection measures (East African Community, 1999).

Regional Hydrocarbon Resource Development Strategy Initiative

The EAC has recognised the strategic importance of the oil and gas sector in driving regional economic growth and integration. In response, the EAC has developed a Regional Development Strategy Initiative focused on optimising the benefits of the region's hydrocarbon resources. A central component of this strategy is the development of a new refinery in Uganda, aimed at ensuring that the oil discovered within its borders provides maximum advantage not only to Uganda but also to neighbouring countries. This initiative seeks to reduce dependence on imported refined petroleum products and enhance energy security across the region.

In addition to the Ugandan refinery project, the strategy emphasises the need to accelerate the upgrading of existing facilities, such as the Mombasa refinery in Kenya. Modernising this refinery is crucial for improving the efficiency and capacity of petroleum processing, thereby meeting the growing energy demands of the EAC Member States. Furthermore, the strategy advocates for the enhancement of handling, transportation, storage, and distribution infrastructure for refined petroleum products.

By improving these logistical components, the EAC aims to facilitate the efficient and economic distribution of energy resources, which is essential for supporting industrial activities and overall economic development in the region (East African Community, 2025).

East African Customs Union

Established in 2005, the East African Customs Union serves as the initial step toward regional integration among EAC Partner States. The Customs Union aims to facilitate free trade within the community by eliminating internal tariffs and adopting a Common External Tariff ("CET") on imports from non-member countries. This framework is designed to enhance economic cooperation and boost intra-regional trade among Member States.

The EAC Customs Union has implemented several key initiatives to streamline cross-border trade:

- To expedite customs procedures and reduce transit times, the EAC has established sixteen (16) fully operational One-Stop Border Posts ("OSBPs"). These facilities allow for joint processing of goods and passengers by the respective border agencies of neighbouring countries, thereby enhancing efficiency and establishing stronger economic ties among the partners.
- The CET standardises import duties on goods including petroleum products entering the EAC from non-member countries, promoting fair competition and protecting local industries. The default CET rate is 25%, with variations depending on the category of goods (East African Customs Union, 2022).

Through these measures, the EAC Customs Union continues to play a pivotal role in advancing economic integration and facilitating trade within the Eastern Africa region.

ECCAS

ECCAS works to promote regional economic cooperation and integration in Central Africa, focusing on developing natural resources and improving infrastructure. The following focus countries are members of ECCAS: Burundi and Rwanda.

IGAD

IGAD addresses issues related to drought, development, and regional security in the Horn of Africa, facilitating cooperation on environmental protection, peace, and economic development. The following focus countries are members of IGAD: Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, and Uganda.

SADC

SADC aims to achieve economic growth and socio-economic development through regional integration, focusing on areas such as trade, infrastructure, and sustainable development. The following focus countries are members of SADC: Comoros, Madagascar, Mauritius, Seychelles, and Tanzania.

3.3.3 African Continental Free Trade Area

AfCFTA offers Eastern African countries a strategic platform to integrate more competitively in the global economy, thereby reducing poverty and enhancing inclusivity. By encouraging intra-continental oil and gas trade, countries in the Eastern Africa region can gain greater autonomy over international trade agreements, which have historically been unfavourable to African interests. The AfCFTA facilitates the creation of regional economies of scale, addressing local challenges through collaborative solutions.

In the oil and gas sector, the AfCFTA is anticipated to attract substantial investments from global players, including the United States and European countries. The agreement provides investors with access to a larger, more integrated market which reduces risks, owing to diminished cross-border barriers. This integration enables investors to undertake more extensive projects on a regional scale, leveraging economies of scale to significantly expand export markets. Moreover, the AfCFTA includes protocols for the equitable resolution of investor-state disputes, thereby reducing investment risks for both foreign investors and Eastern African countries. As of August 2024, four (4) of the Eastern African countries have signed the AfCFTA agreement, indicating their commitment to the principles and objectives outlined in the treaty, while ten (10) have ratified the agreement, indicating the countries have adopted the treaty into their domestic law. Notably, Eritrea remains the only Eastern African country that has neither signed nor ratified the AfCFTA agreement. The countries who have respectively signed or ratified the AfCFTA agreement are provided in Figure 20.

While many African countries still impose tariffs and duties on refined petroleum products, AfCFTA's trade liberalisation could lead to reduced costs for intra-African oil and gas trade. However, crude oil and natural gas are often already exempt from tariffs under bilateral agreements or RECs such as EAC and SADC.

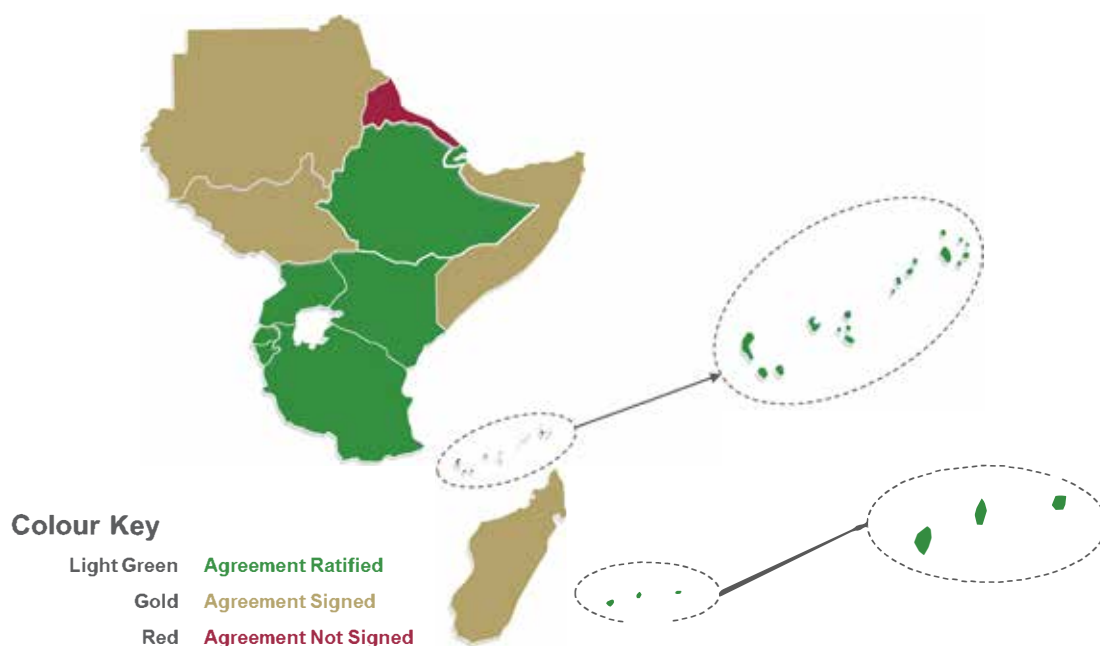


Figure 20: AfCFTA ratification status in Eastern Africa (August 2024)

3.3.4 Indian Ocean Commission

The Indian Ocean Commission (“IOC”) is an intergovernmental organisation of which the following focus countries are members: Comoros, Madagascar, Mauritius, and Seychelles. Established to strengthen diplomatic, economic, and commercial ties among its members, the IOC plays a pivotal role in regional trade dynamics. Notably, Mauritius and Madagascar have implemented a preferential trade regime under the IOC framework, allowing duty-free access for products that meet specific rules of origin. This arrangement facilitates smoother trade flows between the two (2) countries, promoting economic integration. However, Comoros and Seychelles have not yet adopted similar trade preferences within the IOC, indicating potential areas for further economic collaboration. By enhancing trade relations and reducing barriers, the

IOC aims to promote sustainable development and regional cooperation among its island Member States.

3.3.5 Regional Trade Agreements of Eastern Africa

Bilateral and multilateral trade agreements facilitate the reduction of trade barriers, improve market access, and encourage investment in infrastructure and energy projects. Countries with existing trade agreements with focus countries in the Eastern Africa region as per the World Trade Organisation (“WTO”) are summarised in Table 2 (The World Trade Organization, 2023). Participation in global trade agreements connects Eastern African countries to international markets, facilitating the exchange of goods, services, and investments.

Table 2: Countries with existing trade agreements with focus countries in the Eastern Africa region

Country	Burundi	Comoros	Djibouti	Eritrea	Ethiopia	Kenya	Madagascar	Mauritius	Rwanda	Seychelles	Somalia	South Sudan	Sudan	Tanzania	Uganda	Global
Burundi																Lesotho, Eswatini, Zimbabwe, Zambia, Malawi, Angola, DRC, Egypt
Comoros																South Africa, Lesotho, Eswatini, Zimbabwe, Mozambique, Malawi, Zambia, Botswana, Namibia, Angola, DRC, Egypt, EU
Djibouti																
Eritrea																Lesotho, Eswatini, Zimbabwe, Zambia, Malawi, Angola, DRC, Egypt
Ethiopia																Lesotho, Eswatini, Zimbabwe, Zambia, Angola, Malawi, DRC, Egypt
Kenya																Lesotho, Eswatini, Zimbabwe, Zambia, Malawi, Angola, DRC, Egypt, EU, UK
Madagascar																South Africa, Lesotho, Eswatini, Mozambique, Zambia, Malawi, Zimbabwe, Botswana, Namibia, Angola, DRC, EU
Mauritius																South Africa, Lesotho, Eswatini, Mozambique, Zimbabwe, Botswana, Namibia, Angola, Zambia, Malawi, DRC, Egypt, India, Pakistan, China, Turkey, EU, UK
Rwanda																Lesotho, Eswatini, Zimbabwe, Zambia, Malawi, Angola, DRC, Egypt
Seychelles																South Africa, Lesotho, Eswatini, Namibia, Botswana, Zimbabwe, Mozambique, Malawi, Zambia, Angola, DRC, Egypt, EU, UK
Somalia																
South Sudan																
Sudan																Lesotho, Eswatini, Mozambique, Zimbabwe, Zambia, Malawi, Angola, DRC, Egypt, Libya, Tunisia, Algeria, Morocco, Guinea, Ghana, Benin, Nigeria, Cameroon, Yemen, Oman, Saudi Arabia, UAE, Qatar, Bahrain, Kuwait, Iraq, Jordan, Lebanese Republic, Syria, Iran, Pakistan, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Vietnam, Singapore, Malaysia, Indonesia, Philippines, South Korea, North Korea, Chile, Argentina, Bolivia, Brazil, Peru, Ecuador, Colombia, Venezuela, Guyana, Trinidad and Tobago, Nicaragua, Mexico, Cuba
Tanzania																South Africa, Lesotho, Eswatini, Mozambique, Zimbabwe, Botswana, Namibia, Zambia, Malawi, Angola, DRC, Egypt, Libya, Tunisia, Algeria, Morocco, Guinea, Ghana, Benin, Nigeria, Cameroon, Iraq, Iran, Pakistan, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Vietnam, Singapore, Malaysia, Indonesia, Philippines, South Korea, North Korea, Chile, Argentina, Bolivia, Brazil, Peru, Ecuador, Colombia, Venezuela, Guyana, Trinidad and Tobago, Nicaragua, Mexico, Cuba
Uganda																Lesotho, Eswatini, Zimbabwe, Angola, Zambia, Malawi, DRC, Egypt

RTAs promote integration and collaboration, enabling member countries to leverage their energy resources for economic growth, expand intra-regional trade, and attract glob-

al investments in the sector. Understanding which countries in the region have established trade agreements with one another is essential for analysing the potential impact on the

expansion of the oil and gas industry, where such agreements can significantly influence market expansion, infrastructure development, and investment opportunities.

Eastern Africa's integration into the global and regional energy trade landscape is driven by its participation in key RECs, which influence the oil and gas sector in distinct ways. Eastern African countries have entered into numerous bilateral and multilateral agreements, shaping the oil and gas trade landscape. For example, there are multiple planned, under-construction and operational pipelines in the region which will facilitate intra-regional trade of energy commodities, as discussed in Section 3.1.2 and 3.2.2.

The existing trade agreements highlight critical energy trade flows and dependencies among Eastern African countries. For instance, there was an agreement in place for Sudan to purchase 18 kbpd Dar crude from South Sudan for supply to the Um Dabakher power station until 2021, which has been extended until a new agreement is reached. Sudan also had an agreement to supply Ethiopia with LPG and refined petroleum products.

Somalia's trade agreements reflect a limited but progressively advancing agenda, shaped by the country's focus on rebuilding institutions and advancing international partnerships after decades of instability. In addition to REC frameworks as discussed in Section 3.3.2, Somalia has established bilateral investment agreements with countries including Turkey, Italy and Egypt. These agreements are designed to encourage and protect foreign investments, providing a foundation for economic recovery and growth. However, many of Somalia's trade agreements remain under negotiation or require updates to align with the evolving trade dynamics and priorities of the country.

The State Trading Corporation ("STC"), which operates under the aegis of the Ministry of Commerce and Consumer Protection, in Mauritius procures all the country's refined petroleum products and LPG through annual open international tender process. Upon arrival of tankers at the oil jetty at Port Louis harbour, the products are pumped through pipelines into shore tanks situated in the port area.

Madagascar is advancing its energy sector through strategic agreements, including a loan agreement for the Smart Clean Cooking Project with the OPEC Fund for International Development ("OFID"), signed in September 2024. A Memorandum of Understanding ("MoU") with Angola's Ministry of Mineral and Petroleum Resources, signed in August 2024, outlines a five (5)-year partnership (2024-2029), to strengthen Madagascar's oil and gas sector. The agreement focuses on sharing Angolan expertise, developing renewable energy projects, and improving energy transmission infrastructure. Fuel imports to Madagascar are managed through annual international tenders with monthly shipments arriving at the Port of Toamasina. While these transactions are procedural, they demonstrate Madagascar's efforts to secure consistent energy supplies while building capacity in renewable and traditional energy sectors.

Kenya has established a Government-to-Government ("G-to-G") import arrangement for refined petroleum products, which represents a strategic approach to ensure stable supply while addressing broader economic challenges. This framework, governed by the Petroleum Act of 2019 and related regulations, allows Kenya to import refined petroleum products through agreements with supplier governments and International Oil Companies ("IOCs"). This setup combines competitive procurement processes with financial mechanisms, supported by Letters of Support ("LoS") from the National Treasury to mitigate liquidity and foreign exchange risks. Kenya's G-to-G model offers a template for regional adoption, presenting opportunities to enhance trade integration within Eastern Africa.

Ethiopia actively participates in regional and global trade agreements to promote economic integration, increase exports, and secure imports. Globally, Ethiopia is negotiating WTO accession to align with international trade standards, while benefiting from preferential tariff programmes like the Generalised System of Preferences ("GSP") with the United States ("US"), the European Union ("EU"), and Japan. Key bilateral agreements strengthen Ethiopia's ties with countries such as Saudi Arabia, China, and Kenya. Saudi Arabia serves

as Ethiopia's primary supplier of refined petroleum products, while Ethiopia exports electricity to Kenya and Sudan under long-term agreements. Partnerships with Djibouti provide essential port access and trade infrastructure, exemplified by the Ethiopia-Djibouti railway. Ethiopia's domestic energy initiatives, including natural gas exploration in the Ogaden Basin by Poly-GCL, holding potential for future exports via Djibouti. Additionally, Ethiopia engages in cross-border trade with Somalia and South Sudan, focusing on agricultural goods, electricity, and infrastructure development. With incentives like duty-free market access under African Growth and Opportunity Act ("AGOA") and Everything but Arms ("EBA"), and investments in industrial parks and transportation networks, Ethiopia is enhancing its position as a regional trade hub.

Djibouti's strategic location and trade agreements have established it as a pivotal hub for oil and gas imports in Eastern Africa. Djibouti imports oil and gas from Saudi Arabia, utilising facilities like Horizon Djibouti Terminals Limited ("HDTL") for storage. These imports not only meet Djibouti's domestic needs, but also serves neighbouring Ethiopia, with products transported overland. In this supply chain, Société Internationale des Hydrocarbures de Djibouti ("SIHD") and Ethiopian Petroleum Supply Enterprise ("EPSE") are the designated

public entities responsible for importing oil and gas for Djibouti and Ethiopia, respectively.

In Rwanda, the Ministry of Trade and Industry is responsible for all cross-border trade and industry regulations. Rwanda has a policy under development to promote Rwanda as a distribution centre for refined petroleum products in the Great Lakes region by enhancing cross-border trade.

Tanzania is actively engaging with neighbouring countries to enhance natural gas exportation and infrastructure development. On May 26th, 2017, Tanzania and Uganda signed an Inter-Governmental Agreement ("IGA") to establish shared principles for the Eastern African Crude Oil Pipeline ("EACOP") project. Subsequently, on April 11th and May 20th, 2021, both governments entered into Host Government Agreements ("HGA"s) with investors including Total East Africa Midstream B.V. on behalf of EACOP Limited to define the legal and commercial frameworks for the project's financing, construction, and operation.

Uganda is a landlocked country, which imports all its refined petroleum products and LPG via Mombasa or Dar es Salaam ports. There is ongoing enhancement of Kenyan pipeline and storage systems, which will benefit Uganda by promoting the regional refined petroleum pipelines such as the Kenya – Uganda – Rwanda pipeline, promoting alternative supply routes.



4

GOVERNING LAWS, REGULATIONS, AND POLICIES

Regulatory disparities have frequently been cited as a major obstacle to intra-regional trade and investment. This chapter provides an overview of the existing laws and regulations governing the oil and gas industry across Member States and to provide examples of disparities.

4.1 INVENTORY ANALYSIS

Typical legislation aimed at promoting regional trade and attracting international investment in the hydrocarbon industry includes frameworks such as petroleum codes, investment codes, Public-Private Partnership (“PPP”) regulations, and the regulatory bodies that oversee these laws, such as PPP directorates, regu-

lators, and investment promotion agencies as shown in Table 3.

An inventory analysis revealed that most of the countries in question have established some form of the required regulatory frameworks. While these countries generally meet the basic legislative criteria for promoting the sector, the regulations are not always adequate or effective. The analysis simply highlights that, in terms of legislation, the countries have, for the most cases the necessary foundations in place on a national level. However, gaps exist particularly in terms of PPP legislation and in terms of regulating the LPG market. Sections 4.1.1 to 4.1.3 discuss key areas for attention in terms of regulatory frameworks are.

Table 3: Current legislation governing the oil and gas sector in the Eastern Africa region

	Burundi	Comoros	Djibouti	Eritrea	Ethiopia	Kenya	Madagascar	Mauritius	Rwanda	Seychelles	Somalia	South Sudan	Sudan	Tanzania	Uganda	Total out of 15
Hydrocarbon / Petroleum Code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
Integrated Energy Strategy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
Legislation surrounding SEZs	✓	✗	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	11
Investment Code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
Investment Agency	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	14
Petroleum Agency	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
Environmental Code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
PPPs Legislation and Framework	✓	✗	✓	✗	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	9
Regulations – Midstream and Upstream	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	14
LPG Regulations	✗	✗	✗	✗	✗	✓	✗	✓	✓	✗	✗	✗	✗	✓	✓	5
Legislation for Public Procurement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15

4.1.1 General Harmonisation

Most of the Eastern African Member States have the necessary legislation in place to provide a strong foundation for advancing regional initiatives. At the regional level, efforts are already underway to harmonise these regulations across various Member States via the work conducted by the regional communities such as the EAC and COMESA. Emphasis should be placed on hydrocarbon codes, investment codes, and PPP regulations to facilitate cross-border oil and gas projects, ensuring a more integrated and investment-friendly environment.

4.1.2 Adopt LPG Regulations

LPG is expected to play a crucial role in Eastern Africa's energy transition, providing a cleaner alternative to traditional biomass fuels widely used for cooking. However, despite its growing demand, not all countries in the region have integrated specific LPG regulations within their hydrocarbon legislation. The absence of clear regulatory frameworks for LPG creates challenges in market development, investment attraction, and safety compliance, which could slow down the sector's growth and limit its potential benefits for households, businesses, and industries. Given the region's push towards cleaner energy solutions, there is a strong case for governments to prioritise LPG-specific policies that address storage, distribution, pricing, and consumer safety.

By incorporating dedicated LPG regulations into hydrocarbon laws, Eastern African countries can create a more predictable and structured market, encouraging private sector participation and investment in LPG infrastructure such as storage facilities, bottling plants, and distribution networks. A well-defined regulatory environment would also support harmonised safety standards, reducing risks associated with handling, transportation, and retail. Additionally, LPG-specific policies could promote affordability and accessibility, particularly through targeted tax incentives and subsidies, ensuring that the benefits of LPG reach a wider population. As LPG demand continues to rise, ensuring regulatory clarity

and consistency across the region will be key to unlocking its full potential as a clean and viable energy source.

4.1.3 Carbon Emission Regulation

As Eastern Africa continues to develop its refined petroleum sector, there is a significant opportunity to introduce carbon emission regulations and the utilisation of decarbonisation technologies, to attract both regional and international investment. Chapter 6 is devoted to providing an overview of the latest in carbon capturing technology applicable to the oil and gas value chain. All Eastern African Member States have adopted some form of environmental legislation, mandating the performance of an Environmental Impact Assessment ("EIA"), which is deemed very favourable for the development of the oil and gas industry. As of 2023, based on publicly available information, there is little evidence to suggest that the Member States in the Eastern Africa region explicitly mandate the adoption of decarbonisation technologies across their upstream, midstream, or downstream refined petroleum sectors.

By introducing clear regulatory mandates that require the integration of decarbonisation technologies, Eastern African countries could position themselves as leaders in the sustainable energy transition. Such mandates would not only align with global climate goals but also enhance the investment appeal of the region's oil and gas sectors. This is particularly relevant as international investors and financial institutions increasingly prioritise Environmental, Social, and Governance ("ESG") criteria when making investment decisions.

Thirteen (13) of the fifteen (15) Eastern African countries assessed in this study have ratified the Paris Agreement under the United Nations Framework Convention on Climate Change ("UNFCCC"), thereby committing to reduce GHG emissions through the submission of Nationally Determined Contributions ("NDCs"). Eritrea and South Sudan have not ratified the Agreement, and this lack of formal participation introduces variation in regional alignment on climate objectives, particularly concerning the implementation of decarbon-

isation technologies and climate-oriented energy planning.

While the concept and relevance of decarbonisation technologies—such as carbon capture, methane detection, and low-emission electrification—are generally recognised across the oil and gas value chain in the region, the extent to which these technologies are embedded in enforceable national legislation remains unclear. Further in-depth investigation is required to assess the actual legal status and level of enforcement related to decarbonisation technologies in each country.

Some oil and gas projects in Eastern Africa, such as EACOP and Tanzania’s LNG project, are incorporating decarbonisation-supportive technologies like solar power and energy-efficient systems. These efforts are indirectly aligned with national climate policies that promote renewable energy. For instance, Tanzania’s National Climate Change Strategy (2012) and Rwanda’s Green Growth and Climate Resilience Strategy (2011) prioritise solar and hydropower, promoting a low-carbon energy environment that encourages the voluntary adoption of decarbonisation measures in the oil and gas sector.

A preliminary review of publicly available policy documents, including those listed in Appendix D, did not identify explicit mandates requiring the use of decarbonisation technologies in the upstream, midstream, or downstream segments. However, this does not preclude the existence of relevant non-public or sector-specific regulations. Voluntary measures are evident—for example, EACOP’s integration of solar-powered pump stations and methane leak detection systems, as outlined in its Environmental and Social Impact Assessment (“ESIA”), and energy-efficient drilling practices in Uganda’s Kingfisher oil field. These initiatives, while encouraging, remain limited and reflect the broader regional focus on energy access and economic growth, as highlighted in recent African Development Bank reports.

Scaling up decarbonisation in the Eastern African oil and gas sector will require the development of collaborative regulatory frameworks, harmonised emissions stand-

ards across countries, and tailored climate financing mechanisms that align with the region’s developmental priorities. A full inventory of identified regulations, by category and Member State, is provided in Appendix D.

4.2 PPP LEGAL FRAMEWORK ANALYSIS

4.2.1 Introduction to the PPP Sphere

PPPs in the oil and gas industry are crucial collaborations between government and private sectors, focusing on the finance, construction, and operation of energy infrastructure such as pipelines and refineries. Governments support these partnerships through regulatory oversight, land access, and policy incentives, allowing for effective resource allocation and leveraging private expertise and capital to address public infrastructure needs and fiscal limitations.

PPPs are vital for drawing private investment necessary for capital-intensive projects like cross-border pipelines. They distribute risks, helping mitigate governmental financial burdens, ensure timely, budgeted project completions, and incorporate ESG standards. This alignment not only supports global climate goals but also supports economic benefits like job creation and energy security.

While PPPs are a prominent model, alternative approaches such as joint ventures, production-sharing agreements, and fully public or private financing models are also utilised in the oil and gas sector, depending on project needs and regional contexts. These alternatives offer flexibility in balancing risk, control, and investment, complementing the PPP framework.

In the contracting realm, PPPs standardise frameworks governing project initiation, evaluation, procurement, and management, enhancing transparency, accountability, and fairness. These agreements often set clear project timelines, dispute resolution mechanisms, and performance metrics, crucial for managing complex, multi-jurisdictional energy projects. Particularly in Eastern Africa, PPPs facilitate regional cooperation and infrastructure development, playing

a central role in shaping a regional domestic oil and gas market.

This report focuses on assessing Eastern Africa's oil and gas policies and regulations through the lens of PPP frameworks to explore domestic utilisation and regional collaborative opportunities. By examining PPP governance, it provides insights into how strengthened frameworks can unlock the region's energy potential.

4.2.2 Legal and Institution Comparative Analysis in Eastern Africa

This section provides a comparative analysis of PPP frameworks across Eastern African countries, focusing on their relevance to the oil and gas sector. Drawing on previous insights in this report, a review of the oil and gas policies, laws, and regulations in Member States was conducted to map the regulatory landscape. The analysis consolidates diverse views and approaches from national legislation, regional policy documents, and stakeholder feedback gathered from Member States.

To ensure comparability, the data was structured to cover key aspects of PPP governance in the oil and gas industry. This process revealed a varied landscape, as Member States adopt differing approaches to PPP governance, shaped by unique economic, political, and institutional contexts. For instance, while some countries prioritise detailed regulatory frameworks for energy infrastructure, others focus on broader investment policies, leading to diverse interpretations of PPP applicability in the sector.

The resulting map offers a practical overview of the region's oil and gas industry, il-

lustrating its current state and potential for regional collaboration. By focusing on PPP governance, regulatory and institutional factors are emphasised, but this perspective may not fully capture other dimensions—such as cultural, social, or geopolitical influences—that also shape the region's energy sector. This analysis should be viewed as one of many perspectives, aimed at offering clarity and recognising the varied approaches across Eastern Africa.

4.2.3 Framework for Analysis PPP Governance

To systematically evaluate PPP governance in Eastern Africa, the analysis was categorised into five (5) main topics. These categories provide a structured approach to assessing the comprehensiveness and relevance of PPP frameworks in the context of the oil and gas industry, ensuring that the findings are both practical and understandable for Stakeholders.

Existence of Dedicated PPP Laws (Pre-Qualifier)

The first topic serves as a pre-qualifier, determining whether Member States have established any laws or regulations specifically governing PPPs. This foundational step is critical, as the absence of a legal framework for PPPs limits the ability to engage private partners effectively in oil and gas projects. After this has been established, then one can go further to analyse how the laws and regulations are applied across the other four (4) categories. Figure 21 provides a breakdown of the comparative analysis structure for the PPP Frameworks in Eastern Africa.

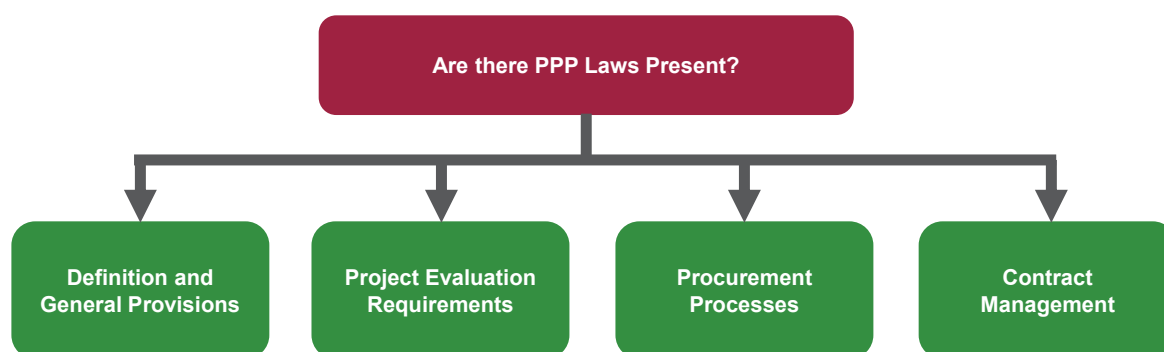


Figure 21: Comparative Analysis Structure of PPP Frameworks in Eastern Africa

Definition and General Provisions

The second category, definition and general provisions, examines the foundational elements of PPP laws, including definitions, scope, and miscellaneous applicability. For example, it assesses whether PPP laws clearly define the roles of public and private entities, specify the types of projects eligible for PPPs, and address cross-sectoral applicability, particularly for oil and gas infrastructure.

Project Evaluation Requirements

The third category, Project Evaluation Requirements, focuses on the processes for identifying, appraising, and approving PPP projects. It evaluates whether Member States have clear guidelines for feasibility studies, risk assessments, and stakeholder consultations, which are essential for ensuring that oil and gas projects are viable and aligned with national and regional priorities.

Procurement Processes

The fourth category, procurement processes, analyses the procurement frameworks for PPPs, including transparency, competitiveness, and fairness in the bidding process. In the oil and gas sector, robust procurement processes are crucial for selecting qualified private partners to develop complex infrastructure like pipelines and/or refining facilities.

Contract Management

The fifth and final category, contract management, assesses the mechanisms for drafting, negotiating, and managing PPP contracts. It

examines whether contracts include clear performance metrics, dispute resolution mechanisms, and provisions for risk-sharing, all of which are vital for the successful execution of oil and gas projects.

4.2.4 Observations Across the Five Categories

To support the analysis presented in this section, a detailed breakdown of the PPP frameworks across Eastern African countries has been compiled into a comprehensive table. This table includes the specific laws and regulations referenced, along with section and article references where applicable, providing a clear view of the legal landscape in each Member State. The table is available for reference in Appendix D.

The following subsections highlight the key observations made during our analysis of the five (5) categories of PPP governance namely; existence of dedicated PPP laws, general provisions, project evaluation stages, procurement processes, and contract management, as discussed in Section 4.2.3, focusing on trends and patterns relevant to the oil and gas sector.

Existence of Dedicated PPP Laws

The presence of dedicated PPP laws in a country establishes a foundational framework for engaging private sector participation in infrastructure projects, including those in the oil and gas sector. Such laws provide clarity on roles, processes, and expectations, facilitating structured collaboration between public and private entities.

Analysis of the data across the fifteen (15) Eastern African countries reveals a positive

trend, with more than two-thirds of the Member States having formalised PPP frameworks, demonstrating a strong commitment to structured PPPs. Out of the fifteen (15) countries assessed, eleven (11), representing approximately 73% of the region, have established dedicated PPP laws or policies as shown in Figure 22. It

is noted that Comoros, Eritrea, Seychelles, and South Sudan lack specific PPP legislation, indicating reliance on general investment or procurement laws, which may not fully address the complexities of PPP arrangements in the oil and gas sector.

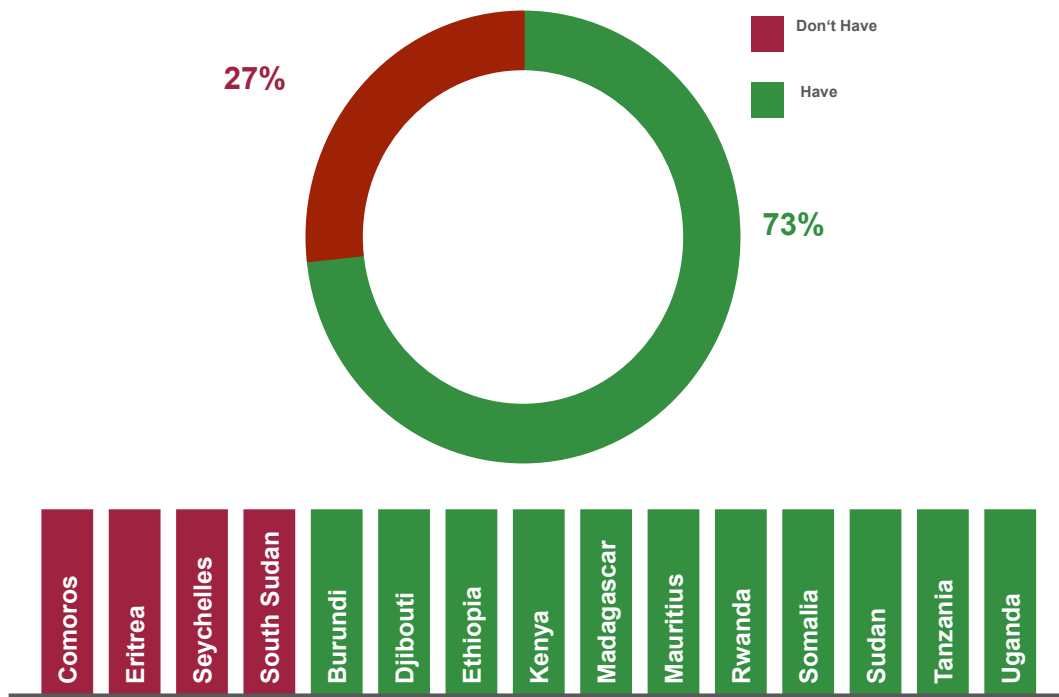


Figure 22: Member States with and without dedicated PPP Laws

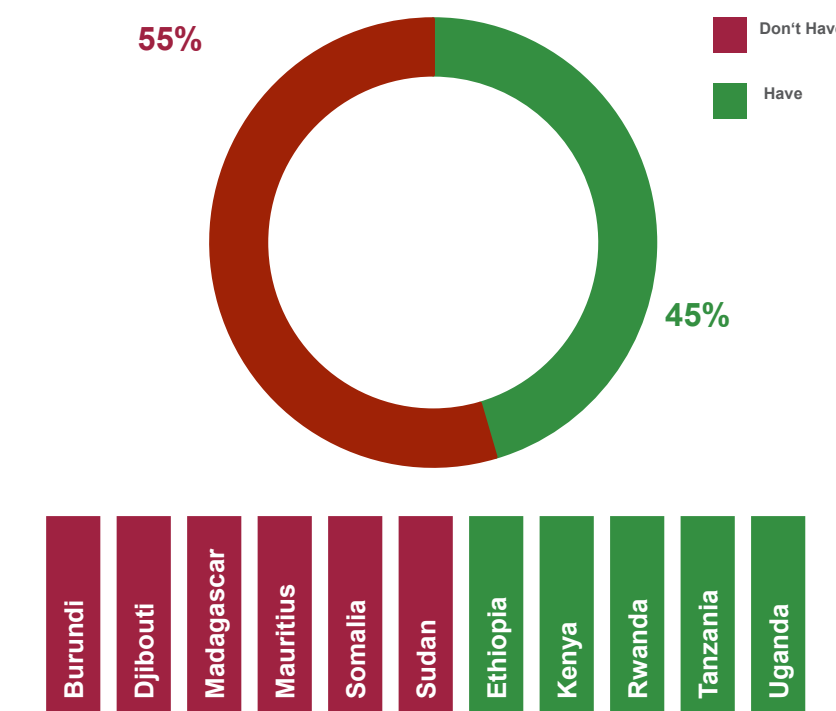


Figure 23: Member States with and without explicitly dedicated PPP units

Trends in oversight structures highlight further diversity. Among the eleven (11) countries with PPP laws, explicitly dedicated PPP units which are formalised to streamline approvals and standardisation are present in five (5) of the countries, namely; Ethiopia, Kenya, Rwanda, Tanzania, and Uganda, accounting for roughly 45% of the eleven (11) countries with dedicated PPP laws as illustrated in Figure 23.

In the remaining countries with PPP laws, such as Burundi, Djibouti, Madagascar, Mauritius, Somalia, and Sudan, oversight often falls to ministries, typically the Ministry of Finance, reflecting a more generalised approach to PPP governance.

A prominent trend is the prevalence of Ministry of Finance oversight, observed in eight (8) out of the eleven (11) countries with PPP laws. This indicates a strong emphasis on fiscal control across the region. Exceptions include Tanzania and Somalia, where oversight is linked to the Office of the President (suggesting a mixed governance approach), and Rwanda, where a dedicated PPP agency oversees activities, re-

flecting more strategic or specialised governance models as illustrated in Figure 24.

Regional variations in the maturity of PPP frameworks are evident, with Kenya, Rwanda, Tanzania, and Uganda showing a developed approach through dedicated units and clear legal mandates, reflecting relative economic stability, as further evident by the moderate to high standing of these countries in accordance with the PESTEL and SWOT analysis, presented in Appendix B. Ethiopia adopts an emerging approach, with recent reforms signalling ambition but still with early-stage implementation. Burundi, Djibouti, Madagascar, Mauritius, Somalia, and Sudan exhibit a minimalist approach, relying on ministries, showing a potential indicator for resource constraints, in terms of experts. These minimalist setups may also reflect a conservative approach to PPP development, allowing cautious engagement with private partners, which can be beneficial in contexts of political or economic uncertainty. Practical implications of these existing laws in the region suggest that developed frameworks align well with economic goals, while minimalist setups may slow coordination.

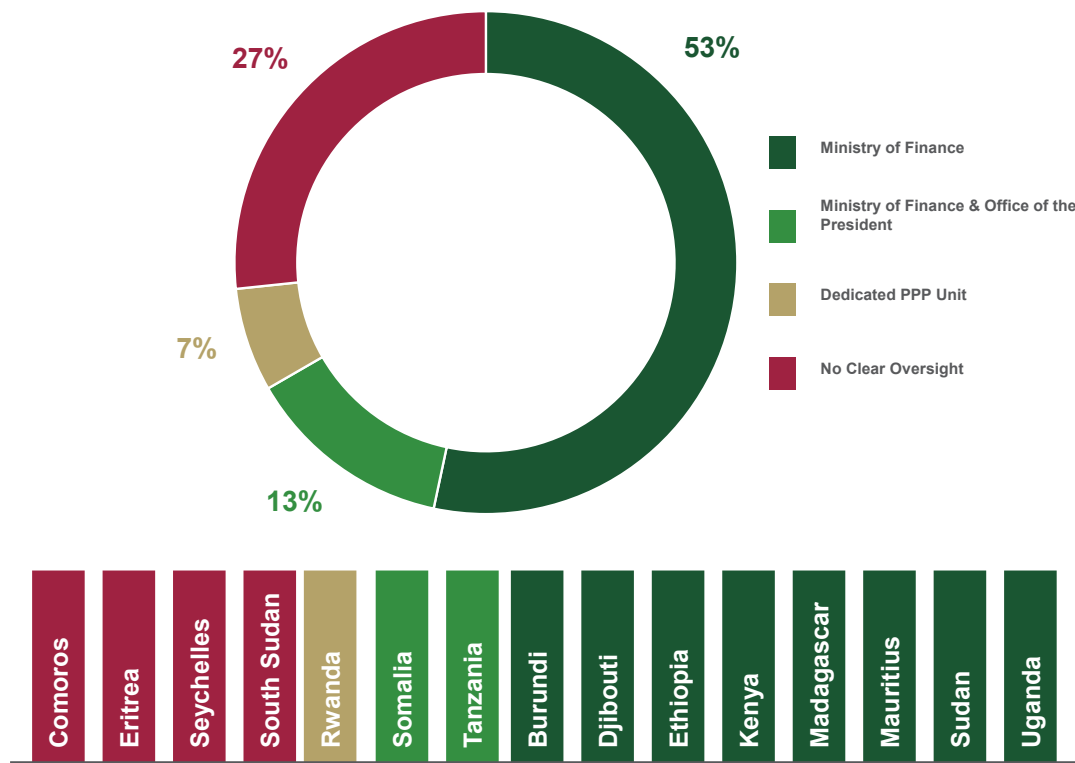


Figure 24: PPP contract oversight responsibility

Definition and General Provisions

General provisions in PPP laws establish the foundational scope, definitions, and criteria that shape the implementation of public-private collaborations, particularly in sectors like oil and gas. Definitions of PPPs across Eastern African countries typically describe a contractual arrangement between a public entity and a private party, focusing on service delivery, risk allocation, and remuneration, but variations in specificity and focus exist. These differences can lead to inconsistent implementation within countries, as broader definitions may allow flexibility while detailed ones ensure clarity, potentially causing confusion in regional collaboration where harmonised frameworks are needed. Such discrepancies may complicate cross-border projects, like pipelines, by creating misaligned expectations among stakeholders. Analysis of the general provisions across the eleven (11) Eastern African countries with dedicated PPP laws, reveals key trends in six (6) areas, each critical to understanding the scope and applicability of PPP frameworks.

Definition of PPPs

The first trend to consider is the definition of PPPs and country-specific understanding of PPPs, where examining how PPPs are conceptualised in each Member State is essential for setting the legal boundaries and expectations for collaboration.

Definitions observed consistently highlight service delivery, risk transfer to the private party, and remuneration models, but vary in detail. Broad definitions, as seen in Burundi and Somalia, focus on general collaboration, while detailed definitions in Kenya, Rwanda, and Tanzania outline risk, payment, and asset transfer, potentially leading to more structured implementation in the latter group. A focus on concessions in Djibouti and performance focused remuneration in Madagascar and Mauritius adds further variation, which may influence how oil and gas projects are prioritised or managed. The countries under which these different definitions are observed is further illustrated in Figure 25.

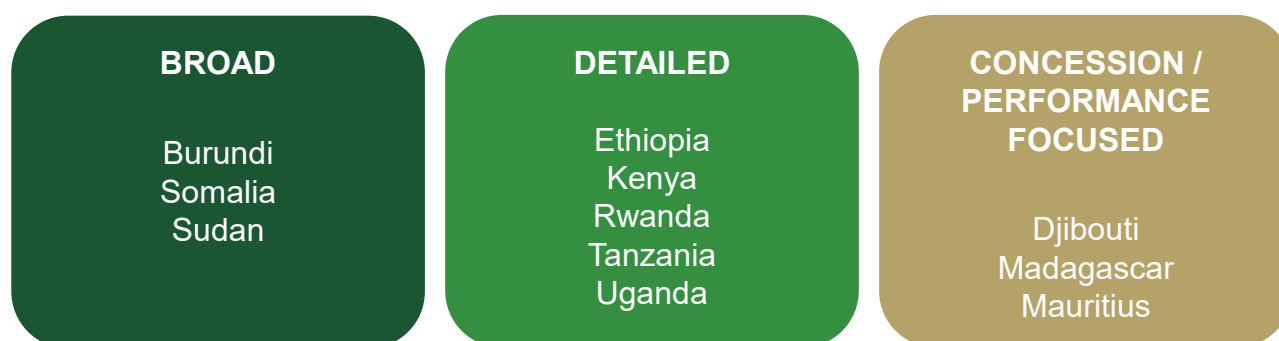


Figure 25: PPP Definitions across the Eastern Africa region

Public Assets and Services

The second trend to consider is the public assets and services area which identifies the underlying assets eligible for PPPs, crucial for determining the sectors, such as oil and gas infrastructure, that can leverage private investment. All eleven (11) countries, with dedicated PPP laws, define assets broadly as “infrastructure” which encompasses works, equipment, services, and/or property, with no prohibitions noted, indicating flexibility for diverse applications like pipelines and/or refineries. Some countries, such as Djibouti, include intangible investments, while Sudan emphasises assets or public services, reflecting slight variations in focus that could shape project types.

Types of Projects

The third trend to consider is the type of project described in the PPP laws which indicates whether the laws are applicable to new projects (Greenfields), existing assets (Brownfields), or both. This distinction is crucial for understanding the scope of infrastructure projects that can be pursued. Across all eleven (11) countries with dedicated PPP laws, the PPP laws uniformly permit both Greenfield and Brownfield projects, either explicitly or implicitly, enhancing flexibility for oil and gas initiatives. This adaptability supports a wide range of activities, from constructing new storage hubs to upgrading existing pipelines.

Remuneration of Private Partners

The fourth trend to consider is the remuneration of private partners which is an important area of focus, which involves examining gov-

ernment-pays versus user-pays models, and is vital for understanding financial structures and fiscal implications. In a government-pays model, the public sector compensates the private partner directly, typically through availability payments or services fees, regardless of user demand. In contrast the user-pays model relies on end-users to pay fees or tariffs, such as tolls or utilities, to recover the costs. Ten (10) out of the Eleven (11) countries, with dedicated PPP laws, allow both government and user payments, providing flexibility to accommodate varying project types and fiscal constraints. Sudan stands out as the exception, specifying a user-pays model only, which may limit government fiscal exposure but could restrict project applicability in sectors requiring public funding, such as large-scale oil infrastructure.

Project Duration Specifications

The fifth trend to consider is the project duration specifications which are analysed to understand the temporal scope of PPP agreements, which is critical for long-term planning in capital-intensive sectors like oil and gas. Durations vary, with five (5) countries namely; Ethiopia, Kenya, Rwanda, Tanzania, and Uganda—setting explicit caps ranging from five (5) to thirty (30) years, all extendable, while the remaining six (6) namely; Burundi, Djibouti, Madagascar, Mauritius, Somalia, and Sudan use vague terms such as “specified period” or “long-term”, offering maximum flexibility but potentially complicating standardisation across the region. The typical project durations in these eleven (11) countries with dedicated PPP laws, is further illustrated in Figure 26.

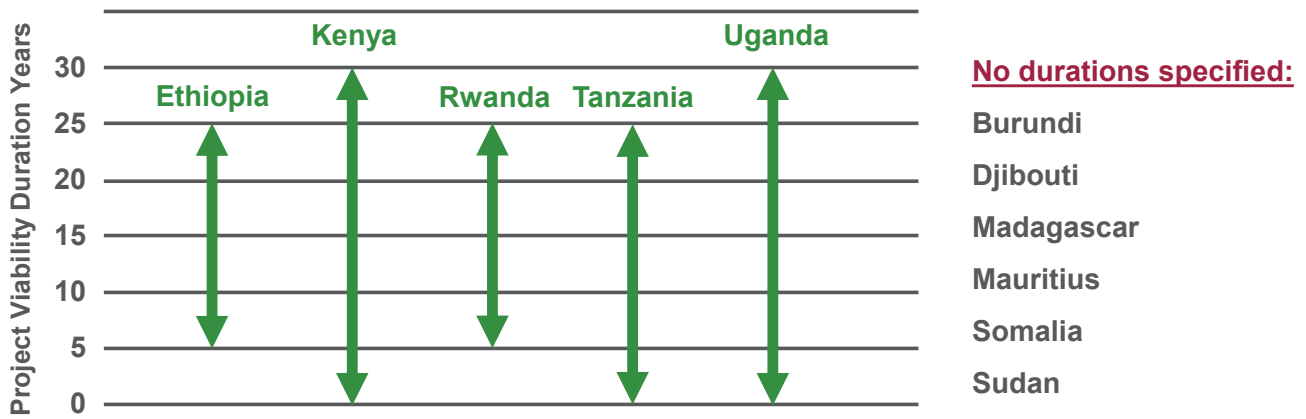


Figure 26: PPP project duration specifications

Project Size and Monetary Value

The sixth trend to consider is project size and monetary value which requires evaluation regarding whether laws specify minimum project values, which helps ensure PPPs are applied to projects justifying private involvement. Five (5) countries namely, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda set explicit minimum thresholds ranging from approximately \$3.8 million to \$27 million, targeting significant infrastructure projects like refineries. The other six (6) countries lack specific thresholds, implying flexibility but potentially leading to inconsistent application, particularly in smaller economies like Mauritius.

Regional variations show Kenya, Rwanda, Tanzania, and Uganda with detailed and clear provisions across all subcategories, aligning with mature PPP ecosystems, while Burundi, Somalia, and Sudan adopt a minimalist approach with less specificity, reflecting newer frameworks. Ethiopia, Djibouti, and Madagascar balance clarity and flexibility, indicating emerging frameworks. These variations suggest that while mature frameworks may support complex oil and gas projects, less detailed provisions could allow adaptability in resource-constrained contexts, though they may hinder regional harmonisation.

Project Evaluation Requirements

Project evaluation requirements in PPP laws outline the assessments needed to determine the suitability of projects, ensuring they align with public interest and economic goals, particularly for complex oil and gas initiatives. These assessments, ranging from risk allocation to fiscal affordability, aim to validate project viability, sustainability, and cost-effectiveness before implementation. Variations in the scope and specificity of these requirements across Eastern African countries can influence the thoroughness of project preparation, potentially affecting the success of regional energy projects. Consistent evaluation standards are crucial for nurturing trust and coordination in cross-border collaborations, such as pipelines or refining facilities.

Analysis of the project evaluation requirements across the eleven (11) Eastern African countries with dedicated PPP laws reveals distinct trends. For the purposes of this evaluation, the criteria that governments consider determining whether a project can succeed as a PPP have been categorised in five (5) main requirements, as shown in Figure 27.



Figure 27: Project Evaluation Requirements

Identification Assessment

The first requirement of identification assessment evaluates how risks are identified and distributed, which is essential for balancing responsibilities between PPPs. Risk allocation is universally mandated across all eleven (11) countries with dedicated PPP laws, with legal provisions consistently requiring risk-sharing, though the level of detail varies. For instance, Ethiopia and Kenya provide specific directives for risk identification and allocation, while Burundi uses broader language, potentially leading to less precise risk management in the latter.

Feasibility and Economic Viability

The second requirement of feasibility and economic viability assessing projects from technical, legal, social, financial, and economic perspectives, is crucial for determining overall project suitability. This requirement is also universal across the eleven (11) countries with dedicated PPP laws, with six (6), namely, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda mandating comprehensive assessments, ensuring a thorough evaluation. Some of the remaining countries, such as Mauritius and Somalia, focus primarily on technical and financial viability, with legal and social aspects less consistently addressed, which may limit the depth of project scrutiny in these jurisdictions.

Environmental Impact Assessments

The third requirement of EIAs are analysed to understand the integration of sustainability considerations, a key factor for oil and gas projects with significant environmental implications. Explicit requirements are observed in six (6) countries namely, Ethiopia, Kenya, Madagascar, Rwanda, Tanzania, and Uganda where laws mandate environmental assessments as part of feasibility studies. In Djibouti and Mauritius, the requirement is implied through general environmental compliance, while Burundi, Somalia, and Sudan lack specific provisions in their PPP laws, relying on separate environmental regulations, which may lead to inconsistent application.

Value for money assessment

The fourth requirement of value for money assessment compares PPPs to traditional procurement, is vital for justifying the use of PPPs over other methods. This assessment is mandated in five (5) countries namely, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda where laws explicitly require a value-for-money analysis, aligning with global best practices. Mauritius implies the need for such an assessment but lacks specificity, while Burundi, Djibouti, Madagascar, Somalia, and Sudan do not specify this requirement, indicating a regional gap in ensuring cost-effectiveness.

Fiscal Affordability Assessment

The fifth requirement of fiscal affordability assessment which checks a project's fiscal costs against government budgets, is critical for managing public finances, especially in resource-constrained contexts. This requirement is nearly universal, with ten (10) of the countries with dedicated PPP laws mandating it either explicitly (e.g., Ethiopia, Kenya, Rwanda, Tanzania, and Uganda tie it to budgets) or implicitly through financial impact assessments (e.g., Burundi, Djibouti, Madagascar, Somalia, and Sudan). Mauritius is the exception, mentioning financial feasibility without a clear budget focus, suggesting a weaker integration of fiscal considerations.

Project Evaluation Requirements Summary

Regional variations highlight a divide, with Ethiopia, Kenya, Rwanda, Tanzania, and Uganda adopting comprehensive frameworks that mandate four (4) to five (5) categories with detailed provisions, ensuring robust project preparation. Burundi, Somalia, and Sudan take a minimalist approach, focusing on two (2) to three (3) categories with less specificity, potentially leaving gaps in environmental or cost-effectiveness considerations. Djibouti, Madagascar, and Mauritius fall in the middle, covering three to four (4) categories but lacking depth in areas like value-for-money assessments. These variations suggest that while comprehensive frameworks may enhance project readiness for oil and gas initiatives, minimalist approaches could lead to vulnerabilities in sustainability and fiscal planning.

Procurement Processes

Procurement processes in PPP laws define the methods used to select private partners, shaping the transparency, competition, and efficiency of project implementation in sectors like oil and gas. These processes encompass a range of approaches, from open competitive tendering to more flexible methods like direct procurement and competitive dialogue, each designed to balance fairness with project-specific needs. Variations in the adoption and regulation of these methods across Eastern African countries can influence the level of competition and

adaptability in partner selection, potentially affecting the quality and cost-effectiveness of energy infrastructure projects. Consistent and transparent procurement practices are essential for cultivating investor confidence and ensuring equitable access to opportunities in regional collaborations.

Analysis of the procurement processes across the eleven (11) Eastern African countries with PPP laws reveals a structured yet flexible landscape for selecting private partners in the oil and gas sector, with key trends as shown in Figure 28.

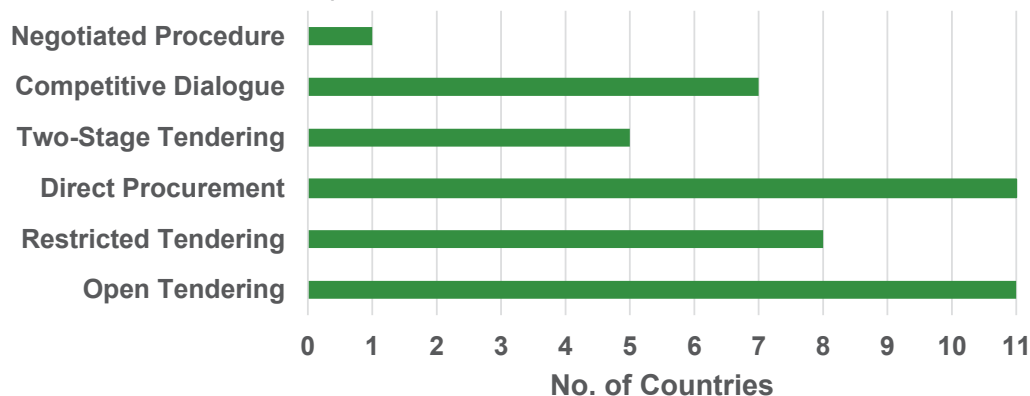


Figure 28: Number of countries employing different types of PPP procurement processes

- Dominance of Open Competitive Tendering:** Universally adopted as the default method, mandated in six (6) countries namely, Djibouti, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda and preferred in five (5) countries namely, Burundi, Madagascar, Mauritius, Somalia, and Sudan, ensuring transparency and competition.
- Alternative Methods for Flexibility:** Restricted tendering seen in eight (8) countries namely, Djibouti, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania, and Uganda targets specialised expertise, two-stage tendering seen in five (5) countries namely, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda addresses complex projects like refineries, and competitive dialogue seen in seven (7) countries, Burundi, Kenya, Madagascar, Mauritius, Rwanda, Tanzania, and Uganda encourages collaboration to refine specifications, all suggested rather than mandatory.
- Exceptional and Negotiated Options:** Direct procurement is permitted in all eleven (11) countries for urgent or sole-source scenarios, with strict regulations, while negotiated procedures, explicit only in Sudan, often overlap with competitive dialogue or direct procurement elsewhere, reflecting some ambiguity.
- Regional Variations:** Comprehensive frameworks in Kenya, Rwanda, Tanzania, and Uganda offer four to five methods, enhancing adaptability for oil and gas projects, whereas simpler frameworks in Burundi, Somalia, and Sudan focus on two to three methods, potentially limiting flexibility for complex initiatives.

The handling of Unsolicited Proposals (“USP” s), which allow private entities to initiate projects and can drive innovation in the oil and gas sector, varies across the region. USPs are explicitly permitted in six (6) countries namely; Djibouti, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda, typically with over-

sight mechanisms like competitive challenges or high-level approvals—such as Kenya’s Swiss Challenge or Ethiopia’s PPP Board approval—to balance transparency with private sector initiative. In contrast, Burundi, Madagascar, Somalia, Sudan, and Mauritius lack specific provisions for USPs, favouring government-led procurement processes, which may limit opportunities for private-driven energy projects in these jurisdictions, potentially affecting the pace of infrastructure development.

Overall, the procurement landscape balances competition with flexibility, though gaps in alternative methods and USP adoption may hinder innovation in less comprehensive frameworks.

Contract Management

Contractual arrangements in PPP laws establish the legal and operational framework for partnerships, defining how agreements are approved, executed, and enforced in sectors like oil and gas. These arrangements cover approvals, contracting authority, standardisation, governing laws, regulated terms, and dispute resolution, ensuring alignment with national priorities while managing risks. Variations in the depth and specificity of these frameworks across Eastern African countries can influence the predictability and attractiveness of PPP projects for private investors. Robust contractual arrangements are critical for ensuring trust and the long-term success of energy infrastructure initiatives in the region.

Analysis of the contractual arrangements across the eleven (11) Eastern African countries with dedicated PPP laws reveals a framework that prioritises government oversight and local legal alignment, with varying levels of detail and standardisation, as outlined below:

High-level Approvals and Contracting Authority

All eleven (11) countries mandate high-level approvals before contract execution, with six (6) countries namely, Burundi, Kenya, Madagascar, Mauritius, Rwanda, and Tanzania requiring cabinet-level approval, and five (5) countries Djibouti, Somalia, Sudan, Tanzania,

and Uganda involving the Ministry of Finance or PPP Units, often with multiple entities in Kenya, Rwanda, Tanzania, and Uganda, reflecting complex oversight.

Contracting authority is predominantly assigned to public bodies like ministries or agencies in nine (9) countries namely, Burundi, Djibouti, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Tanzania, and Uganda, with Somalia and Sudan implying similar authority. Four (4) countries Ethiopia, Kenya, Rwanda, and Tanzania require gazette publication for contracts to take effect, adding formality.

Standardisation and Governing Laws

Standard contractual terms are underdeveloped, with only three (3) countries namely, Kenya, Tanzania, Uganda mandating standard clauses, covering aspects like risk allocation and termination, developed by PPP Units, while the remaining eight (8) countries namely, Burundi, Djibouti, Ethiopia, Madagascar, Mauritius, Rwanda, Somalia, and Sudan rely on ad hoc drafting, indicating a regional lag in standardisation.

Local law governs contracts in ten (10) countries, either explicitly namely, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda or implicitly namely Burundi, Djibouti, Mauritius, Somalia, Sudan, aligning with sovereignty concerns, except in Madagascar, where parties can choose the governing law, offering rare flexibility.

Regulated Terms and Dispute Resolution

Regulation of contract terms is sparse, with only six (6) countries addressing specific terms with Kenya and Uganda regulating transfer of shares and termination, while Djibouti and Ethiopia includes step-in rights, and Rwanda and Tanzania specify termination conditions, leaving gaps in areas like state equity compared to global benchmarks.

Dispute resolution universally favours arbitration across all eleven (11) countries, of which four (4) countries namely, Kenya, Rwanda, Tanzania, and Uganda furthermore allowing courts, mediation, or dispute boards, reflecting a preference for alternative mechanisms over judicial recourse, which supports efficient resolution but may limit legal options.

Contract Management Summary

In terms of regional patterns, Kenya, Tanzania, and Uganda exhibit robust frameworks with detailed provisions across approvals, standard terms, regulated terms, and dispute options, indicating mature PPP systems, while Burundi, Somalia, and Sudan adopt minimalist approaches, focusing on basic approvals and arbitration with less detail on terms or laws; Djibouti, Ethiopia, Madagascar, Mauritius, and Rwanda offer moderate specificity, balancing oversight with flexibility.

Overall, the contractual arrangements emphasise control through high-level approvals and local law, but limited standardisation and sparse term regulation may introduce inconsistencies, potentially affecting investor confidence in oil and gas PPPs.

4.2.5 Countries Without Dedicated PPP Laws

Countries without dedicated PPP laws or units including Comoros, Eritrea, Seychelles, and South Sudan depend on alternative mechanisms to facilitate public-private collaborations in the oil and gas sector, but these approaches often fall short of providing the necessary structure for effective partnerships. Comoros channels its efforts through a national agency focused on promoting investments, while Seychelles relies on its investment board and broader investment policies to engage private partners. While Eritrea and South Sudan, lean on general investment frameworks or direct government negotiations, often managing partnerships on a case-by-case basis without a formalised system.

This reliance on non-specialised frameworks creates significant challenges for managing complex energy projects like pipelines or refineries, which require clear guidelines to attract private investment. Investors in these countries may face uncertainty around how risks are shared, how disputes are resolved, or how projects are overseen, making it difficult to commit to long-term, capital-intensive initiatives.

Without a standardised approach, transparency and consistency suffer, which can discourage private sector participation and slow

the development of critical infrastructure. Compared to their neighbours with established PPP systems, these countries struggle to compete regionally, potentially missing out on opportunities to advance their oil and gas sectors and support broader economic growth.

4.2.6 Conclusion of the PPP Sphere

The observations above highlight the diverse approaches to PPP governance across the region, influenced by varying economic, political, and institutional contexts, with over two-thirds of the member states establishing formal PPP frameworks to support structured collaborations. However, countries lacking dedicated PPP laws face significant challenges, including uncertainties in project management and risk-sharing, which hinder private investment and slow down the development of crucial infrastructure. This analysis emphasises the importance of robust, clear legal structures to attract sustainable investment and promote regional economic integration and energy security.

4.3 DOMESTIC UTILISATION OF OIL AND GAS PRODUCTS

The downstream segment of the oil and gas sector in Eastern Africa, encompassing refining, distribution, and retail for domestic use in households, transportation, and small-scale industries, is supported by various laws and regulations that enhance accessibility and affordability for local consumers. This analysis examines the legal frameworks to identify key enablers promoting downstream and domestic applications.

On the other hand, the downstream segment of the oil and gas sector in Eastern Africa also faces significant challenges due to various laws and regulations. These legal frameworks, often designed to address environmental concerns, promote alternative energy, or manage economic constraints, can create barriers to the growth and accessibility of oil and gas products for domestic consumption. This analysis further identifies key barriers to downstream and domestic applications.

The findings are structured by thematic areas, with specific examples drawn from the region to illustrate how these regulations may impede sector development.

4.3.1 Laws and Regulations Promoting Domestic Utilisation

Tax Incentives and Exemptions

Tax incentives play a critical role in reducing costs for both downstream operators and consumers, thereby encouraging the domestic adoption of oil and gas products across Eastern Africa.

In Kenya, the Petroleum Regulations of 2019 govern the handling, storage, and distribution of LPG. Historically, Value Added Tax (“VAT”) exemptions on LPG significantly improved affordability during the country’s transition to cleaner cooking fuels. Although VAT on LPG had returned to 16% in recent years, the Finance Act of 2022 reduced it to 8%. Most recently, the Finance Bill (2023) proposed full VAT exemption on LPG. These measures aim to make LPG more accessible to households, especially in response to rising global energy prices.

In Rwanda, the Downstream Petroleum Law (2013) regulates the transportation, storage, and distribution of petroleum products. Under the East African Community Common External Tariff and duty remission schemes, Rwanda has offered import duty exemptions on LPG, helping to lower consumer prices. However, household uptake of LPG remains relatively low. This is not only due to behavioural and awareness barriers but also due to distribution challenges, particularly in rural areas where LPG cylinder access and infrastructure remain limited.

In Uganda, the Petroleum Act (2013) provides a comprehensive legal framework for refining activities through clear licensing and operational guidelines. While the legislation does not currently include tax credits, its strong emphasis on infrastructure development enhances Uganda’s capacity to produce refined petroleum products locally. This, in turn, strengthens the reliability and efficiency of distribution to domestic markets.

In addition to this legal foundation, Uganda has introduced several key fiscal incentives to promote the adoption of cleaner fuels, particularly LPG. Since the 2020/21 financial year, LPG has been exempted from VAT, making it more affordable for households. Furthermore, LPG imports are subject to a 0% import duty under the East African Community Common External Tariff, further reducing costs for importers and supporting broader accessibility. These tax exemptions are aligned with Uganda’s national energy strategy to reduce dependence on biomass and promote cleaner, more sustainable fuel alternatives. Although other levies such as withholding tax and infrastructure tax may still apply, the overall tax regime for LPG is clearly structured to support increased domestic use and private sector investment.

Pricing Regulations and Subsidies

Pricing controls and subsidies ensure affordability, driving demand for oil and gas products in domestic markets. Mauritius’ Consumer Protection Regulations (2011) regulates retail prices, ensuring petroleum products remain accessible for household and transport use, with the State Trading Corporation’s oversight suggesting possible subsidies, though exact mechanisms are not specified. In Comoros, the National Energy Regulation Board (“NERB”) monitors pricing to maintain affordability, potentially through subsidies or price caps, supporting domestic access, particularly for rural consumers, though specific details are unavailable. Rwanda’s Downstream Petroleum Law 2013 has historically supported price reductions for LPG, with past interventions lowering costs to encourage its adoption for cooking, as noted in regional reports Rwandan households slow to switch to gas despite tax incentives.

Infrastructure and Equipment Support

Support for downstream infrastructure and equipment ensures the availability of oil and gas products for domestic consumption. Kenya’s National LPG Growth Strategy focuses on enhancing LPG infrastructure, aiming to increase per capita consumption from 7.5 kilograms (“kg”) to 15 kg by 2028, directly promot-

ing clean cooking in households. Burundi's National Development Plan (2018-2027) plans for regional petroleum storage depots, ensuring a stable supply for domestic distribution, which supports local access to fuels like kerosene and diesel. Uganda's Petroleum Act (2013) manages refining and storage infrastructure through licensing and operational frameworks, streamlining the distribution of refined petroleum products to domestic markets and strengthening supply reliability for end-users.

Regulatory and Administrative streamlining

Streamlined regulations reduce barriers for downstream operators, facilitating efficient distribution to domestic markets. Somalia's Downstream Regulation 2021 mandates smooth handling of petroleum products, covering offloading, transportation, storage, and supply, ensuring consistent availability for domestic consumers. Rwanda's LPG Regulations 2012 provide legal requirements for safe transportation, storage, and sale of LPG, streamlining operations to support its efficient distribution for household use. The Petroleum Authority of Uganda ("PAU") regulates the sector, with the intent of simplifying approvals for downstream projects, ensuring a steady flow of products to retail stations and households.

Energy Access and Domestic Supply Security

Policies prioritising energy access and domestic supply security promote the use of oil and gas products in local markets. Mauritius' Consumer Protection Regulations (2012) designates LPG in small cylinders (5, 6, or 12 kg) for domestic use only, enhancing safety and encouraging its adoption for cooking, with strict penalties for misuse ensuring compliance. Seychelles' Petroleum Act (1978) specifies that petroleum be stored in government warehouses or licensed tanks, supporting downstream logistics and ensuring a stable supply for domestic needs. Burundi's Société Pétrolière du Burundi ("SOPEBU") manages

the import, distribution, and retailing of petroleum products, focusing on midstream and downstream activities to ensure affordable access for domestic consumers, particularly in underserved areas.

Environmental and Sustainability Incentives

Environmental policies can indirectly promote cleaner downstream applications, encouraging the use of oil and gas products in domestic settings. Rwanda's Downstream Petroleum Law (2013) aligns with environmental goals by promoting LPG as a cleaner fuel, potentially offering incentives for its use in households to reduce reliance on biomass, though specific tax benefits are not detailed. Kenya's National Contingency Plan for the Release of Hydrocarbons ensures preparedness for spills, indirectly supporting sustainable downstream operations by mitigating environmental risks, which builds consumer confidence in using petroleum products. Madagascar's Malagasy Environmental Charter mandates EIAs for projects, encouraging sustainable practices in downstream activities, though direct incentives for domestic use are not specified.

Broader Implications of Promoting Factors

Countries like Kenya, Rwanda, and Uganda demonstrate robust frameworks with specific provisions for downstream and domestic applications, leveraging historical tax exemptions, pricing controls, and infrastructure support to promote sector growth. Mauritius and Somalia also show targeted regulations, particularly in pricing and distribution, enhancing domestic access. However, countries like Eritrea, South Sudan, and Sudan lack detailed downstream provisions, relying on general laws, which may limit affordability and accessibility for domestic consumers. This variation underscores the need for regional harmonisation to ensure consistent support for downstream and domestic oil and gas applications across Eastern Africa, promoting broader energy access and economic development.

4.3.2 Laws and Regulations Hindering Domestic Utilisation

Environmental Regulations and Restrictions

Most Eastern African countries have EIA legislation in place — a positive sign of regulatory progress and commitment to environmental governance. However, it is not the regulations themselves that typically delay oil and gas project development, but rather the strong and often disruptive influence of environmental lobbying and civil society activism.

A clear example is the EACOP, which has faced multiple layers of resistance. Legal challenges were brought before the East African Court of Justice by a coalition of civil society organisations from Uganda, Kenya, and Tanzania, citing environmental and human rights concerns. In parallel, the #StopEACOP campaign applied sustained financial pressure, leading to several international banks and insurers pulling out of the project. As a result, the first part of EACOP's financing was only secured recently — years after the project's initial announcement.

Public protests have also played a role, with several Ugandan activists arrested or detained while petitioning against the project. These combined forces have contributed to significant delays, highlighting how coordinated lobbying efforts — more than regulatory barriers — are shaping the pace and viability of oil and gas infrastructure development in the region.

Promotion of Alternative Energy Sources

Policies favouring renewable energy or alternative fuels can shift focus away from oil and gas, potentially hindering their domestic application. Ethiopia's policy to promote electric mobility, including restrictions on non-electric private vehicle imports reported since early 2024, aims to reduce reliance on gasoline and diesel, which may decrease demand for downstream oil products in the transport sector, though the full implementation and impact of this policy require further verification.

Seychelles' National Development Strategy 2024–2028 prioritises renewable energy and energy efficiency, which could shift policy focus and resources away from oil and gas infrastructure like fuel stations, though the direct impact on investment remains uncertain. Mauritius' Renewables Policy targets 60% renewable energy in the electricity mix by 2030, which could divert resources from expanding LPG or kerosene distribution for domestic cooking, though the specific effect on downstream oil and gas is not universally established.

High Taxation and Import Duties

High taxes and duties on oil and gas products or equipment can increase costs, potentially making them less affordable for domestic consumers and hindering downstream growth. Ethiopia's tax structure on combustion-engine vehicles, prior to its Electric Vehicle ("EV") focused policies, included up to 100% excise tax, 15% VAT, a 10% surtax, and a 3% withholding tax, which likely increased the cost of gasoline and diesel vehicles, possibly reducing demand for downstream fuel products in the transport sector. Since January 2024, Ethiopia has implemented a groundbreaking policy by banning the import of gasoline and diesel vehicles, making it the first country in the world to do so. This move clearly positions EVs as the preferred mode of transport, placing internal combustion engine vehicles at a distinct disadvantage.

Rwanda has abolished import taxes on EVs, including hybrids and electric motorcycles, to encourage the adoption of EVs and contribute to a cleaner and greener future. This policy aims to make EVs more affordable and accessible to its citizens.

While Kenya has not entirely eliminated import duties on EVs, it has reduced the excise duty for electric-powered vehicles to 10%, compared to higher rates for internal combustion engine vehicles. However, import duty and VAT still apply, which can make EVs more expensive upfront.

These policies reflect a regional trend towards incentivising EV adoption through fiscal measures, aiming to reduce greenhouse gas emissions and dependence on fossil fuels for combustion engine vehicles.

Lack of Specific Downstream Support

The absence of targeted laws or incentives for downstream activities can hinder the development of distribution networks and domestic access to oil and gas products. Eritrea's Eritrean Petroleum Regulations (2007) focus primarily on upstream exploration, with no specific provisions for downstream activities like fuel retailing, potentially leaving domestic markets underserved, though this observation aligns with general views on Eritrea's underdeveloped downstream sector. South Sudan's Petroleum Act (2012) emphasises exploration and production, lacking detailed downstream regulations, which may result in underdeveloped distribution infrastructure, though the specific impact on domestic supply requires further study. Tanzania's Petroleum Act (2015) prioritises upstream and midstream activities, with little emphasis on downstream distribution, which could limit the growth of retail networks, a concern often noted by experts, though direct causal links are not comprehensively documented.

Infrastructure and Regulatory Gaps

Inadequate infrastructure support and regulatory frameworks can impede the efficient distribution and adoption of oil and gas products in domestic markets. Ethiopia's focus on electric mobility, with plans to expand EV infrastructure, may signal reduced investment in oil and gas infrastructure like fuel depots, potentially limiting the domestic supply of petroleum products, though comparative investment data is needed to confirm this trend. Djibouti's Vision, Djibouti 2035, emphasises energy infrastructure but does not explicitly detail oil and gas distribution networks, which may reflect a lack of strategic focus on downstream development, though this is not a confirmed regulatory barrier. Madagascar's Petroleum Code (1996) focuses on upstream activities, with no clear regulatory support for downstream infrastructure like LPG bottling plants, potentially restricting domestic access to cleaner cooking fuels, though specific impacts are not well-documented.

Economic and Policy Focus on Foreign Exchange Saving

Policies aimed at conserving foreign exchange can restrict oil and gas imports, potentially reducing domestic supply and hindering downstream growth. Ethiopia's EV-focused policies were partly motivated by the need to reduce fuel import costs, reported at \$6 billion in 2023, which may decrease the availability of gasoline and diesel for domestic use, though this impact is an economic inference requiring further data. Somalia's National Investment Promotion Strategy (NIPS 2020) emphasises reducing imports to save foreign currency, which could limit petroleum product imports, though the specific effect on domestic supply chains is not clearly documented. Sudan's Oil and Gas Policy aims to maximise economic benefits, potentially through reduced fuel imports, which might lead to domestic shortages, though this connection is an interpretation needing further evidence on fuel availability.

Broader Implications of Hindering Factors

Countries like Ethiopia, Seychelles, and Mauritius, with policies favouring alternative energy, may pose barriers to the oil and gas sector's downstream growth, as resources and focus shift away from petroleum products, though the extent of this impact varies. Nations like Eritrea and South Sudan, with a lack of specific downstream regulations, may suffer from underdeveloped infrastructure, potentially limiting domestic access, though empirical evidence is needed to quantify these effects. High taxation in countries like Ethiopia (pre-EV policies) and Uganda, along with economic policies in Somalia and Sudan aimed at foreign exchange savings, could further exacerbate affordability and supply issues, though these effects are partly interpretative. These barriers highlight a regional trend where environmental and economic priorities may overshadow the needs of the oil and gas sector, necessitating a balanced approach to ensure energy access while pursuing sustainability goals.

4.4 EXAMPLES OF DISPARITIES HINDERING REGIONAL COOPERATION

A further analysis highlights key areas where regulatory and standardisation differences persist. While not exhaustive by any means, these examples serve to illustrate the challenges posed by these inconsistencies and their impact on regional integration.

4.4.1 Sulphur Content in Diesel

Harmonising production specifications and standards across Eastern African countries

presents a significant opportunity to enhance intra-regional trade and improve energy efficiency. A key example is the sulphur content in diesel, which currently varies widely between countries.

The latest data available from the United Nations Environment Programme provides the following information depicted in Figure 29, regarding the sulphur content of diesel based on government policies in the relevant Member States (UN Environmental Programme, 2025) (CITAC, 2020).

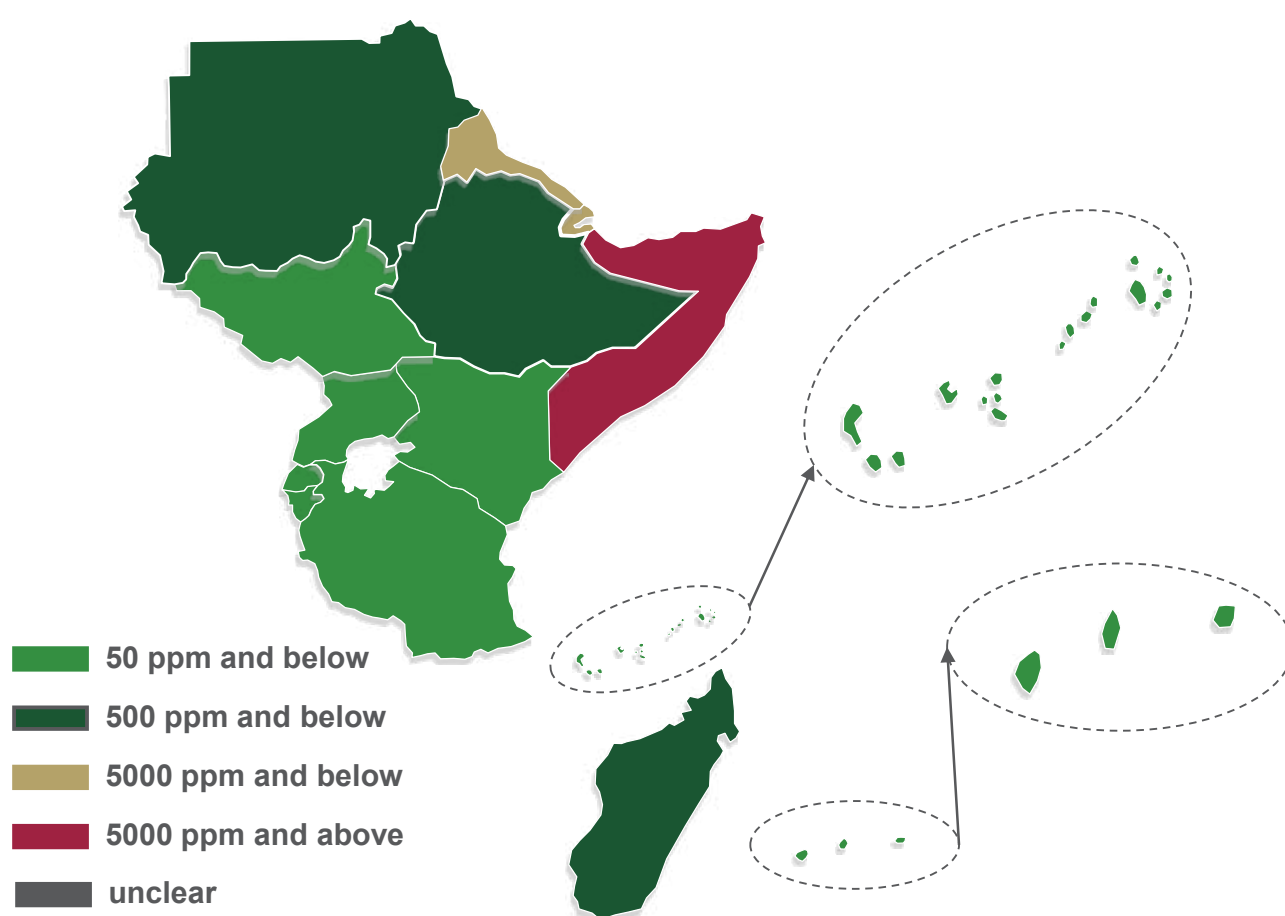


Figure 29: Diesel fuel sulphur levels based on government policies

Kenya, Uganda, Tanzania, Burundi, South Sudan, Comoros, Mauritius, Seychelles, and Rwanda are leaders in adopting lower sulphur levels regulations. These countries have implemented regulations to reduce the sulphur content in diesel fuels to a maximum of 50 parts per million (“ppm”). This initiative began in January 2015 when the EAC, adopted harmo-

nised standards for cleaner fuels, setting the sulphur limit for diesel at 50 ppm (Climate and Clean Air Coalition, 2015).

Currently the sulphur content in diesel remains high in Eritrea and Djibouti, while the limitation of sulphur content in diesel is under-regulated in Somalia. According to the United Nations and CITAC reports, Sudan, Ethiopia

and Madagascar implemented policies to limit sulphur to 500 ppm and lower.

This discrepancy presented in Figure 29 complicates trade, as fuel products that meet one country's specifications may not meet the regulatory standards of neighbouring countries, creating barriers to cross-border trade. By harmonising these specifications, such as aligning sulphur content in diesel, countries in the region can facilitate smoother and more efficient trade flows, reduce logistical costs, and improve access to cleaner and higher-quality fuels. This harmonisation would not only enhance regional integration but also attract more investment by providing a more predictable and standardised regulatory environment for the petroleum industry.

4.4.2 Sulphur Content in Petrol

Another aspect of production specifications and standards to be harmonised across the Eastern Africa region is the sulphur content in

petrol, which, like diesel, varies significantly across the region, impacting trade and environmental health.

Information regarding the petrol sulphur content of the countries in the Eastern Africa region are depicted in Figure 30. The EAC countries – Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda – have a set maximum sulphur content of 50 ppm for petrol, a standard achieved by 2019 after initially adopting 150 ppm in 2015 (UN Environmental Programme, 2025) (CITAC, 2020). Mauritius aligns with this, also enforcing a 50 ppm limit. Ethiopia, Seychelles, and Sudan, however, maintains a higher threshold at 500 ppm, reflecting slower progress in fuel quality upgrades. However, Ethiopia has banned the import of vehicles with internal combustion engines since January 2024, promoting EVs. Publicly available data for Comoros and Somalia is sparse.

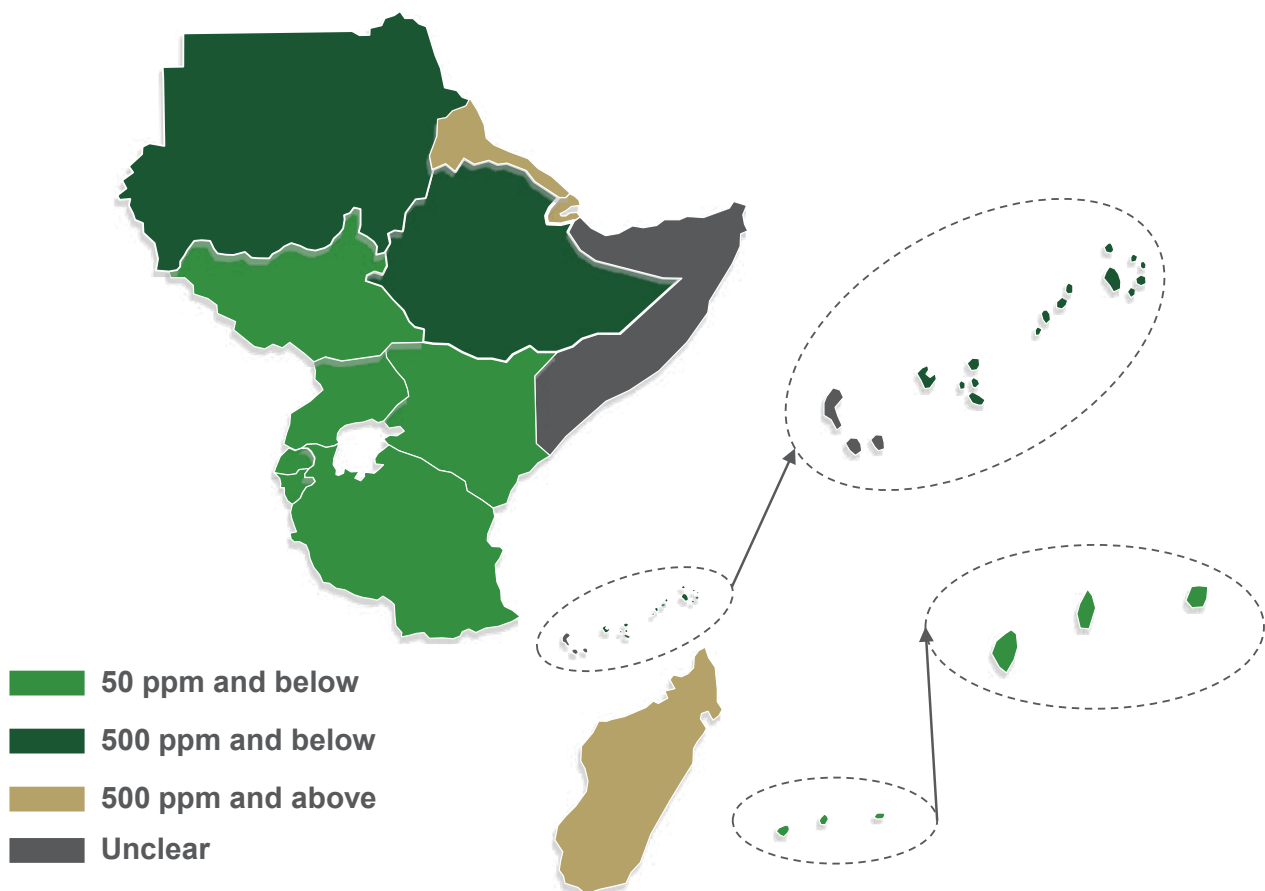


Figure 30: Petrol fuel sulphur levels based on government policies

Historically, petrol sulphur content has taken a backseat to diesel due to diesel's dominance in heavy transport and industrial sectors, which contribute significantly to air pollution through particulate matter and sulphur dioxide emissions. Global and regional efforts, like those of the United Nations Environment Programme, prioritised diesel sulphur reduction – evident in the EAC's earlier adoption of 50 ppm for diesel in 2015 – because of its larger environmental footprint. Petrol, used mainly in lighter vehicles, produces fewer harmful emissions, leading to less urgency in regulatory focus and data collection.

With diesel sulphur levels increasingly standardised, attention must shift to include petrol to maximise environmental and health benefits. High sulphur in petrol still contributes to air pollution, exacerbating respiratory issues and degrading vehicle emission systems, particularly in urban areas with growing car ownership. Aligning petrol standards region-wide would not only enhance air quality but also support the adoption of modern vehicle technologies requiring cleaner fuels. Furthermore, harmonised petrol standards would eliminate trade barriers, enabling the Eastern Africa region to integrate more fully into global clean fuel markets.

4.4.3 Petroleum Pricing Mechanisms

Harmonising pricing mechanisms for refined petroleum products across Eastern Africa is crucial for promoting regional trade, ensuring market stability, and enhancing investment attractiveness. Currently, different pricing models create disparities that can lead to trade inefficiencies, arbitrage risks, and market distortions. In a recent report from the Energy Regulators Association of Eastern Africa the various pricing mechanisms employed in the EAC Members States were analysed (Energy Regulators Association of East Africa, 2020). According to this report, Uganda follows a market-related pricing approach, where prices fluctuate based on global oil prices and local market conditions. In contrast, Tanzania and Kenya implement a cost-plus mechanism, where fuel prices are regulated based on im-

port costs, taxes, and predetermined margins. These variations in pricing models can lead to situations where fuel is significantly cheaper in one country than in another, creating incentives for informal cross-border trade and disrupting supply chains.

By harmonising pricing mechanisms, Eastern African countries can establish a more predictable and transparent trading environment; reducing price volatility and ensuring fair competition. A unified approach—whether through regional coordination on cost structures or a blended pricing model—would help streamline refined petroleum trade, prevent artificial shortages, and attract investment in refining and distribution infrastructure. Additionally, a harmonised pricing system could enhance energy security by improving supply chain efficiency and reducing economic disparities between countries. This alignment would further strengthen regional economic integration and contribute to a more sustainable and competitive refined petroleum market.

4.4.4 Public Procurement Policies

Harmonising public procurement legislation across Eastern Africa is essential for improving trade efficiency, enhancing transparency, and attracting investment in the oil and gas sector and related infrastructure projects. Currently, procurement approaches vary widely between countries, creating regulatory fragmentation that complicates cross-border trade and investment. For instance, Kenya has recently shifted towards a G-to-G procurement model for petroleum imports, allowing direct agreements between governments rather than open-market competition. In contrast, other countries in the region, such as Uganda and Tanzania, primarily rely on open tendering procedures, which promote competition and market-driven pricing. These inconsistencies in procurement mechanisms can create trade inefficiencies, making it challenging for suppliers and investors to navigate different regulatory landscapes.

A harmonised procurement framework would level the playing field, ensure fair market access, and promote regional cooperation

in oil and gas trade and infrastructure development. Standardising procurement processes—whether through regional guidelines or mutual recognition of procurement systems—could increase transparency, reduce costs, and accelerate infrastructure development by enabling joint investments and cross-border projects. This would aid in mitigating risks such as price distortions and supply chain bottlenecks, ensuring that Eastern Africa benefits from a more integrated and competitive energy market.

4.4.5 LPG Regulation and Taxation

It is important that these LPG regulations and taxation be harmonised across the Member States in the region to facilitate trade. The different historical tax regimes on LPG between Kenya and Tanzania illustrates the complications in trading between countries.

In June 2021, the Kenyan government imposed a 16% VAT on LPG, significantly increasing retail prices. Prior to this, LPG was exempt from VAT, making it more affordable. The re-introduction of VAT led to a surge in prices, with a 13 kg cylinder's cost rising from approximately 2,500 Kenyan Shilling (“Ksh”) to over Ksh 3,000 (Clean Cooking Alliance et al., 2022).

VAT policies on LPG between Kenya and Tanzania have historically contributed to price disparities, which in turn have led to unregulated cross-border trade. Recognising the burden on consumers, the Kenyan government reduced VAT to 0% in the Finance Bill, 2023, aiming to reduce prices and promote environmental conservation (Grant Thornton, 2023). In contrast, Tanzania has maintained a more favourable tax regime for LPG. In 2008, the country removed import duties and VAT on LPG to encourage its adoption as a cleaner energy source (Tanzania Invest, 2023).

In evaluating VAT policies across the other Member States, it is evident there is a mix of approaches regarding taxation. Countries like Eritrea, Djibouti, South Sudan, Sudan, Somalia, Burundi, and Madagascar charge VAT on LPG, aligning with their broader fiscal policies that generally include minimal exemptions. In contrast, Ethiopia, Rwanda, Uganda, Mauritius, and Seychelles do not impose VAT on LPG. These exemptions are part of strategic efforts to promote cleaner energy sources and make LPG more affordable for consumers. In the case of Comoros, details on VAT policies for LPG are less clear, suggesting a general application of taxation similar to other goods and services. This variation in VAT application highlights the different fiscal and environmental priorities shaping each country's approach to energy policy.

4.4.6 Light Duty Vehicle Emission Standards

The regulation of Light-Duty Vehicle (“LDV”) emissions across the countries in the Eastern Africa region varies significantly, reflecting diverse policy approaches and infrastructural capacities in each of these countries. The EAC—comprising of Burundi, Kenya, Rwanda, Tanzania, and Uganda—have made notable strides in working towards the harmonisation of vehicle emission standards across the region.

In November 2019, technical committees from these Member States convened to discuss the possibility of adopting Euro 4/IV emission standards for both new and used vehicles. This collaborative initiative is aimed at establishing uniform regulatory standards across the region, improving air quality, and promoting more efficient regional trade. The adoption of these standards will also serve to mitigate environmental and health concerns associated with vehicle emissions, while aligning the region with global best practices in environmental management (UN environment programme, 2019).



The background of the page is a dark green gradient. In the top left and bottom left corners, there are white line-art networks of dots connected by thin lines. In the center, a hand is shown from the wrist up, holding a large, glowing green sphere. From the base of the sphere, several upward-pointing arrows of varying heights and opacities emerge, creating a sense of growth and progress. The overall theme is investment and development.

5

INVESTMENT

This chapter provides an overview of the regional factors that influence investment in the oil and gas sector, addressing the barriers that have historically limited investment flow and offering suggestions on how to create a more conducive environment for investment. It highlights the importance of policy frameworks, regional cooperation, and institutional support in attracting the capital needed to expand infrastructure, improve refining capacities, and ensure energy security. Additionally, we explore the historical trends in investment within the region, focusing on the current gaps and potential opportunities for growth.

5.1 HISTORICAL INVESTMENT TRENDS AND FUTURE POTENTIAL

Private sector investment in Eastern Africa's energy sector has experienced fluctuating trends, driven by both global market conditions and regional factors. As shown in Figure 31, private sector participation has had notable peaks, particularly in 2007 and 2014.

These peaks reflect significant investments in large infrastructure projects during these years. However, the years following 2014 saw a decline in investments, with notable dips from 2015 and 2016, and a steady decline from 2017 to 2023. This is consistent with broader trends in Sub-Saharan Africa, where private sector participation in energy projects has been relatively low and declining, with state-owned enterprises taking a larger share of infrastructure projects (World Bank, 2023).

Figure 32 illustrates the variation in private sector investment in the energy sector across Eastern African Member States, revealing that investments are predominantly concentrated in specific countries. Notably, Kenya, Rwanda and Uganda have attracted the majority of these investments, while other states have seen limited activity. This pattern of concentration underscores the role of these countries as key hubs for private sector engagement in the region's energy sector. While no private sector investment data is available for Burundi, Comoros, Eritrea, Sudan, South Sudan, and Seychelles.

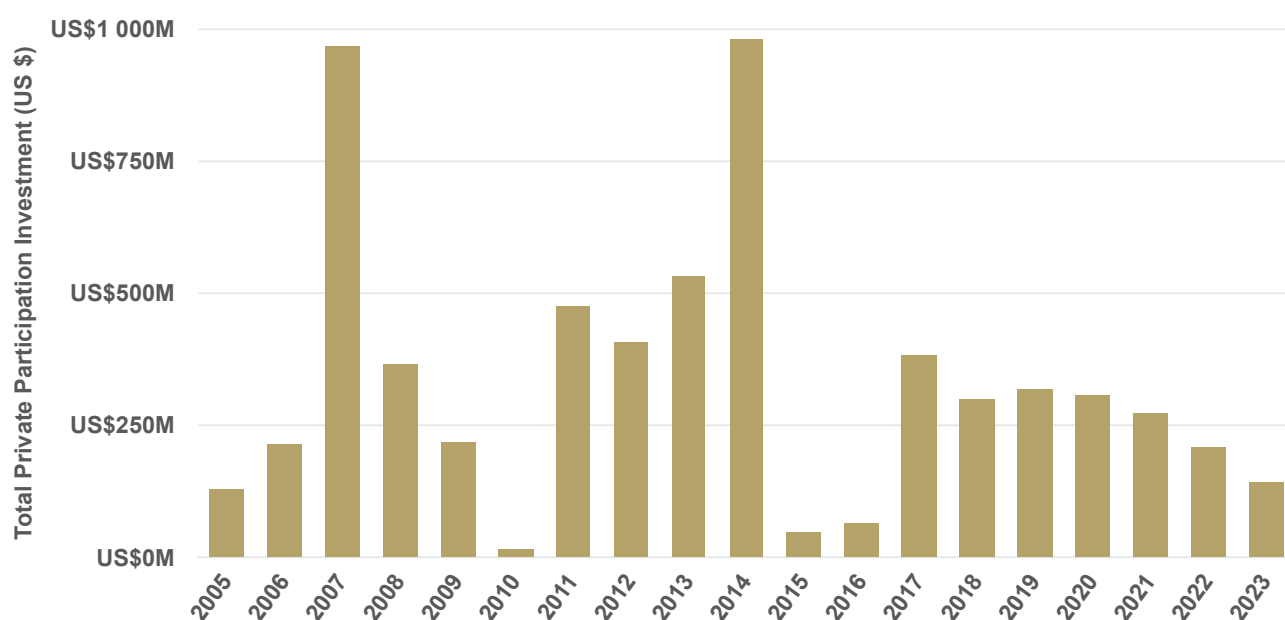


Figure 31: Private sector participation in Eastern Africa's energy projects

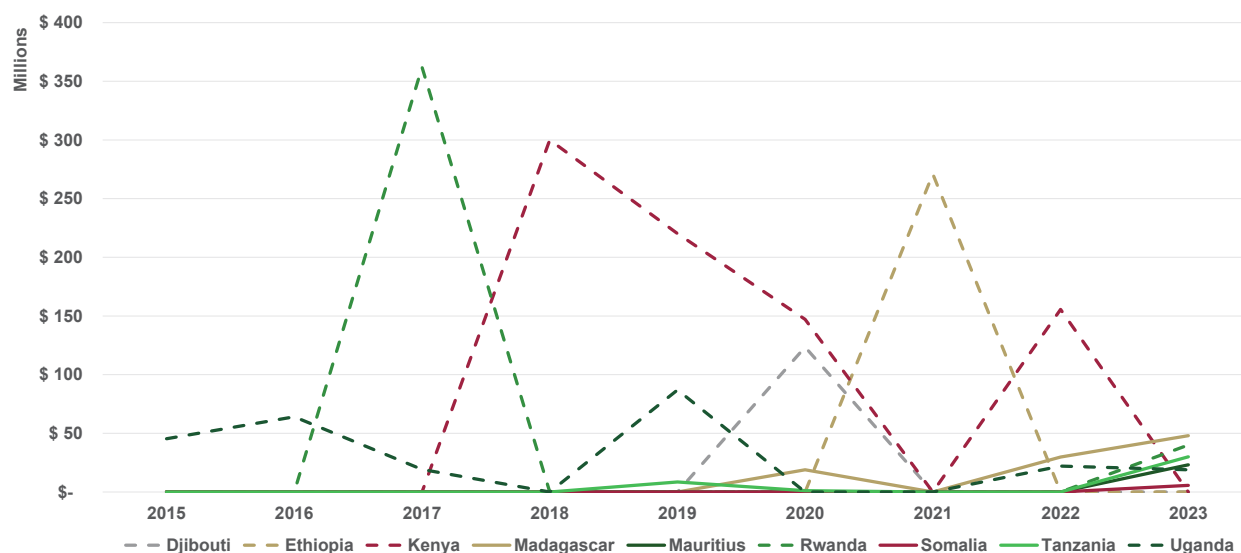


Figure 32: Private sector investment in the energy sector – variation across Member States

The decline in investment, despite the region's rich resources and growing energy demand, highlights the need for improved policies and more attractive investment environments. Historical trends suggest that while the region has significant potential, its ability to attract sustained private investment has been hampered by factors such as political instability in some Member States, infrastructure gaps, and inconsistent regulatory frameworks.

A few projects in the region such as Tanzania's proposed LNG project, which involves major international oil companies like Shell and Equinor, has seen significant delays. Initially, progress was stalled due to slow government negotiations and regulatory approvals. The Tanzanian government took a considerable amount of time to finalise terms on the Host Government Agreement ("HGA"), which is crucial for determining the framework for revenue sharing and the overall governance of such projects. Changes in government policies and shifts in priorities, particularly under different presidential administrations, have contributed to an uncertain investment climate.

The project's uncertainty was further compounded by changes in local content requirements and tax structures, which needed clearer definitions to assure investors of stable operational conditions. Additionally, the environmental and social impacts of oil and gas exploration have raised concerns about the region's readiness to meet global sustainability and ESG

criteria. These factors have led many international investors, particularly pension funds and large investment firms, to limit their exposure to fossil fuels, despite the growth opportunities within the sector.

Despite these challenges, the future of Eastern Africa's energy sector remains promising. The region is home to several untapped oil and gas reserves, particularly in countries like Uganda, Kenya, and Ethiopia. For instance, Uganda's oil sector, with significant discoveries in the Albertine Graben, is expected to attract substantial investments over the coming years, especially as infrastructure projects like pipelines and refineries move forward.

To fully capitalise on its energy potential, Eastern Africa must focus on attracting diversified, sustainable investments. This will require aligning local regulations with international best practices, offering clear and competitive incentives, and mitigating the risks posed by political instability as seen by the moderate to poor political standing found during the PESTEL and SWOT analysis as presented in Appendix B. In this regard, the enhancement of regional infrastructure frameworks and sovereign wealth fund could serve as a way to attract both domestic and international capital. Additionally, a strong focus on implementing low-carbon energy technologies, can also appeal to climate-conscious investors, positioning the region for sustainable energy development.

The future growth of Eastern Africa's energy sector depends on overcoming the barriers to investment, while capitalising on its rich resource base. With the right policies, regulatory reforms, and investment strategies in place, Eastern Africa can not only meet its domestic energy needs but also position itself as an energy exporter with sustainable, profitable energy infrastructure.

5.2 FUNDING / FINANCING OPPORTUNITIES

Securing investment for oil and gas infrastructure in Eastern Africa is critical to advancing the region's energy goals. With a shifting global financing landscape influenced by decarbonisation commitments and ESG pressures, innovative and diverse funding mechanisms are required. Multilateral and Development Finance Institutions ("DFIs") play a central role in this effort, offering concessional loans, risk guarantees, and Sharia-compliant instruments like Sukuk bonds. Institutions such as the African Development Bank ("AfDB") and the Islamic Development Bank ("IsDB") provide valuable support, particularly in de-risking projects and attracting private capital.

Governments can also leverage sovereign and green bonds to finance sustainable oil and gas projects. Transition bonds, for instance, can support lower-carbon solutions within the value chain, such as carbon capture and flaring reduction initiatives. Additionally, blended finance mechanisms, combining concessional funding with commercial capital, have emerged as effective tools to attract investment while navigating areas with higher risk exposure.

PPPs remain a cornerstone of financing large-scale infrastructure. Structures such as Build-Operate-Transfer ("BOT") agreements allow private entities to develop and manage projects, reducing the fiscal burden on governments. Sovereign wealth funds, like Uganda's Petroleum Fund, can further provide long-term financing while encouraging local economic participation. Additionally, private equity and venture capital present growing opportunities to finance midstream assets such as pipelines and refineries.

Regional coordination is equally critical. By aligning policies and consolidating demand through frameworks like the EAC, countries can develop cross-border infrastructure and improve project bankability. These collective efforts, combined with innovative financial instruments, will ensure Eastern Africa can attract the capital needed to drive sustainable energy development amidst global decarbonisation challenges.

5.2.1 Examples of Historical Financing Models in Eastern Africa

In the oil and gas industry, particularly in Eastern Africa, financing large infrastructure projects requires a diversified approach due to the scale, complexity, and strategic importance of these projects. Various financing mechanisms are employed, often in combination, to manage the substantial financial requirements and risks associated with such developments. Below is an overview of key financing mechanisms, their relevance to the oil and gas sector, and some examples of financing mechanisms utilised in the region.

Overview of Financing Mechanisms

Grants and Subsidies

Grants and subsidies are non-repayable funds provided by governments or international organisations to support projects that are considered beneficial for economic development and may not be commercially viable on their own. In the oil and gas industry, grants and subsidies can be directed towards projects that aim to enhance energy access, develop local capacity, or mitigate environmental impacts.

There have been several initiatives involving grants and subsidies for the development of clean cooking solutions in Eastern Africa. For instance, the African Clean Cooking Energy Solutions ("ACCES") initiative, supported by the AfDB, provides grants and technical assistance to promote clean cooking technologies. Additionally, organisations like the Clean Cooking Alliance have partnered with local and international stakeholders to provide financial and technical support to scale up clean cooking

solutions in countries such as Kenya, Uganda, and Tanzania.

Sovereign Wealth Fund

Sovereign Wealth Funds (“SWF” s) are state-owned investment funds composed of money generated by the government, often derived from surplus reserves or natural resource revenues. SWFs can invest in domestic or international projects that enhance the country’s strategic interests, such as securing energy supplies or investing in critical infrastructure for economic diversification. However, there are some challenges associated with using SWFs for such projects, which can impact both the performance of the fund and the project itself.

SWFs are state-owned and can be subject to political influences that affect investment decisions. Political instability or changes in government policy can lead to abrupt shifts in investment strategies or the withdrawal of funding. In addition, the profitability of oil and gas projects is heavily tied to fluctuating global commodity prices. Sudden drops in oil or gas prices can drastically affect the expected returns on investments made by SWFs.

Government Funding / Public Funding

Direct financial investments from government budgets dedicated to developing infrastructure that is crucial for national development. Public funding is often essential for major infrastructure projects that have high upfront costs and long-term payback periods, typical in the oil and gas industry.

Government funding of oil and gas infrastructure projects comes with a range of challenges and risks. While such funding can provide essential capital for development, it can also expose governments and their citizens to financial and operational vulnerabilities. Here are some of the key challenges and risks associated with government funding in this sector:

- Large-scale infrastructure projects require significant capital outlay, which can strain government budgets and divert funds from other critical areas such as education and healthcare.

- Funding these projects often involves loans, which can lead to increased national debt and interest liabilities, potentially destabilising the economy.
- Oil and gas projects are notoriously susceptible to cost escalations due to their complexity and the technical challenges involved. Governments may find it challenging to manage these costs effectively.
- Projects can face delays due to regulatory hurdles, environmental concerns, or logistical issues, each of which can escalate costs and diminish the projected economic benefits.

Development Finance

Funds provided by development banks or international financial institutions offer capital under more favourable terms than commercial entities, often with a focus on sustainable development. Development finance can support large-scale projects that align with broader developmental goals, such as regional energy integration or sustainable resource extraction.

Project Finance

Project finance is a financial structure where project revenues are used to pay back the investment, and the project’s assets, rights, and interests are used as collateral. Well-suited for large, capital-intensive projects typical in the oil and gas sector, where risks can be isolated and managed within the project company.

The structuring of finances in oil and gas projects can be extremely complex, involving multiple parties and intricate contractual arrangements. Mismanagement or financial oversights can lead to significant losses.

Public-Private Partnerships

PPPs are a cooperative arrangement between one or more public and private sectors, typically of a long-term nature, where some of the services that fall under the responsibility of the public sector are provided by the private sector. PPPs are crucial for leveraging private sector expertise and funding in the development, operation, and maintenance of infrastructure.

PPP financing model is often preferred for oil and gas infrastructure projects due to its ability to mitigate large-scale investment risks through shared responsibilities between the public and private sectors.

This model leverages private capital, reducing strain on public budgets and introducing advanced technical and managerial expertise from the private sector. PPPs are frequently structured with performance-based contracts that align incentives for efficiency and quality, ensuring projects are completed to high standards.

Additionally, these partnerships often enjoy strong government support, which provides regulatory stability and economic predictability, making them attractive to investors. The combined expertise and resources from both sectors facilitate not only the successful execution of complex projects but also contribute to local job creation and broader economic development.

Blended Finance

Blended finance entails the use of capital from public and philanthropic sources to spur private sector investment in projects that address social and environmental objectives. Blended finance can attract private investment to regions and projects where risks might otherwise deter purely private investments.

Overlap and Combination

Many large infrastructure projects in the oil and gas industry in Eastern Africa use a combination of these financing mechanisms. For example, a large pipeline project might use government funding to cover initial studies and early-stage development, secure project finance for construction, and engage in a PPP for operation and maintenance. Blended finance strategies might also be incorporated to ensure environmental sustainability components are funded.

5.2.2 Examples of Innovative Financing Models

Five (5) examples can provide insights into how Eastern Africa can successfully attract investment in its oil and gas sector. These case studies demonstrate how innovative financing

structures, strategic policy frameworks, and collaboration with international development institutions can lead to successful outcomes.

EACOP Pipeline

The EACOP project, while involving multiple stakeholders including government entities and private international oil companies, is not strictly classified as a PPP in the conventional sense. However, it does display characteristics commonly associated with PPP projects. These include collaboration between public sector entities (like the Uganda National Oil Company and the Tanzania Petroleum Development Corporation) and private sector companies (such as TotalEnergies and CNOOC International) in the development, financing, and operation of the pipeline.

The EACOP project involves significant private investment and expertise in managing a major infrastructure project, which aligns with the PPP model's emphasis on leveraging private sector efficiencies and capital. Moreover, the project aims to serve public interests by enhancing regional energy security and economic development, which are typical goals of PPPs.

EACOP successfully obtained its first tranche of external financing in March 2025 (East African Crude Oil Pipeline, 2025). This funding is supported by a consortium of financial institutions including the African Export-Import Bank, The Standard Bank of South Africa, Stanbic Bank Uganda, KCB Bank Uganda, and The Islamic Corporation for the Development of the Private Sector. This achievement underscores the significant financial backing from both regional and international stakeholders.

Financing Mechanisms for EACOP

Project Financing: While specific details of the financial agreements are not fully disclosed, it appears that the EACOP project is primarily financed through project financing. This financing strategy leverages the project's cash flows for securing and repaying the funds. Such a method is particularly well-suited for large infrastructure projects like pipelines, which require significant capital and involve considerable risk distribution.

PPPs: The EACOP involves collaboration between government entities and private inves-

tors, reflecting characteristics typical of PPPs. This collaboration leverages both public sector support and private sector efficiency.

Development Finance: Involvement of entities like the African Export-Import Bank suggests the use of development finance to promote regional development through strategic infrastructure investment.

Blended Finance: The project may also involve blended finance, combining different forms of capital including public investment, development finance, and commercial loans to optimise funding structures.

Cabora Bassa Natural Gas Project

In 2024, Invictus Energy, an Australian oil and gas exploration company, secured US\$10 million funding package for the Cabora Bassa Project in Zimbabwe (Mining Zimbabwe, 2024). This financing was made possible through a strategic capital raise, with significant participation from Zimbabwe's sovereign wealth fund, the Mutapa Investment Fund, underwriting US\$5 million of the placement. Additionally, local private equity firms and institutional investors contributed to the project, and Invictus also listed on the Victoria Falls Stock Exchange ("VFEX"), issuing Zimbabwe Depository Receipts ("ZDR"s) to facilitate greater domestic investment. This case demonstrates how leveraging national financial institutions and capital markets, combined with local investor participation, can secure funding and encourage economic ownership.

Azura-Edo Gas-Fired Power Project

In Nigeria, the Azura-Edo 450-megawatt gas-fired power project used a Put-and-Call Option Agreement ("PCOA") to secure investment without a traditional sovereign guarantee (Fulbright, 2017). The PCOA introduced a direct contractual obligation between the host government and the project company, providing investors with a clear exit strategy and mitigating risks associated with sovereign obligations. This innovative financing mechanism increased the project's bankability and has been successfully adopted in other Sub-Saharan energy projects. The PCOA model proves the value of creative contractual arrangements in increasing investor confidence,

especially in regions where traditional financial instruments may not be available.

Bagamoyo Port Project in Tanzania

The Bagamoyo Port project in Tanzania, initially envisioned as a potential major hub capable of competing with Kenya's Mombasa port, has faced numerous setbacks, leading to its indefinite stalling. The port was intended to serve as a logistics hub, particularly for the oil and gas industry. Initially backed by Chinese investors under the Belt and Road Initiative, the project aimed to significantly boost Tanzania's strategic and economic stature in East Africa.

However, negotiations stumbled as the Tanzanian government and Chinese investors clashed over several critical issues, including investment commitments and control over operations. These disputes, compounded by concerns about sovereignty and the project's economic viability, led the Tanzanian government to suspend the project. This suspension highlights the intricate challenges and complexities involved in financing substantial infrastructure projects, where diverse expectations and geopolitical factors can cause substantial disruptions.

In a significant development, the Kingdom of Saudi Arabia acquired the port in February 2025, integrating it into their ambitious "East Gate" project. This acquisition marks a new chapter for the Bagamoyo Port. As the new investor takes the helm, there is cautious optimism about the resolution of the previous sovereignty issues, paving the way for a successful project implementation that benefits the region economically and strategically (Argaam, 2025).

LAPSSET Corridor

The LAPSSET Corridor project, a major infrastructure initiative in Eastern Africa, aims to significantly enhance the region's connectivity and economic prospects through various components, including a port, railways, highways, and oil facilities. However, the project faces significant financial hurdles, exacerbated by regional instability and security concerns (Dr Mwangi & Muniu, 2023).

Security issues, particularly in parts of the project that extend into South Sudan, pose a

considerable risk. The ongoing conflicts and instability in South Sudan affect the safety and viability of constructing and maintaining infrastructure, making it a less attractive proposition for investors. These security concerns naturally lead to apprehensiveness among international investors, who are wary of committing funds to areas where their investments might be jeopardised by conflict.

Additionally, the project requires a high degree of political cooperation across three countries—Kenya, South Sudan, and Ethiopia. However, fluctuating political will and potential conflicts of interest have led to inconsistencies in support and collaboration, further complicating the project's execution and undermining investor confidence.

These factors collectively heighten the financial risks associated with the LAPSET project, as investors remain cautious about the potential for disruption and loss due to the unstable regional context. This apprehension is a critical barrier to securing the substantial

investment needed to bring the project to fruition.

Conclusion

The examples above highlight the complexity and necessity of adopting multifaceted financial strategies. Successful financing of these projects hinges not merely on securing adequate capital but also on nurturing a stable and supportive investment environment. This stability reassures all stakeholders, from local governments to international investors, of the project's long-term viability and benefits. Furthermore, PPPs have emerged as a preferred financing structure.

PPPs not only facilitate a beneficial risk-sharing between public entities and private investors but also ensure that local content is promoted, thereby enhancing local industries and workforce capabilities. This approach not only leverages financial resources but also aligns project objectives with national development goals, creating a synergistic impact across the economic spectrum.



6

DECARBONISATION TECHNOLOGY CONSIDERATIONS

It is crucial for Eastern Africa to leverage advanced technologies in developing its oil and gas markets to navigate the complex intersection of achieving a Just Energy Transition and adhering to decarbonisation goals. Employing innovative solutions, such as CCUS, methane emissions reduction, and enhanced energy efficiency, can enable the region to capitalise on its fossil fuel resources while minimising environmental impacts.

This approach would support equitable economic development, which is vital for the Eastern Africa region, based on the overall moderate economic standing found in the PESTEL and SWOT analysis, as presented in Appendix B, by addressing energy poverty and promoting industrial growth, especially in countries with high population and Gross Domestic Product (“GDP”) growth rates. At the same time, adopting such technologies ensures alignment with global climate objectives, contributing to a sustainable and responsible energy future for the region. Striking this balance will position Eastern Africa as a leader in demonstrating how resource-rich developing economies can transition to cleaner energy systems without compromising their development priorities.

The oil and gas industry has embraced various decarbonisation technologies tailored to its upstream, midstream, and downstream operations to align with global net-zero targets. The sections below provide an overview of the current technologies and pathways implemented in the oil and gas industry.

6.1 METHANE EMISSION REDUCTION

Methane accounts for nearly half of the sector’s emissions. Technologies like Leak Detection and Repair (“LDAR”) programs and advanced sensors reduce fugitive emissions aid in reducing methane-based emissions (Studies, 2020).

Historically, LDAR programs have used Optical Gas Imaging (“OGI”) cameras as the workhorses for detecting methane emissions. More recently, advanced detection technologies, such as Bridger Photonics Gas Mapping LDAR (“GML”), have emerged with the hope of

providing more effective and efficient methods for accomplishing the same goal.

GML is an advanced remote sensing technology used to detect and quantify methane emissions across oil and gas operations. Utilising laser-based systems mounted on aerial platforms such as drones or helicopters, GML scans large areas quickly and measures methane concentrations with high precision.

Unlike conventional methods like OGI, which requires on-site personnel to inspect equipment manually, GML covers vast regions more efficiently, identifying leaks that might otherwise go undetected. Its ability to provide real-time, actionable data makes it a valuable tool for operators aiming to reduce fugitive emissions and meet environmental compliance goals (Bridger Photonics, 2024). This technology not only finds application in the upstream sector but also in pipeline operations and other industrial manufacturing infrastructure.

Complementing these efforts, satellite detection plays a crucial role in decarbonisation technologies within the oil and gas industry by enabling real-time monitoring of GHG emissions, particularly methane. Using high-resolution sensors, satellites can detect and quantify emission sources across vast and often remote areas, providing accurate and transparent data to support regulatory compliance and corporate climate goals. This capability allows companies and governments to identify leaks, track emission trends, and prioritise mitigation efforts more effectively, thereby accelerating the transition toward lower-carbon operations and contributing to global climate targets.

6.2 CARBON CAPTURING TECHNOLOGY

Progress has been made in the innovation of new materials for Direct Air Capturing (“DAC”) of carbon dioxide (“CO₂”). Researchers have synthesised new molecules able to quickly capture significant amounts of CO₂ from the air, an important tactic in climate change mitigation.

In a recent article published by the American Chemical Society, a research team explored titanium as an alternative to vanadi-

um for carbon capture due to its lower cost, greater abundance, and environmental benefits. Titanium is also closely related to vanadium on the periodic table, leading the team to hypothesise that its carbon capture behaviour could be similar. They created new tetraperoxo titanate structures, which are titanium atoms bonded with four peroxide groups, known for their reactivity.

These structures showed promising abilities to capture CO₂. Potassium tetraperoxo titanate stood out because it also contains hydrogen peroxide, which enhances its reactivity. The carbon capture capacity of this structure was about twice that of vanadium peroxide, making titanium a more efficient and safer material for this application (ACS, 2024).

6.3 CARBON STORAGE TECHNOLOGY

Traditional methods of storing carbon primarily focus on capturing CO₂ emissions and storing them in secure, long-term facilities to prevent their release into the atmosphere. Sections 6.3.1 to 6.3.5 outlines key approaches for carbon storage technology.

6.3.1 Geotechnical Storage

Captured CO₂ is injected into underground rock formations, such as depleted oil and gas reservoirs, deep saline aquifers, or unmineable coal seams. The CO₂ is stored in liquid form under high pressure and is trapped within the pore spaces of the rock. This is the most widely used method of carbon storage and has been implemented in projects like the Sleipner gas field in Norway (Vattenfall, 2024).

6.3.2 Enhanced Oil Recovery

Captured CO₂ is injected into oil fields to increase the recovery of crude oil. While primarily an extraction method, it also sequesters CO₂ underground in the process. Enhanced Oil Recovery (“EOR”) is a commercially viable option that combines carbon storage with economic incentives (US Department of Energy, 2024).

6.3.3 Mineralisation

CO₂ reacts with certain minerals, such as basalt or peridotite, to form stable carbonate rocks. This natural process, known as carbon mineralisation, permanently stores CO₂ as a solid. While effective, it tends to be slower and geographically limited to areas with suitable rock formations (World Resource Institute, 2023).

6.3.4 Terrestrial Storage

This involves capturing and storing carbon in ecosystems like forests, wetlands, and soils. Practices include reforestation, afforestation, and improved agricultural techniques to enhance the natural carbon absorption capacity of plants and soil. While not a permanent solution, it supports carbon sequestration for decades to centuries (European Environment Agency, 2024).

6.3.5 Ocean Storage

CO₂ is dissolved in ocean water at great depths or injected directly into the seabed, where high pressure and low temperatures keep it in liquid form. However, this method raises concerns about ecological impacts on marine ecosystems (European Environment Agency, 2024).

6.4 CARBON UTILISATION PATHWAYS

CCSU serves as a key tool for decarbonisation by capturing CO₂ emissions from upstream processes and repurposing the carbon for alternative uses. This approach not only reduces GHG emissions but also promotes a circular economy by transforming waste CO₂ into valuable products or inputs for other industries.

The Oil and Gas Climate Initiative (“OGCI”) in collaboration with Boston Consulting Group (“BCG”) identified and investigated the following four (4) pathways for carbon utilisation (BCG, 2024):

- **Construction Aggregates** refers to raw materials used in the construction industry, primarily for making concrete and asphalt. These materials include sand, gravel, and

crushed stone, which are essential for creating the structural foundation of buildings, roads, and other infrastructure projects. While infusing captured CO₂ into construction aggregates has significant decarbonisation potential, the economics are complicated by the low margin nature of the construction materials industry.

- **CO₂-infused concrete** refers to concrete that incorporates captured CO₂ into its production process. This is typically done by curing the concrete with CO₂, which reacts with calcium compounds in the mixture to form stable carbonates. The result is concrete that is stronger and has a lower carbon footprint compared to conventional concrete. Similar to the construction aggregates pathway, the economics remain a challenge.
- **E-kerosene** is a type of synthetic fuel produced by capturing CO₂ and combining it with hydrogen derived from renewable electricity (often through electrolysis of water). This process creates a fuel that is chemically like conventional kerosene, commonly used in aviation. The pathway for E-kerosene involves utilising CO₂ captured from industrial emissions or directly from the air, via DAC. Although the technology for producing E-kerosene is nearing scalability, there are significant economic challenges.
- **E-methanol**, a synthetic liquid, follows a similar production process to that of E-Kerosene. The process typically involves using renewable electricity for water electrolysis to produce hydrogen, which is then combined with captured CO₂ through a catalytic reaction to create methanol. In the context of carbon utilisation, E-methanol provides a means to recycle CO₂ into a usable fuel, contributing to decarbonising sectors like shipping, chemicals, and energy. However, the economic viability of E-methanol faces challenges.

6.5 LOW-EMISSION ELECTRICITY INTEGRATION

6.5.1 Upstream Applications

Powering oil and gas upstream sites with renewable energy or low-emission electricity, such as solar or wind power, plays a critical role in reducing operational emissions. Typically, upstream oil and gas operations rely on fossil fuels, such as natural gas or diesel, to generate electricity for drilling, production, and other site activities. This reliance contributes to significant GHG emissions, especially methane and CO₂ (IEA, 2024).

By integrating renewable energy sources, operators can lower their reliance on conventional fossil fuels and reduce operational emissions. For instance, solar power can be used to supply electricity for remote drilling rigs or offshore platforms, especially in areas with abundant sunlight. Wind energy can be harnessed in regions with high wind potential, such as offshore or coastal operations. These renewable sources displace emissions from diesel generators, which are commonly used at remote sites.

6.5.2 Electrification of Compression Systems

Replacing gas-powered compressors with electric ones powered by renewable energy significantly enhances energy efficiency and reduces GHG emissions. Gas-powered compressors often rely on combustion, which releases methane and CO₂, contributing to climate change. In contrast, electric compressors eliminate direct emissions during operation and can leverage clean energy sources such as solar, wind, or hydropower, creating a more sustainable system. TC Energy is one such an example of a company that successfully implemented electrification of compression systems (TC Energy, 2024).

Additionally, electric compressors are generally more energy-efficient due to precise controls and reduced mechanical losses. This transition not only aligns with decarbonisation goals but also improves operational reliability and reduces long-term costs associated with emissions management and regulatory compliance.

6.5.3 Downstream Applications

Process electrification in refineries involves replacing traditional heat-intensive processes, such as those powered by fossil fuel combustion, with systems driven by electricity. When paired with renewable energy sources like solar, wind, or hydropower, this approach significantly reduces GHG emissions. Technologies such as electric boilers, induction heaters, and plasma torches are emerging solutions that can efficiently generate the high temperatures required for refining processes.

Electrification not only enhances sustainability but also aligns with the broader energy transition by decreasing reliance on fossil fuels and integrating clean energy into industrial operations. This trend reflects the growing commitment of the refining industry to achieve long-term decarbonisation goals (Schneider Electric, 2024).

6.6 HYDROGEN INTEGRATION IN PIPELINE OPERATIONS

Utilising green or blue hydrogen in pipeline operations can significantly reduce carbon footprints while supporting the transport of decarbonised energy. Green hydrogen, produced using renewable electricity and water electrolysis, is entirely carbon-free, while blue hydrogen, derived from natural gas with CCSU, minimises associated emissions. Integrating these hydrogen sources into existing natural gas pipelines enables cleaner energy transportation, reducing reliance on fossil fuels. This transition not only aligns with global de-

carbonisation goals but also helps modernise energy infrastructure, enabling a shift toward a sustainable energy system while maintaining reliable and efficient energy delivery.

Several countries from mature oil and gas markets have begun blending hydrogen with natural gas as part of efforts to reduce carbon emissions. In the Netherlands, for instance, hydrogen has been blended with natural gas in several pilot projects. The H2RES project in Denmark is another example, where green hydrogen is blended into the gas grid to decarbonise energy use (State of Green, 2022). In the UK, hydrogen blending has been approved by the government, with several trials underway aiming for hydrogen to make up to 20% of the gas mix by 2030 (IGEM, 2023).

6.7 BIOFUELS AND BLENDING

Biofuels and fuel blending present a strategic opportunity to support decarbonisation while enhancing regional energy security. Given the region's agricultural potential and availability of biomass resources, the development of sustainable biofuels can offer a viable pathway to reduce dependence on imported fossil fuels and lower GHG emissions.

One of the most practical applications is the blending of biofuels—such as ethanol or biodiesel—with conventional hydrocarbon fuels like gasoline or diesel. This approach is already widely implemented globally and allows for emissions reductions without requiring major changes to existing fuel infrastructure or engines, especially at lower blend ratios.

Promoting such blending, particularly in the transport sector, can serve as a transitional solution toward cleaner energy. To fully realise this potential, coordinated policies, investment in biofuel processing capacity, and harmonised regional standards will be essential to drive adoption and ensure environmental and economic sustainability.





7

DEMAND OUTLOOK

Understanding how oil and gas demand in Eastern Africa will evolve over time is crucial for shaping strategies in energy development and investment.

According to data provided by the Member States within the Eastern Africa region, oil consumption in 2023 was estimated at approximately 0.5 MMbbl/d, while natural gas consumption was approximately 0.2 billion standard cubic feet per day (“Bscf/d”) in the region. Sections 3.1.3. and 3.2.3 provides a detailed overview of the consumption per country in the region.

In terms of how this consumption is expected to evolve, this study draws on insights from leading energy outlooks, including OPEC, GECF, ExxonMobil, IEA, and BP, to describe potential pathways for the region’s energy future. Each organisation’s scenario provides a unique perspective: OPEC’s Reference Case for Africa examines baseline growth driven by population and urbanisation; ExxonMobil’s Baseline Scenario highlights the strive to reach the minimum modern energy threshold in developing countries, bolstered by strong population growth rates; the IEA’s Announced Pledges Scenario explores the impact of climate policies and renewable integration; and BP’s Current Trajectory and Net Zero Scenarios outline contrasting pathways based on current trends and aggressive decarbonisation efforts.

7.1 DRIVERS OF OIL DEMAND IN AFRICA

While Eastern Africa currently consumes less crude oil and refined petroleum product than other regions on the African continent, it was assumed for this analysis that the region will generally align with broader African trends due to shared demographic and economic drivers. This assumption reflects the potential for Eastern Africa to leverage its untapped reserves for industrial growth and export markets, even as global and regional pressures accelerate the transition to renewable energy.

7.1.1 OPEC

The latest OPEC World Oil Outlook 2024 highlights key drivers for Africa’s oil demand growth in the coming decades. The primary factors include the continent’s rapid population growth, expanding urbanisation, and a burgeoning middle class. These demographic and economic trends are expected to increase energy consumption across sectors like transportation, petrochemicals, and aviation.

OPEC forecasts significant demand growth in regions not belonging to the Organisation for Economic Co-operation and Development (“OECD”), particularly Africa, as economic development spurs energy needs. The petrochemical industry and road transport are notable contributors to this increase. Additionally, while renewable energy is expanding, OPEC emphasises the continued importance of oil in Africa’s energy mix due to infrastructure and investment requirements (OPEC, 2024).

7.1.2 ExxonMobil Baseline Scenario

ExxonMobil’s Energy Outlook 2024 highlights several factors shaping the oil demand outlook in Africa. Economic growth and urbanisation are key drivers, contributing to increased energy consumption across the continent. Africa’s energy demand is projected to grow significantly due to population growth and the rapid expansion of urban centres, leading to higher demand for transportation fuels and industrial energy needs.

A central narrative in their report is energy demand growth driven by increasing energy consumption per capita in developing economies, as the population in these countries strive to attain the minimum modern energy threshold.

Additionally, while renewable energy investments are expanding, oil and natural gas remain critical for meeting the current, short-term, and medium-term energy needs, especially in areas lacking access to reliable electricity infrastructure. ExxonMobil emphasises that addressing energy poverty and enhancing energy access are integral to Africa’s development and energy strategies.

The baseline scenario also assumes that while renewable energy sources and electrification will expand, sectors such as aviation, shipping, and heavy industry will continue to rely heavily on oil due to limited viable alternatives in the near to medium-term. This is expected to sustain a significant portion of global oil demand through 2050.

The report also identifies technological advancements, such as decarbonisation technologies, as essential for reducing emissions while maintaining oil's role in the energy mix. It aligns with the need for a balanced approach to energy transition, where fossil fuels continue to support economic activities while cleaner technologies are developed and deployed (ExxonMobil, 2040).

7.1.3 IEA Announced Pledges Scenario

The IEA's Announced Pledges Scenario ("APS"), presented in the 2024 World Energy Outlook, models a trajectory for global energy systems where countries fulfil their announced energy and climate pledges. For oil demand in Africa, the APS emphasises slower growth compared to traditional projections due to increased adoption of cleaner energy technologies and stronger policy measures.

Key insights include:

- African nations transition to cleaner energy through progressively integrating renewable energy sources, which could limit the region's reliance on oil for power generation and industrial needs.
- The realisation of announced national climate goals and policies is expected to accelerate transitions in sectors like transport and electricity, reducing the demand for oil-based fuels.
- Despite the push for cleaner energy in emerging economies, population growth and urbanisation continue to drive energy service demand. However, efficiency improvements and alternative fuels temper the growth in oil consumption.

In this scenario, oil's role in Africa's energy mix evolves under the influence of climate-con-

scious policies, increasing electrification, and investments in renewables and low-carbon technologies (IEA, 2024).

7.1.4 BP Current Trajectory Scenario

The BP Energy Outlook 2024, under its Current Trajectory scenario, highlights a nuanced future for oil demand in Africa. This scenario, based on existing policies and trends, projects that while global oil demand will see a gradual decline, certain factors will sustain oil consumption in Africa.

Key drivers include:

- Africa's expanding economies and increasing urbanisation will continue to drive demand for energy, including oil, particularly for transport and industrial applications.
- With Africa's population expected to grow significantly, there will be a corresponding rise in energy needs, particularly in sectors like transport and petrochemicals, which are less likely to immediately shift to low-carbon alternatives.
- Oil demand in the region remains robust due to reliance on traditional fossil fuels for road and aviation transport. The transition to electric vehicles is slower compared to developed economies.
- Rising consumption of plastics and related products boosts demand for oil as a feedstock, a trend resilient even under moderate energy transitions within the Petrochemical industry.

The Current Trajectory scenario foresees modest growth in overall energy consumption in Africa, driven by these demographic and economic factors, even as global oil demand begins to stabilise or decline. This reflects the region's unique energy dynamics and slower adoption of renewables and electric alternatives relative to developed markets (BP, 2024).

7.1.5 BP Net Zero Scenario

In BP's Net Zero scenario from the 2024 Energy Outlook, Africa's oil demand is projected to decline significantly as part of the broader

global energy transition. This scenario envisions a steep reduction in oil demand globally, with consumption declining from 44 MMbbl/d in 2022 to around 7 MMbbl/d by 2050. The decline in Africa, as elsewhere, is driven by:

- The widespread adoption of renewable energy sources like wind and solar, alongside improvements in energy efficiency, reduces reliance on oil for electricity generation and other sectors.
- The rapid growth of electric vehicles, coupled with efficiency gains in internal combustion engines, significantly reduces oil demand in the transportation sector.
- Stringent policies supporting the energy transition, such as carbon taxes, mandates for low-carbon energy, and incentives for renewables, play a central role in curbing oil consumption.
- Investments in non-oil industries, supported by international development and climate funding, help reduce oil dependency in African economies and promote economic diversification.

Overall, this scenario aligns with ambitious global efforts to achieve net-zero emissions, resulting in a marked shift away from fossil fuels toward cleaner energy sources across the continent (BP, 2024).

7.2 OIL DEMAND OUTLOOK SCENARIOS FOR EASTERN AFRICA

The outlook scenarios and their underlying assumptions, applied to the region's current cumulative oil consumption of 0.47 MMbbl/d in 2023, result in a wide range of projected demand by 2050 as depicted in Figure 33 below.

The OPEC model predicts the highest demand at approximately 0.94 MMbbl/d, closely followed by ExxonMobil's baseline scenario, which estimates a similar figure. In contrast, BP's Net Zero scenario anticipates the lowest demand at around 0.28 MMbbl/d, reflecting a sharp decline driven by decarbonisation efforts. Meanwhile, the IEA's Announced Pledges Scenario and BP's Current Trajectory scenario project intermediate demand levels, estimating 0.65 MMbbl/d and 0.63 MMbbl/d, respectively.

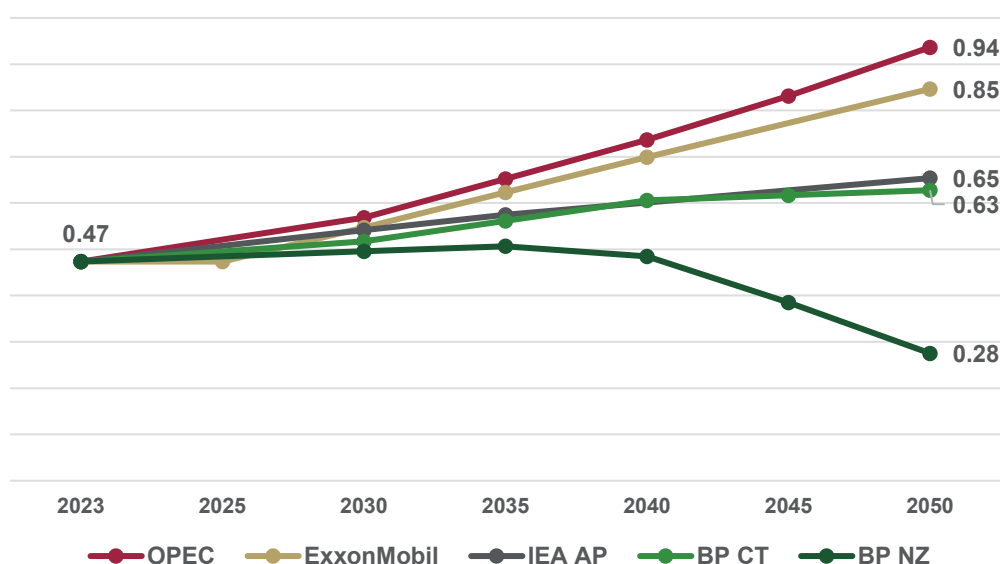


Figure 33: Comparison of Eastern Africa oil demand outlooks (MMbbl/d)

7.2.1 Comparison Analysis of Energy Outlook Models

The models and scenarios employed in this study primarily focus on global trends, followed by regional analyses, with Africa highlighted as a key region. However, these outlooks often fail to fully account for the unique circumstances of the Eastern African countries under consideration.

A key finding from the SWOT and PESTEL analysis, as provided in Appendix B, is the notable population growth rates in countries like Somalia, Tanzania, Uganda, Burundi, Sudan, and Ethiopia, averaging approximately 3% annually. A 3% annual population growth rate is considered very high, especially in the context of global or national trends, meaning the population doubles roughly every 23 years. This rapid increase puts pressure on all aspects of society, especially in developing countries. Similarly, in terms of GDP growth rates Djibouti, Eritrea, Ethiopia, Kenya, Mauritius, Rwanda, South Sudan, Tanzania and Uganda have GDP growth rates above 5%. These high growth rates align closely with assumptions made in the OPEC, ExxonMobil and BP Current Trajectory outlook scenarios for the continent, underscoring the region's potential for increased oil demand.

BP Current Projectory's projections for oil demand lag those of OPEC and ExxonMobil

due to several factors. Notably, BP anticipates a more rapid transition to renewable energy and a greater uptake of EVs compared to the other forecasts. This expectation leads BP to adopt a more conservative outlook for long-term oil demand, reflecting its emphasis on energy decarbonisation and the potential displacement of fossil fuels by cleaner energy alternatives. This contrast highlights the differing assumptions and priorities in each organisation's energy outlook.

Additionally, there is widespread scepticism regarding the feasibility of the APS of the IEA scenario. Conversely, the BP Net Zero outlook is viewed as unrealistic for Eastern Africa, as it does not align with the principles of a just energy transition for the continent.

7.2.2 Most Suitable Energy Outlook for Oil

While the OPEC model reflects a higher demand projection, it may be too ambitious as a reference scenario for the Eastern Africa region, making ExxonMobil's baseline scenario the most suitable for projecting oil demand in Eastern Africa.

Applying the ExxonMobil outlook, the region's oil demand is projected to reach 0.55 MMbbl/d in the short-term, 0.70 MMbbl/d in the medium-term, and 0.85 MMbbl/d in the long-term as depicted in Figure 34 below.

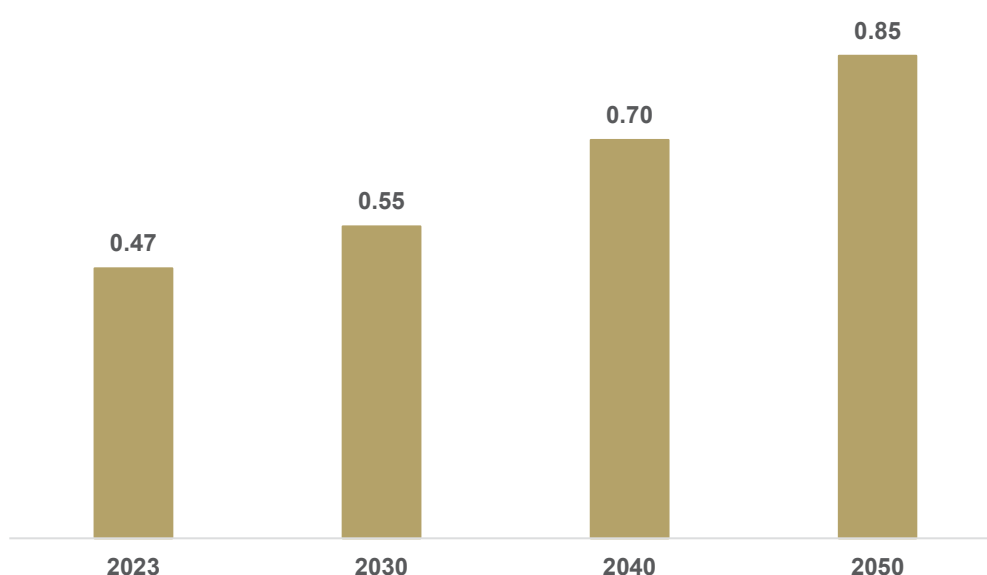


Figure 34: Eastern Africa oil demand outlook (MMbbl/d) – ExxonMobil

7.3 DRIVERS OF NATURAL GAS DEMAND IN AFRICA

While Eastern Africa currently consumes less natural gas than other regions on the African continent, it was assumed for this analysis that the region will generally align with broader African trends due to shared demographic and economic drivers. This assumption reflects the potential for Eastern Africa to leverage its untapped reserves for industrial growth and export markets, even as global and regional pressures accelerate the transition to renewable energy.

7.3.1 GECF

GECF's 2024 Outlook highlights natural gas as a cornerstone for Africa's energy future, driven by demographic trends, economic development, environmental goals, and the need for substantial infrastructure investments. Population growth is one of the key drivers of the energy outlook for natural gas consumption on the African continent, accompanied by rapid urbanisation and a substantial rise in energy demand.

Currently, a significant portion of Africa's population lacks access to clean cooking fuels and reliable electricity. Expanding natural gas infrastructure is seen as a pathway to improve energy access, thereby supporting poverty reduction and sustainable development.

The GECF energy outlook also postulates that the utilisation of natural gas, the cleanest hydrocarbon, can help reduce indoor pollution from traditional biomass and lower GHG emissions by replacing higher-emission fuels like coal and oil in power generation.

Their energy outlook for the consumption of natural gas is also based on the assumption that Africa will be able to secure significant investments in natural gas infrastructure, including pipelines and LNG facilities which will be essential to meet the projected demand (GECF, 2024).

7.3.2 OPEC

In the latest OPEC World Oil Outlook 2024, natural gas demand in Africa is projected to grow significantly due to several key drivers. Similar

to the oil outlook, economic growth and urbanisation across the continent are leading to increased energy needs, particularly in sectors like electricity generation, industrial activities, and transportation. Natural gas, seen as a relatively cleaner and more cost-effective option compared to coal and oil, is expected to play a pivotal role in meeting these demands.

Additionally, the expansion of LNG infrastructure, both for exports and domestic consumption, is facilitating greater accessibility to natural gas. This growth aligns with broader global trends where gas serves as a transitional fuel in regions aiming to diversify their energy mix while maintaining affordability and reliability (OPEC, 2024).

7.3.3 ExxonMobil

In the ExxonMobil Energy Outlook 2024, the demand for natural gas in Africa is expected to grow significantly, driven by increasing urbanisation, economic development, and the need for reliable energy sources to support industrial and electricity generation sectors. A central narrative in their report is energy demand growth driven by increasing energy consumption per capita in developing economies, as the population in these countries strive to attain the minimum modern energy threshold.

The minimum modern energy threshold is a concept that outlines the baseline level of energy access required to support basic living standards and enable economic development. It goes beyond the traditional metric of 100 kilowatt-hour ("kWh") per person annually, which is considered insufficient for promoting significant socioeconomic growth.

A new benchmark, called the "Modern Energy Minimum," proposes a threshold of 1,000 kWh per person per year. This includes approximately 300 kWh for residential use and 700 kWh for activities in sectors like industry, commerce, transportation, and agriculture. This broader scope aims to reflect the role of energy in driving not just household needs but also income-generating and productive uses, aligning better with Sustainable Development Goal 7 ("SDG 7"), which focuses on ensuring affordable, reliable, sustainable, and modern energy for all (Rockefeller Foundation, 2020).

Natural gas is positioned as a key contributor to the continent's energy mix, valued for its role in transitioning from coal and oil to lower-carbon energy solutions. The demand is also bolstered by its utility in providing affordable and relatively cleaner energy for power generation, industrial feedstocks, and other applications.

However, ExxonMobil highlights the importance of advancing infrastructure and policy frameworks to unlock the potential of natural gas in meeting Africa's growing energy requirements. Innovations in technology, including decarbonisation technologies, will also play a critical role in ensuring that natural gas aligns with decarbonisation efforts while addressing Africa's energy access and economic development goals (ExxonMobil, 2040).

7.3.4 IEA Announced Projects

In the IEA's APS for natural gas demand in Africa, key drivers include the region's ongoing push toward economic and industrial growth alongside commitments to climate targets. While there is potential for growth in natural gas consumption in specific sectors like power generation and industrial applications, the APS emphasises that future demand will be shaped by efforts to balance economic development with sustainability goals.

Investments in infrastructure, particularly for LNG facilities and domestic distribution, are highlighted as crucial for expanding access to natural gas. However, demand is tempered by the accelerated adoption of renewable energy and electrification in line with the APS goals. Moreover, regional disparities in access to financing and energy resources could affect the pace at which natural gas is integrated into Africa's energy mix.

The IEA also notes that while natural gas could play a transitional role in Africa's energy development, its long-term demand is contingent upon achieving cost efficiencies, policy support, and integration into a broader clean energy framework (IEA, 2024).

7.3.5 BP Current Trajectory

In BP's Current Trajectory Scenario, natural gas demand in Africa is projected to grow significantly in the short-term, driven by increasing energy needs due to population growth, urbanisation, and industrialisation. This growth is supported by the role of natural gas as a transitional fuel, balancing the need for affordable and reliable energy with efforts to reduce emissions compared to coal and oil. The demand is primarily fuelled by its use in power generation, where natural gas continues to play a crucial role, and in industrial applications as countries aim to expand their manufacturing and energy infrastructure.

However, BP views natural gas as a short-term bridge fuel that plays a critical role in the transition to cleaner energy sources. BP's Current Trajectory Scenario expects a faster shift away from gas due to policy, technology, and decarbonisation trends, especially post-2040. (BP, 2024). As renewable energy technologies scale up and decarbonisation efforts intensify, particularly in sectors like electricity generation and transportation, natural gas demand growth is expected to plateau. The shift is driven by government policies aimed at reducing carbon emissions, such as stricter regulations and financial incentives for clean energy technologies, pushing the global energy mix towards sustainability more quickly.

7.3.6 BP Net Zero

Under the BP Net Zero scenario demand for natural gas declines by over 50% relative to 2022 levels, reflecting a shift toward decarbonisation. While natural gas continues to serve as an energy source in Africa, its role diminishes over time as renewable energy technologies gain traction, though natural gas demand may persist in regions requiring energy security and industrial growth, but it faces increasing competition from alternatives like hydrogen, bioenergy, and renewables.

7.4 NATURAL GAS DEMAND OUTLOOK SCENARIO

The outlook scenarios and their underlying assumptions, applied to the region's current cumulative natural gas consumption of approximately 0.2 Bscf/d in 2023, result in a wide

range of projected demand by 2050 as depicted in Figure 35 below.

The GECF presents an ambitious projection for natural gas demand. Applying GECF's projected growth rates for Africa to Eastern Africa results in an estimated demand of 0.50 Bscf/d by 2050.

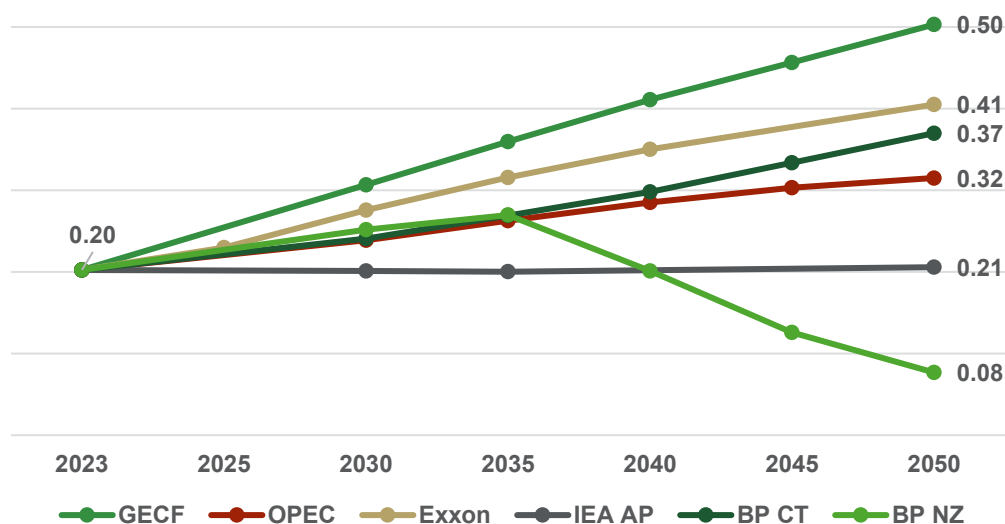


Figure 35: Comparison of Eastern African natural gas demand outlooks (Bscf/d)

The ExxonMobil and BP Current Trajectory forecasts are more conservative than the projections from GECF, albeit still optimistic. Based on current consumption levels, ExxonMobil projects natural gas demand reaching 0.41 Bscf/d, while BP's Current Trajectory scenario closely aligns, estimating demand at 0.37 Bscf/d.

The IEA's APS suggests a flat demand trajectory, while OPEC's forecast positions itself in the middle, projecting demand at 0.32 Bscf/d.

BP's Net Zero scenario, however, represents the most pessimistic outlook, assuming a rapid global energy transition that significantly curtails natural gas consumption in the region, with a projected demand of 0.08 Bscf/d.

7.4.1 Optimism in Natural Gas Market Development of Eastern Africa

The introduction of natural gas into an economy with previously limited access often triggers a self-reinforcing cycle of demand growth. Initial adoption typically begins with key sectors, and as these early adopters experience its benefits, awareness spreads, driving broader market expansion.

Australia provides a strong example of this pattern. Initially focused on LNG exports, domestic consumption surged as production increased. Infrastructure investments and government policies, such as the Australian Domestic Gas Security Mechanism ("ADGSM"), ensured stable supply and stimulated demand across various sectors, reinforcing long-term market growth.

Several Eastern African countries are in the early stages of gas market development, with limited infrastructure and supply. As gas becomes increasingly available, demand could rise rapidly, fuelled by population growth and sectoral adoption. Unlike static markets, Eastern Africa's expanding population and evolving technologies suggest sustained long-term demand growth.

Natural gas is also seen as a vital transition fuel, offering a cleaner alternative to biomass and helping address energy access challenges. The potential role of natural gas in gas-to-power and petrochemical applications is highlighted in section 8.2.3 of this report. Regional initiatives promoting clean cooking solutions further highlight natural gas's role in improving public health and environmental sustainability.

7.4.2 Comparative Analysis of the Optimistic Energy Outlooks

Based on this growing optimism and with the aim of selecting a suitable energy outlook to determine the expected natural gas consumption in Eastern Africa, the top three (3) optimistic energy outlooks namely GECF, ExxonMobil, and BP Current Protectory have been scrutinised on various factors to determine the different nuances driving their outlooks.

Based on the analysis provided in Table 4, the focus and perspective of these three (3) energy outlooks are slightly different. The GECF perspective represents that of producing and exporting countries, whereas the ExxonMobil and BP Current Trajectory perspectives reflect international energy companies with a market-driven view, carefully balancing supply and demand aspects in projecting future developments.

However, while the GECF outlook is the most optimistic, it does not fully acknowledge several regional challenges that could hinder investments. The increasing global pressure to decarbonise; evolving policy landscapes and growing financial constraints in funding large-scale natural gas infrastructure create uncertainties which could potentially not be adequately accounted for in GECF's projections.

It is also important to highlight the differences in how these outlooks perceive the energy transition and decarbonisation to unfold. GECF considers gas a transitional and long-term energy source for Africa due to its lower emissions than coal. ExxonMobil also views gas as a long-term transition fuel, particularly in emerg-

ing economies, but acknowledges pressure to adopt renewables. In contrast, BP's Current Trajectory model sees gas as a medium-term bridge fuel with accelerating clean energy investments, emphasising policy shifts, including government incentives for renewables and potential carbon pricing impacts on gas.

The extent to which policy shifts as one of the drivers of the BP energy outlook could be achieved is uncertain. In general, many African countries prioritise energy access and economic growth over strict emissions reductions, leading to continued reliance on fossil fuels. In addition, evolving regulatory frameworks and limited institutional capacity slow down the implementation of decarbonisation policies.

7.4.3 Most Suitable Energy Outlook for Natural Gas

When considering a more balanced yet optimistic projection, ExxonMobil provides the most suitable outlook for Eastern Africa. While BP anticipates a faster shift away from gas due to policy, technology, and decarbonisation trends, especially post-2040, ExxonMobil takes a stronger long-term position on gas, viewing it as a crucial energy source well beyond 2050, particularly for Africa's economic growth and global LNG exports.

Under ExxonMobil's projections, natural gas demand in the region is expected to reach 0.28 Bscf/d in the short term, 0.35 Bscf/d in the medium term, and 0.41 Bscf/d in the long term, as illustrated in Figure 36 below.

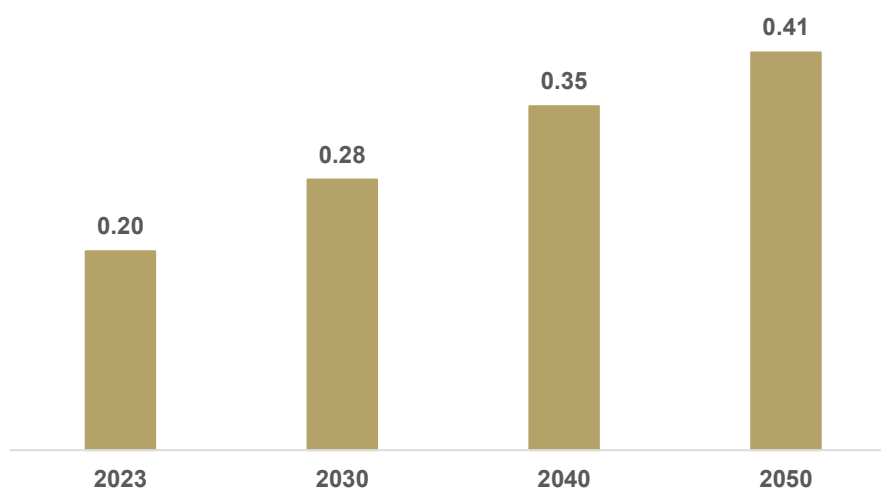


Figure 36: Eastern African natural gas demand outlook (Bscf/d) – ExxonMobil

Table 4: Comparison for natural gas energy outlooks

Factor	GECF	ExxonMobil	BP Current Trajectory
Focus and Perspective	Producer/exporter perspective, emphasising gas-exporting nations' strategies.	Global energy company perspective, with market driven perspective balancing supply, demand, and investments.	Global energy company perspective with a scenario-based approach considering long-term policy, technology, and energy transition trends.
Natural Gas Demand Growth	Expects strong growth in Africa's domestic gas demand due to urbanisation, industrialisation, and power generation needs.	Sees demand growth but emphasises competition with other fuels and renewables. Demand growth fuelled by reaching minimum modern energy threshold.	Slightly more conservative on gas demand, expecting competition with renewables and concerns about long-term carbon emissions and implementation of associated policies and regulation.
LNG vs. Pipeline Exports	Emphasises pipeline exports and regional integration within Africa, alongside LNG exports to global markets.	Focuses on LNG as the dominant mode for African gas exports due to global market demand.	Also sees LNG as critical but highlights regional trade growth and the role of pipeline gas in Africa's energy security.
Role of Policy & Regulation	Highlights government policies, local content requirements, and regional cooperation in shaping the market.	Emphasises private sector investment climate and the need for stable regulatory frameworks.	Anticipates policy shifts, including government incentives for renewables and potential carbon pricing impacts on gas.
Energy Transition & Decarbonisation	Considers gas a transitional and long-term energy source for Africa due to its lower emissions than coal.	Views gas as a long-term transition fuel but expects renewables and carbon capture to gain a larger share in the long run.	Sees gas as a shorter-term bridge fuel, with demand peaking earlier due to accelerating clean energy investments.
Investment & Infrastructure	Calls for increased investments in domestic gas infrastructure to support economic growth.	Stresses the importance of large-scale infrastructure investments, particularly in LNG and gas pipelines.	Highlights infrastructure bottlenecks and potential underinvestment risks due to shifting capital toward renewables.
Supply & Production Outlook	Strong emphasis on Africa's untapped gas reserves and production potential.	Acknowledges Africa's production growth but sees competition from other global gas suppliers.	Acknowledges Africa's gas potential but expects growth to slow as the global energy system decarbonises.

8

OIL AND GAS SUPPLY OUTLOOK

This chapter presents an analysis of the oil and gas supply outlook for the Eastern Africa region, encompassing a current situation gap analysis for crude oil, refined petroleum products, LPG and natural gas. Additionally, this analysis examines the midstream infrastructure landscape, focusing on planned and under-construction facilities that are pivotal for enhancing supply chain efficiency and capacity.

8.1 CRUDE OIL AND REFINED PETROLEUM PRODUCTS

8.1.1 Current Situation Gap Analysis

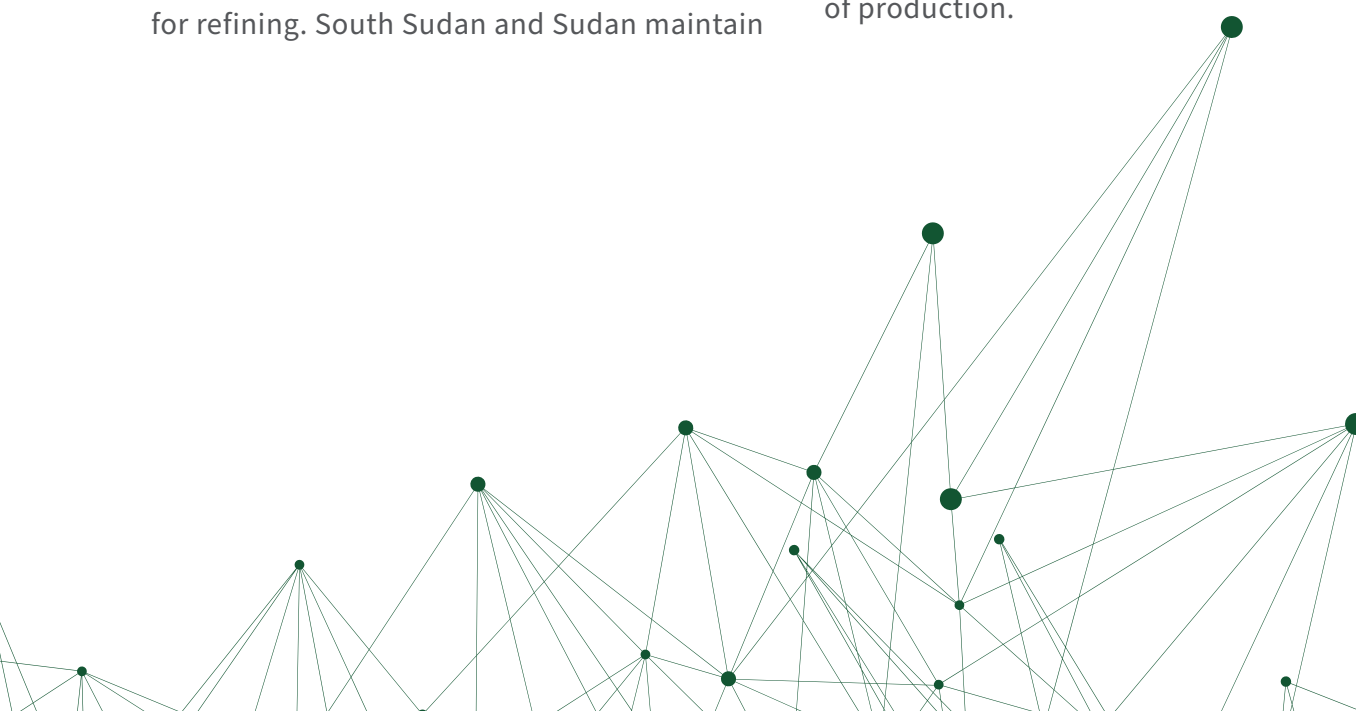
Crude Oil Gap Analysis

In the Eastern Africa region, South Sudan and Sudan are the sole producers and consumers of crude oil, both maintaining a surplus as presented by the crude oil production gap in Figure 37. The specific crude oil production and consumption for South Sudan and Sudan are presented in Appendix C. The surplus production in both countries position them as key suppliers in Eastern Africa, however, their oil sectors are intricately linked, with South Sudan relying on Sudan's pipelines and port facilities for export, and Sudan benefitting from the transit fees and access to crude oil for refining. South Sudan and Sudan maintain

a crude oil production surplus after satisfying their domestic consumption needs, positioning them as key players in the global oil market. This surplus enables both countries to export crude oil, generating vital revenue that supports their economies and promotes regional energy cooperation.

As presented in Figure 38, the crude oil production surplus in South Sudan and Sudan is effectively balanced by the countries' crude oil exports, resulting in neither a crude oil deficit, nor a crude oil surplus. Sudan's refining capabilities allow it to process both domestic and South Sudanese crude, with refined products serving local markets and contributing to export revenues.

Eastern Africa holds significant untapped crude oil resources across several countries, presenting potential for expansion of the region's oil sector. Ethiopia, Somalia, Uganda, and Madagascar have the largest untapped crude oil resources of approximately 7.33 Bbbls, 30 Bbbls, 6.5 Bbbls, and 12.8 Bbbls respectively, thus holding the largest untapped contingent resources in the Eastern Africa region. Despite this notable potential, none of these countries has exploited this potential by the commencement of crude oil production, as shown in Figure 39. Ethiopia, Kenya, and Uganda also have substantial proven reserves awaiting development and commencement of production.



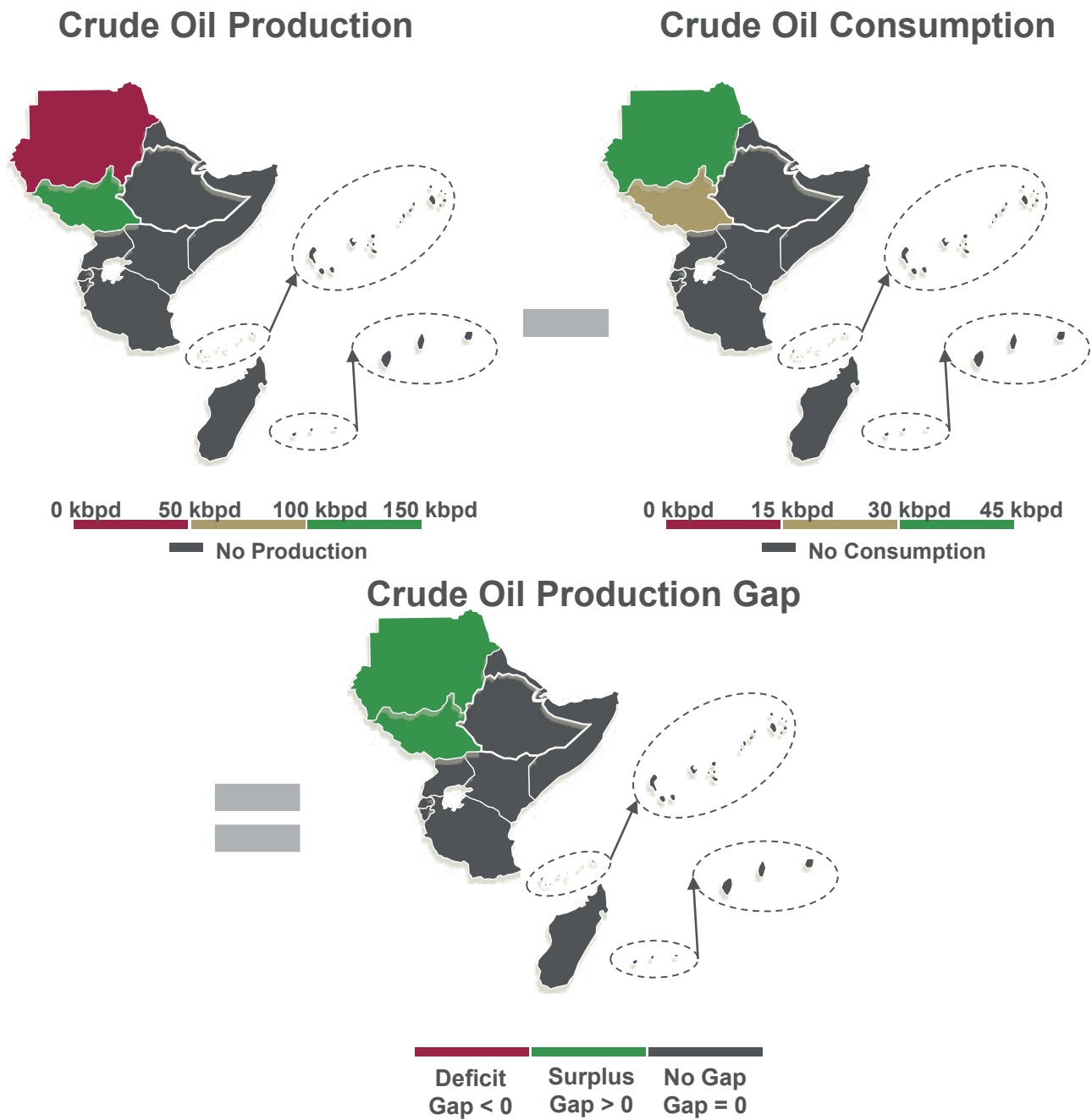


Figure 37: Crude oil production gap within the Eastern Africa region

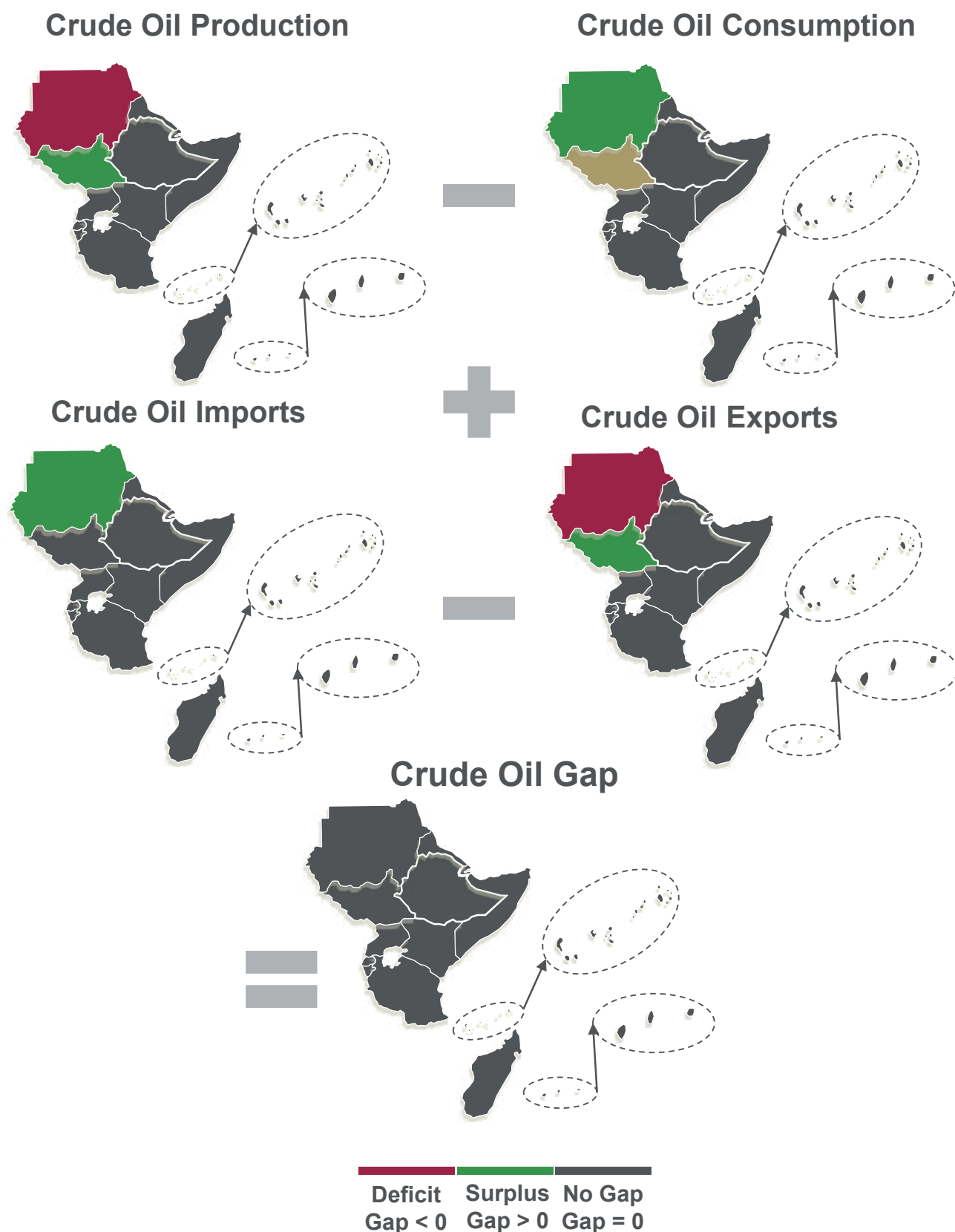


Figure 38: Crude oil gap within the Eastern Africa region

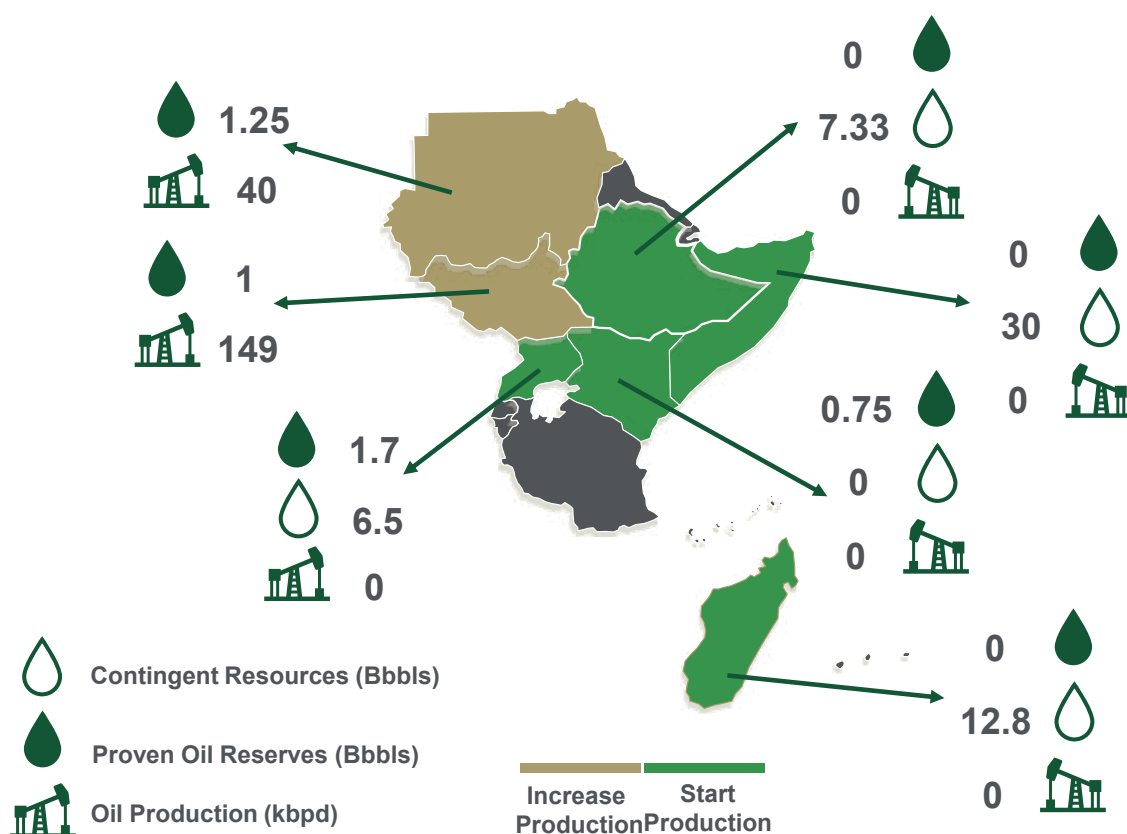


Figure 39: Crude oil production within the Eastern Africa region

Refined Petroleum Product Gap Analysis

The Eastern Africa region exhibits a complex dynamic in the production and consumption of refined petroleum products. Currently only two (2) countries in the region, namely South Sudan, and Sudan, produce refined petroleum products. However, all fifteen (15) Eastern African countries consume refined petroleum products leading to a significant production deficit, as presented in Figure 40, with the specific refined petroleum production and consumption presented in Appendix C. This gap signifies the region's inability to meet its overall consumption needs through regional production alone. Consequently, the region is heavily reliant on imports which poses challenges related to cost, supply chain vulnerabilities, and energy security.

Despite this overarching production deficit, certain countries have managed to address their specific consumption needs effectively. The overall refined petroleum product gap is shown in Figure 41. Somalia and Rwanda

have successfully mitigated their production gaps by importing sufficient refined petroleum products to meet their domestic consumption requirements. Burundi, Djibouti, Mauritius, South Sudan, and Uganda have leveraged imports to create a surplus of refined petroleum products. This surplus not only satisfies their internal consumption requirements but also presents an opportunity for these countries to serve as regional exporters, supplying neighbouring countries that face deficits, as shown in Figure 43.

Nevertheless, a significant number of countries, namely Comoros, Eritrea, Ethiopia, Kenya, Madagascar, Seychelles, Sudan, and Tanzania remain in an overall deficit even after accounting for imports. The persistent deficit in these countries highlights the need for strategic interventions to enhance regional energy security. Possible solutions, presented in Figure 42, include increasing refining capacity by refurbishing existing facilities, boosting production levels, investing in the construction of new refineries, upgrading current infrastructure, or scaling up imports to bridge the gap.

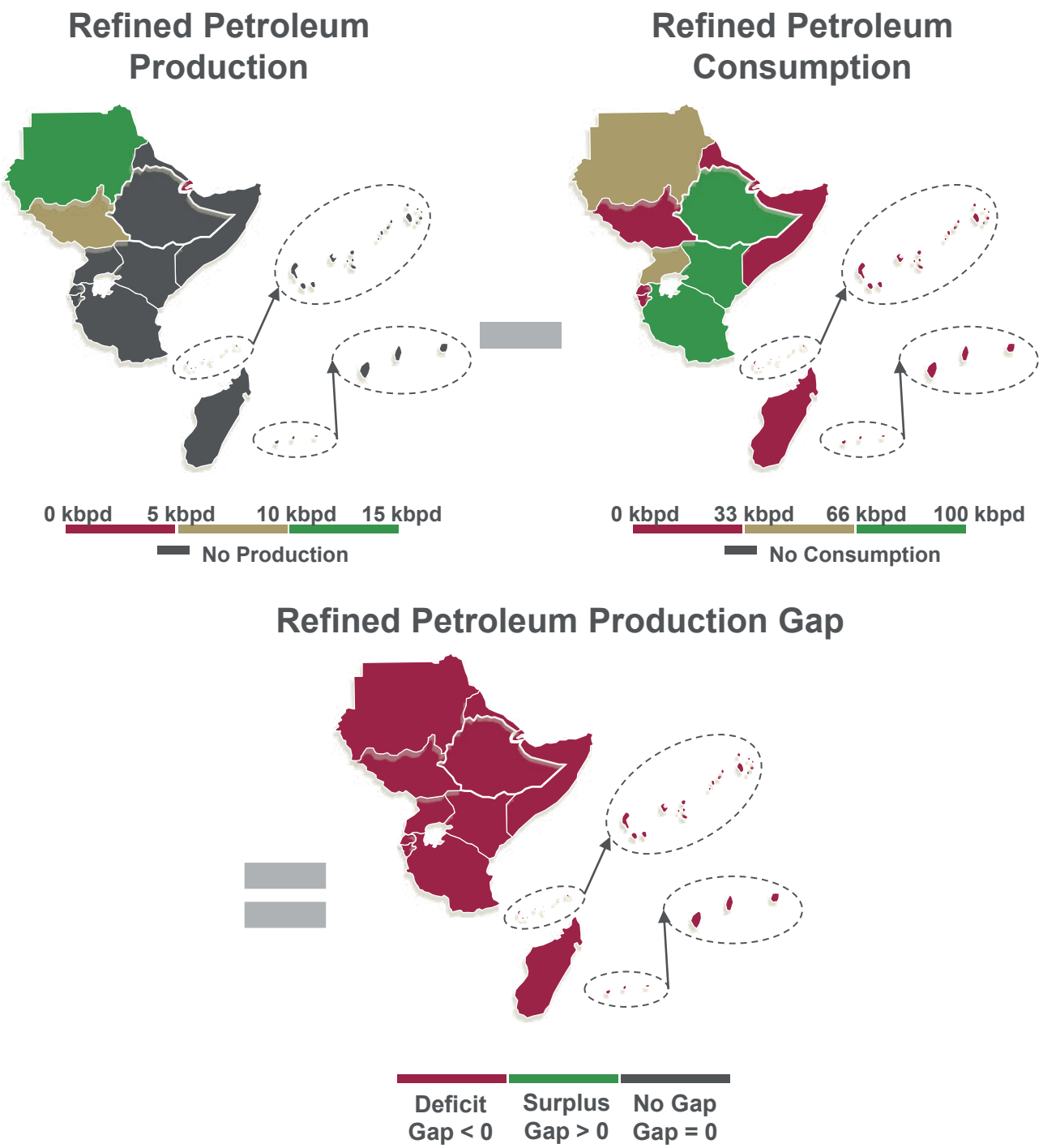


Figure 40: Refined petroleum products production gap within the Eastern Africa region

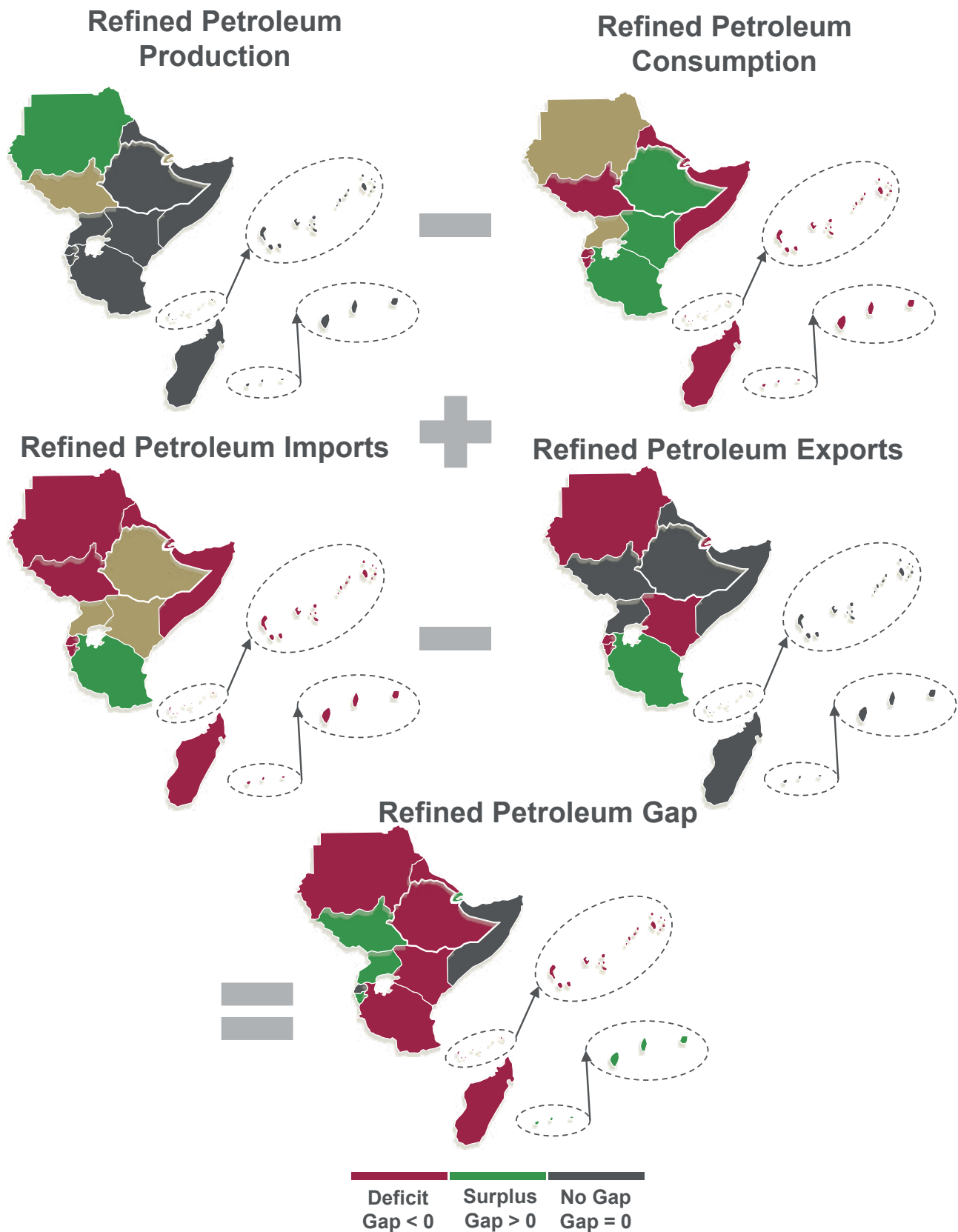


Figure 41: Refined petroleum products gap within the Eastern Africa region

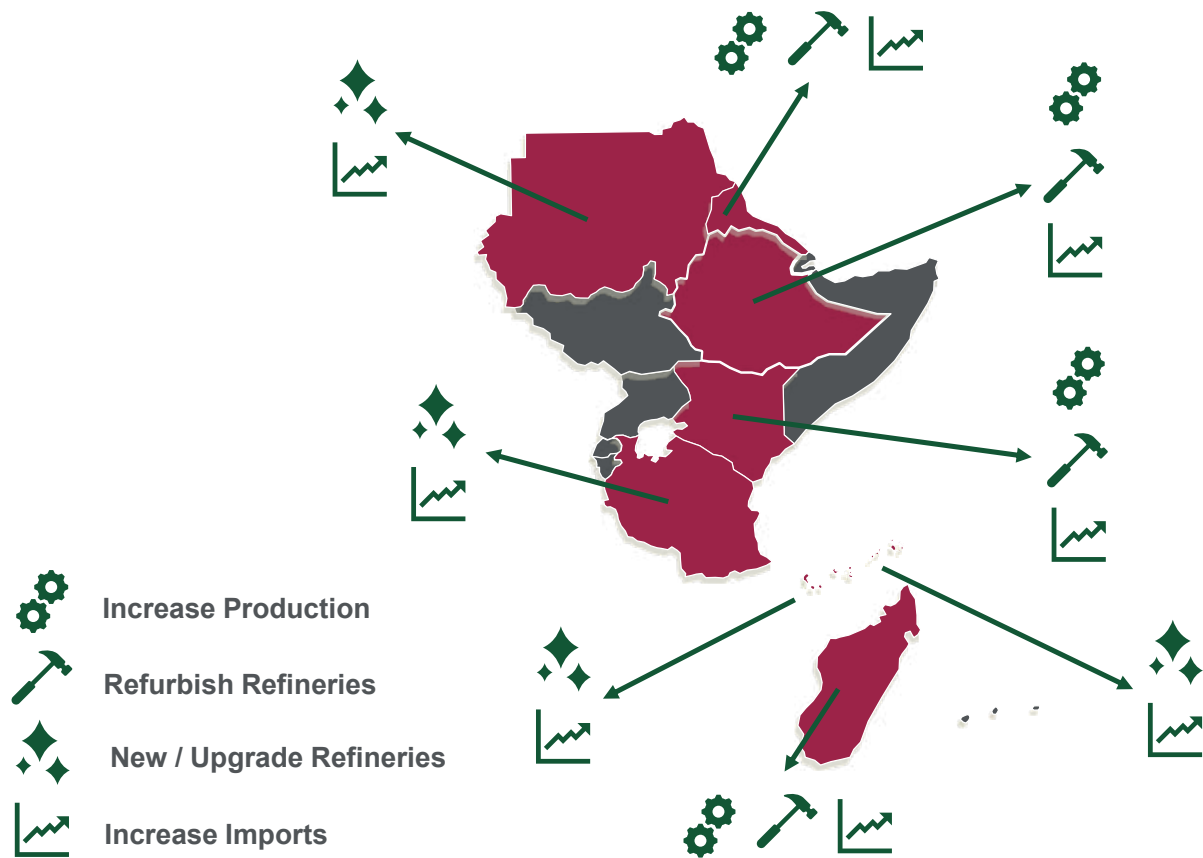


Figure 42: Refined petroleum product deficit solution

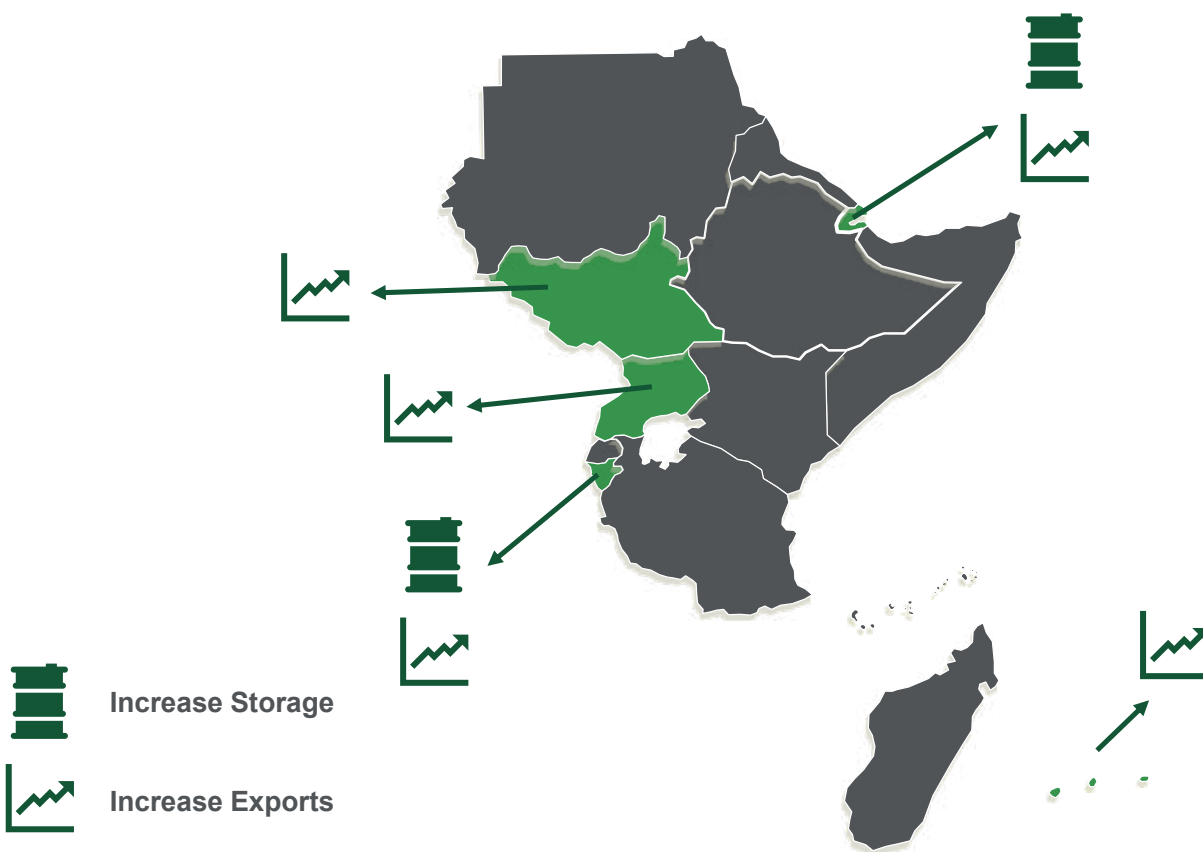


Figure 43: Refined petroleum product surplus solution

LPG Gap Analysis

LPG plays a crucial role in advancing clean cooking solutions across Eastern Africa, offering significant health, social, and environmental benefits. As a clean-burning fuel, LPG reduces household air pollution, which is a major cause of respiratory diseases linked to traditional biomass cooking. Its efficiency and convenience save time, particularly for women and children who would otherwise spend hours collecting firewood, thus promoting gender equity and economic productivity. Environmentally, LPG adoption curbs deforestation and mitigates carbon emissions compared to biomass fuels. Recognising these advantages, governments and regional bodies are increasingly supporting LPG expansion. Uganda and Tanzania, for instance, have launched initiatives to scale up LPG adoption, with policies aimed at improving affordability, accessibility, and infrastructure development. These efforts align with global clean energy goals and reinforce LPG's growing role in ensuring sustainable and modern cooking solutions for the region.

The LPG gap within the Eastern Africa region is presented in Figure 44. Within the Eastern Africa region, Sudan is the only country producing LPG, while all fifteen (15) countries in the region consume LPG. This significant imbalance highlights the region's reliance on imports to meet their domestic LPG consumption needs.

Despite this dependency, some countries have successfully bridged their LPG gaps through imports, resulting in a balance between supply and consumption. These countries include Comoros, Djibouti, Mauritius, Seychelles, Rwanda, Somalia, South Sudan, and Uganda. Their ability to ensure sufficient

LPG supply highlights effective import strategies and logistical frameworks.

However, Eritrea, Ethiopia, Kenya, and Madagascar continue to face LPG deficits despite imports. Conversely, Burundi, Sudan, and Tanzania have managed to create an LPG surplus after accounting for imports. This surplus presents an opportunity for these countries to enhance regional LPG trade by exporting to deficit countries, thereby establishing greater energy cooperation in the region.

LPG production is intrinsically linked to the availability of natural gas, crude oil, or refined petroleum product, as propane and butane can be extracted during their production or refining processes provided that the chemical composition is suitable. Countries with these resources have the potential to reduce the region's reliance on imports by initiating or expanding local LPG production as illustrated in Figure 45. The recommendation provided in Figure 45 is however only based on the available of proven reserves and the production of natural gas and crude oil, in depth analysis will be required in order to determine whether the chemical composition makes it viable.

To address the LPG supply challenges, deficit countries can adopt strategies such as scaling up imports or developing local production capacities, as summarised in Figure 46. At the same time, surplus countries can explore opportunities to enhance regional trade by increasing LPG exports, as summarised in Figure 47. A coordinated approach that combines increased local production, improved import frameworks, and strengthen export capabilities could significantly alleviate the LPG supply-demand imbalances across Eastern Africa, enhancing energy security and economic stability for the region.

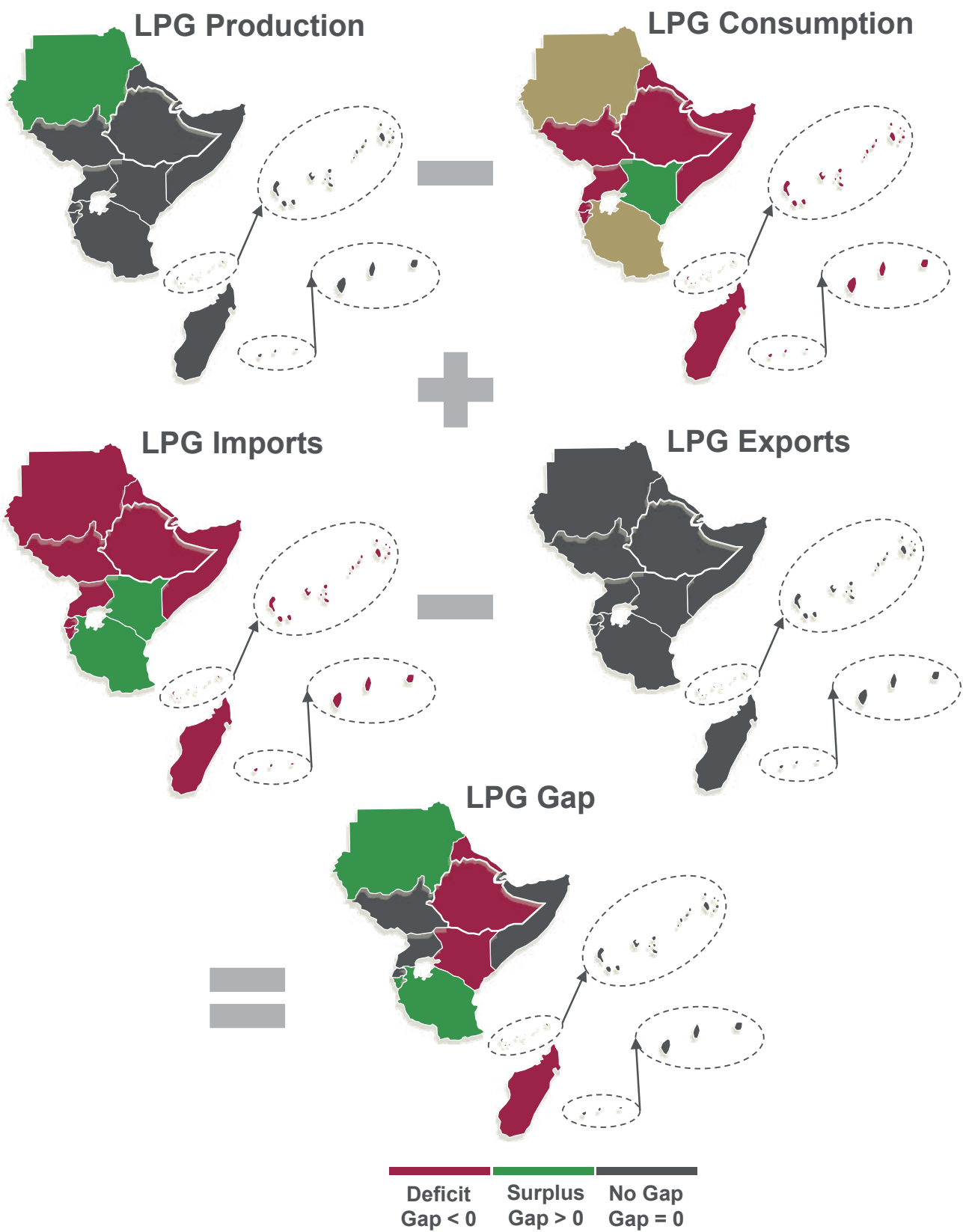


Figure 44: LPG gap within Eastern Africa

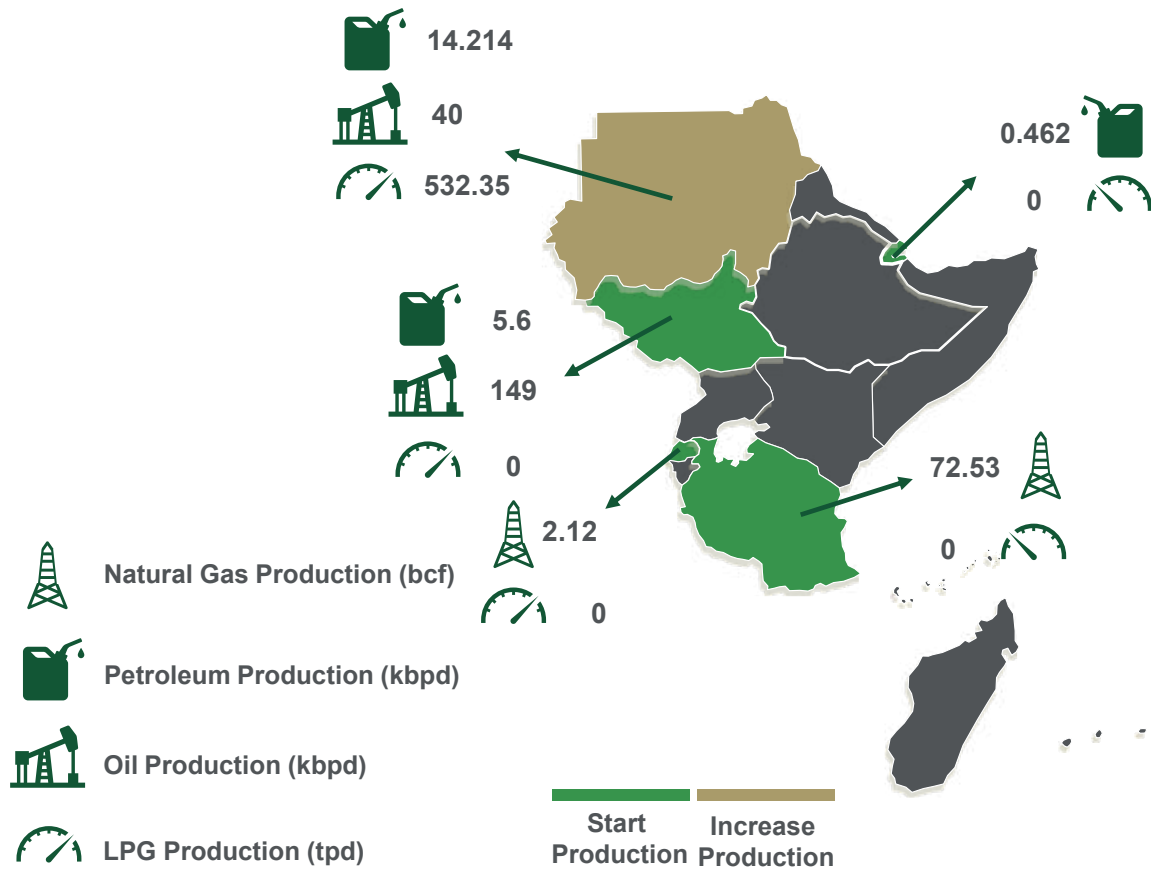


Figure 45: LPG production potential in the Eastern Africa region

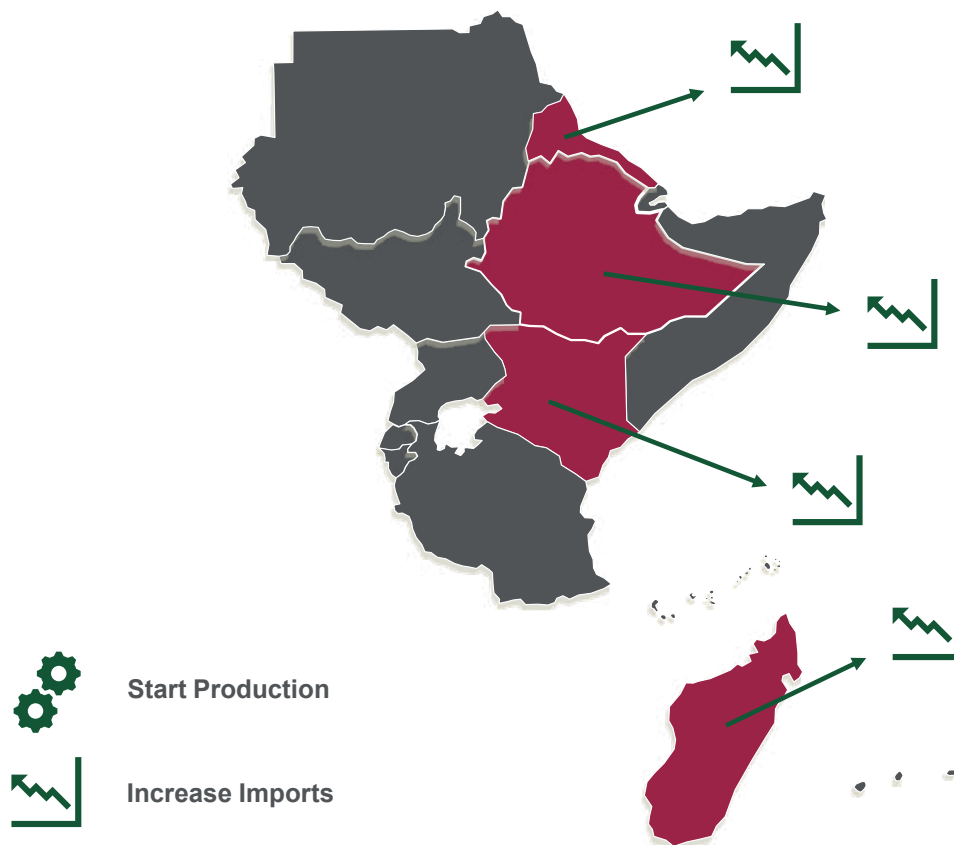


Figure 46: LPG deficit solution

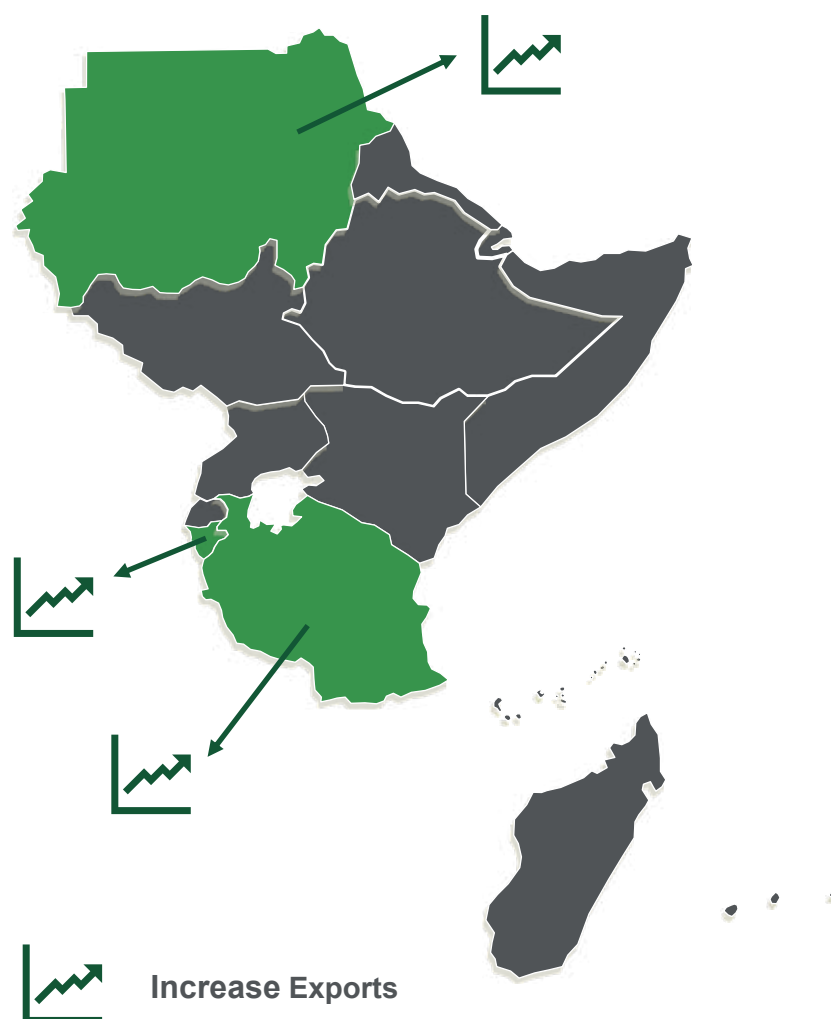


Figure 47: LPG surplus solution

8.1.2 Current Status of Midstream Infrastructure Developments¹

The development of midstream infrastructure, encompassing pipelines, refineries, ports/terminals, and storage facilities, plays a pivotal role in shaping the crude oil and refined petroleum products sectors. This section explores the status of midstream infrastructure projects, focusing on their potential to address critical challenges and unlock significant opportunities within the energy landscape. Examining planned and under-construction facilities highlights how these developments can mitigate refined petroleum deficits, alleviate crude oil surpluses, and reduce dependency on imports by supporting domestic and regional refining capacities. Midstream infrastructure can promote resource shar-

ing, facilitate intra-regional trade, and drive self-sufficiency while improving energy access and facilitating commerce across the region. These advancements are essential for transforming the energy sector into a more resilient and integrated system that meets the growing domestic and regional demands.

Midstream Pipeline Infrastructure

Figure 48 presents the operational, under construction, and proposed cross-border pipelines in the Eastern Africa region with Table 5 and Table 6 providing a detailed overview of these developments for crude oil and refined petroleum products in the Eastern Africa region, respectively on a cross-border and in-country level. These developments highlight the progress in

¹ To ensure consistency, infrastructure developments reflected in this section is only up to and including 2023

the region's infrastructure, which are vital for enhancing energy connectivity and ensuring the effective transportation of vital resources.

From a logistical standpoint, pipelines are among the most efficient and cost-effective means of transporting crude oil and refined petroleum products. They offer a safer and more sustainable alternative to road- and rail transport by minimising environmental risks associated with spillage and emissions. Additionally, the increased pipeline capacity creates opportunities for virtual pipelines-transport systems that integrate pipelines with multi-modal logistics like railways and trucking to optimise delivery to remote or less accessible areas.

The Eastern Africa region is witnessing significant developments in its energy infrastructure, marked by the operational and planned expansion of crude oil and refined petroleum product pipelines. Currently the region operates seven (7) inter- and intra-country pipelines with a combined length of 6712 km. These pipelines include the South Sudan-Sudan pipeline, facilitates the export of crude oil from South Sudan to the Red Sea through Sudan, providing a crucial lifeline for South Sudan's oil industry.

In addition to the operational pipelines, eleven (11) new pipelines, both inter- and intra-country, are either planned or under construction, spanning a total proposed length of 16 896 km. These pipelines include the Djibouti Crude Oil pipeline, the Horn of Africa pipeline (South Sudan to Kenya), the Kenya-Uganda-Rwanda pipeline, and the Central African Pipeline. These projects aim to create strategic links between oil-producing and consuming nations such as Somalia, South Sudan, Sudan, and Ethiopia, providing additional ex-

port routes and improving the distribution of refined petroleum products across the region.

This integration ensures a steady supply of crude oil and refined petroleum products, reducing dependency on imports from outside the region and enhancing energy security. The expansion will furthermore support economic growth by lowering transportation costs, which can translate into more affordable energy prices for consumers and industries. Additionally, the pipelines will encourage investment in energy-related industries, including refining, storage, and distribution facilities, further driving regional development.

The pipelines which are under construction includes the EACOP, the Lamu Port – South Sudan – Ethiopia Transport (“LAPSSET”) corridor, and the Horn of Africa pipeline (Djibouti to Ethiopia). The EACOP will transport crude oil from Uganda's Lake Albert oil fields to the port of Tanga in Tanzania, unlocking Uganda's oil export potential. The LAPSSET corridor is a transformative infrastructure project connecting Lamu port in Kenya to South Sudan and Ethiopia, aiming to provide these landlocked countries with an efficient export/import route. The Horn of Africa pipeline from Djibouti to Ethiopia will enhance Ethiopia's access to refined petroleum products, reducing dependency on trucking.

These operational, planned, and under-construction pipeline infrastructure depicted, illustrates both challenges and opportunities in Eastern Africa's oil and gas sector. Operational pipelines are critical for sustaining the current supply chain, while proposed and under-construction projects hold the promise of transforming the region's energy landscape. These projects, if successfully completed, will enable countries to better utilise their resources, reduce import dependency, and enhance regional economic integration.

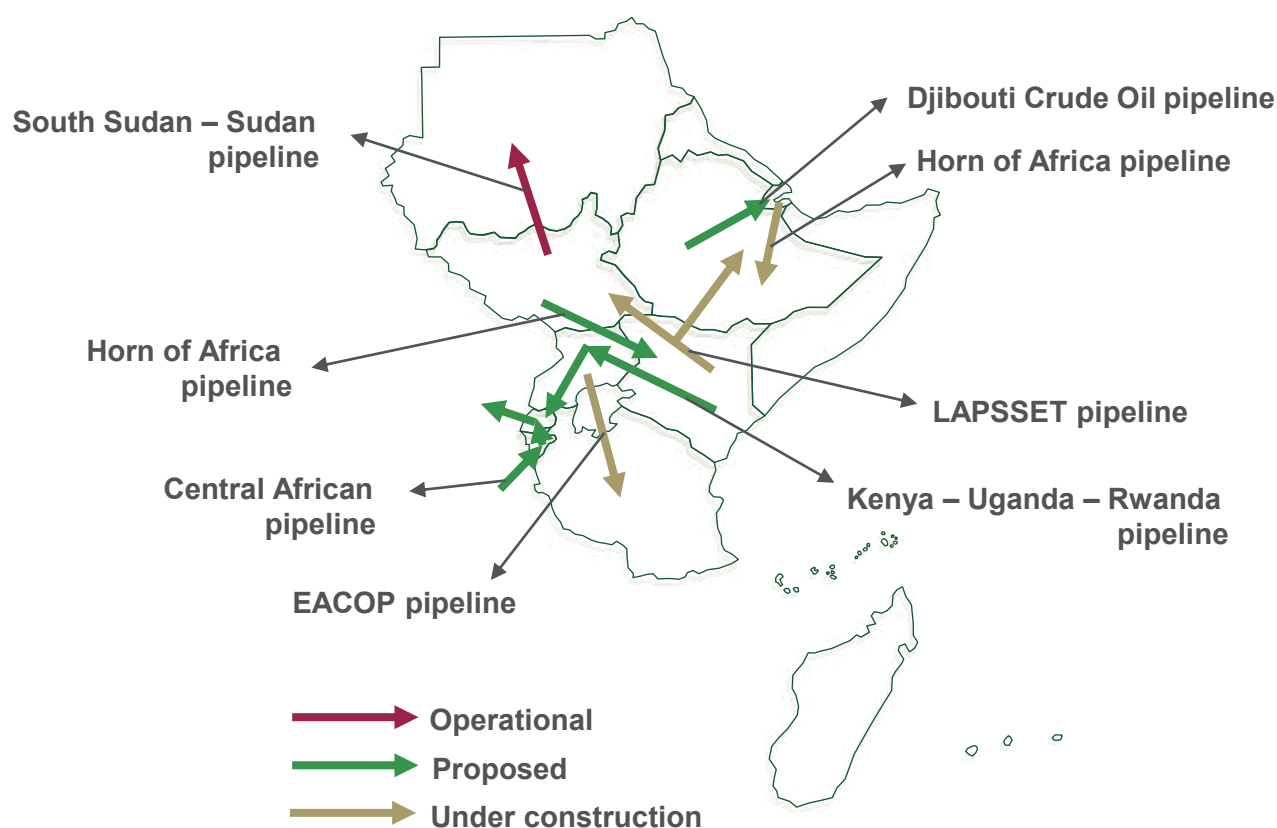


Figure 48: Cross-border crude oil and refined petroleum product pipelines in Eastern Africa

Table 5: Current status of pipelines for crude oil in the Eastern Africa region

Name	Country	Description	Length (km)	Status
South Sudan-Sudan Pipeline	South Sudan, Sudan	Transports crude oil from South Sudan to export terminals in Sudan.	1600	Operational.
Djibouti Crude Oil Pipeline	Ethiopia, Djibouti	Proposed as an alternative route for oil exports to Djibouti's ports.	1000	As of October 2024, the project remains in the conceptual stage.
Horn of Africa Pipeline	Djibouti, Ethiopia	Proposed multi-product fuel pipeline from Djibouti to Ethiopia.	767	Framework agreement signed in 2015; however, progress remains uncertain.
Horn of Africa Pipeline	South Sudan, Kenya	Proposed to transport crude oil from South Sudan to Kenya.	1500	In planning phase.
LAPSSET Pipeline	Kenya, South Sudan, Ethiopia	This proposed corridor includes a crude oil pipeline from Kenya through South Sudan to Ethiopia.	2000	Construction ongoing.

Name	Country	Description	Length (km)	Status
EACOP Pipeline	Uganda, Tanzania	Proposed pipeline to transport crude oil from Uganda to Tanzania.	1443	Under construction with operation planned for 2027.
Heglig-Marine Terminal-1	Sudan	Intra-country crude oil pipeline	1505	Operational
Aljiabalein-Marine Terminal -2	Sudan	Intra-country crude oil pipeline	1131	Operational
El Fula-KRC	Sudan	Intra-country crude oil pipeline	720	Operational
Lokichar – Lamu crude oil pipeline	Kenya	Planned intra-country crude oil pipeline	824	Planned

Table 6: Current status of pipelines for refined petroleum product in the Eastern Africa region

Name	Country	Description	Length (km)	Status
Khartoum – Port Alkhair Export	Sudan	Intra-country petroleum product pipeline	815	Operational
Alroyan – Port Alkhair Export	Sudan	Intra-country petroleum product pipeline	741	Operational
Khartoum Madani pipeline	Sudan	Intra-country petroleum product pipeline	200	Operational
Port Sudan – Gadarif – Galabat pipeline	Sudan	Planned intra-country multi-product	911	Planned
Khartoum – Madni – Sinnar – Rabak pipeline	Sudan	Planned intra-country multi-product pipeline	438	Planned
Hoima – Namwabula pipeline	Uganda	Planned intra-country refined petroleum product pipeline	213	Planned
Keyna-Uganda-Rwanda pipeline	Kenya, Uganda, and Rwanda	Transports crude oil from Kenya to Rwanda through the borders of Uganda with potential future expansion to Tanzania and Burundi.	1300	Proposed.
Central African Pipeline	Burundi, Rwanda	Proposed network of pipelines for various products within Central Africa, spanning into Burundi and Rwanda.	6500	MoU signed in September 2022. Expected to be operational by 2030.

Midstream Refinery and Port Infrastructure

Figure 49 presents an overview of the current refinery and port developments for crude oil and refined petroleum products in the Eastern Africa region. The capacities of these refineries and ports are further detailed in Table 7

and Table 8 respectively. This provides insights into the region's refining capabilities and infrastructure improvements, which are essential for meeting domestic and regional demand, as well as enhancing energy security across Eastern Africa.

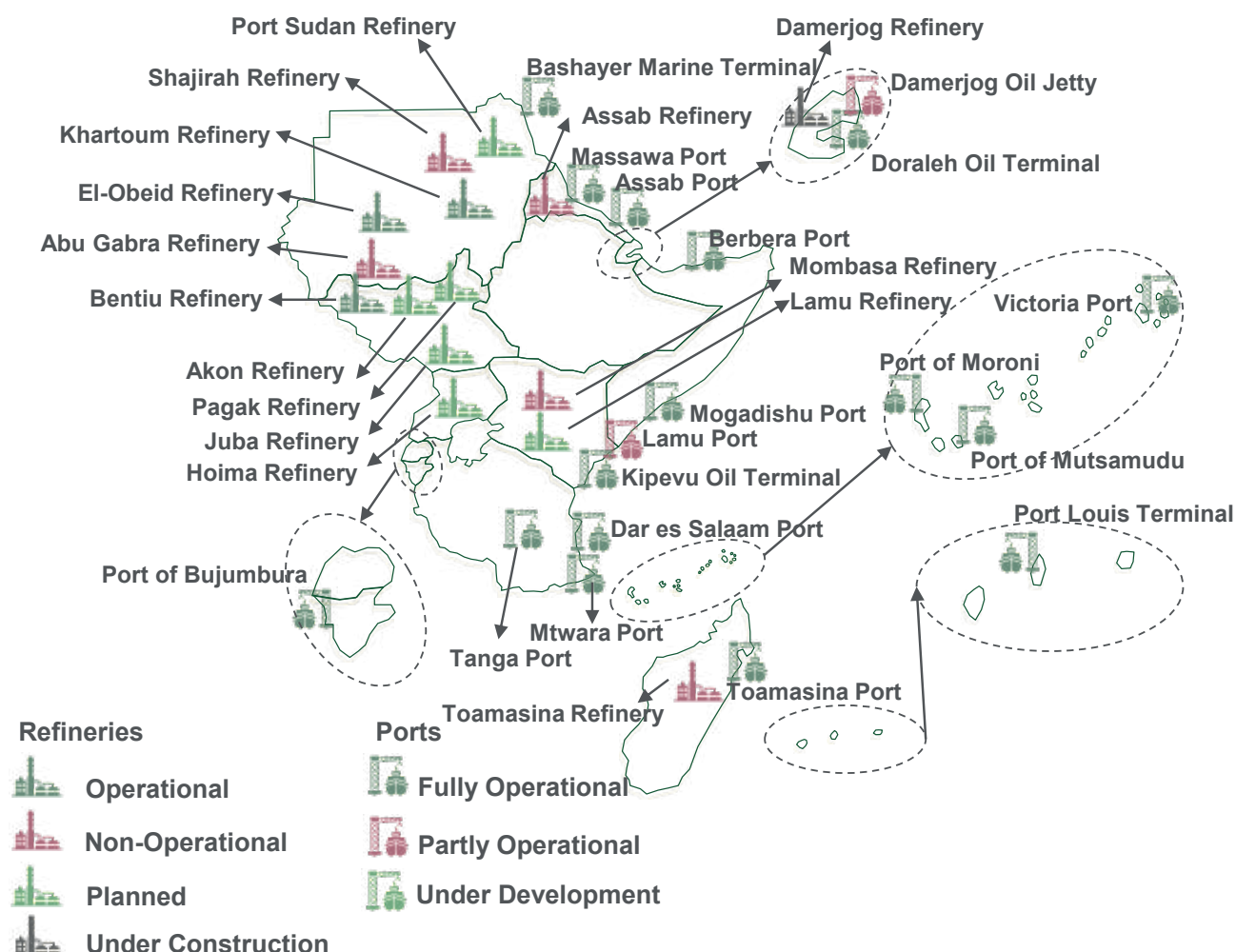


Figure 49: Status of ports and refineries in Eastern Africa

The Eastern Africa region has fifteen (15) refineries, with varying statuses, across Sudan, South Sudan, Uganda, Kenya, Djibouti, Madagascar, and Eritrea, with a potential capacity of 1170 kbpd. However, only three (3) refineries are currently operational, reflecting significant underutilisation and infrastructure challenges. The remaining twelve (12) refineries consist of two (2) decommissioned, three (3) non-operational, and seven (7) in various stages of planning or construction, highlighting a significant gap between potential and actual refining capacity.

Enhancing refining capacity in the Eastern Africa region, offers transformative benefits for the region's energy and economic landscape. By operationalising planned refineries like Djibouti's Damerjog with a capacity of 300 kbpd and Sudan's port Sudan with a capacity of 250 kbpd and advancing projects like Uganda's Hoima and South Sudan's Akon refineries, the region could significantly reduce its reliance on imported fuels. This would promote energy security by ensuring a steady supply of refined petroleum products, even during global supply disruptions.

Economically, new and upgraded refineries would save billions in foreign exchange currently spent on imports, enabling investments in critical infrastructure and social services. The development of modern refineries such as those planned in Kenya and South Sudan, could also incorporate advanced technologies to produce cleaner fuels, aligning with global environmental standards and reducing the region's carbon footprint.

Furthermore, expanding midstream infrastructure would drive job creation and industrial growth. Large-scale projects like the Lamu refinery, part of the LAPSSET corridor, could stimulate regional trade and connectivity, positioning the Eastern Africa region as a hub for energy and industrial activity. By leveraging domestic crude oil resources, countries can achieve greater self-sufficiency, reduce economic vulnerabilities, and promote sustainable development across the region.

Table 7: Current refinery status for crude oil and refined petroleum products within the Eastern Africa region

Name	Country	Description	Capacity (kbpd)	Status
Port Sudan Refinery	Sudan	Previously decommissioned but new refinery and petrochemical complex is planned	250	Planned
Shajirah Refinery	Sudan	Processes crude oil into petroleum product.	10	Non-operational.
Khartoum Refinery	Sudan	Converts crude oil into refined products.	100	Operational, running at 80% capacity.
El-Obeid Refinery	Sudan	Processes naphtha, kerosene, gas oil and other products.	15	Operational.
Abu Gabra Refinery	Sudan	Formerly produced diesel.	2	Non-operational.
Bentiu Refinery	South Sudan	Processes diesel, gasoline and Heavy Fuel Oil ("HFO").	10	Operational.
Akon Refinery	South Sudan	Planned to produce refined petroleum products.	50	Feasibility studies completed. Awaiting construction.
Pagak Refinery	South Sudan	Proposed to process crude oil.	60	In planning stage.
Juba Refinery	South Sudan	Intended to refine crude oil.	60	In planning stage.
Hoima Refinery	Uganda	Planned to process crude oil from Lake Albert.	60	Front-End Engineering in progress.
Lamu Refinery	Kenya	Proposed as part of the LAPSSET corridor project.	130	Early planning stages.
Mombasa Refinery	Kenya	Formerly processed crude oil.	90	Decommissioned.
Damerjog Refinery	Djibouti	Proposed to process crude oil.	300	Under construction with expected operation in 2025

Name	Country	Description	Capacity (kbpd)	Status
Toamasina Refinery	Madagascar	Previously processed crude oil.	15	Decommissioned due to damage
Assab Refinery	Eritrea	Formerly produced refined petroleum product from crude oil.	18	Non-operational

The Eastern Africa region's port and terminal infrastructure plays a pivotal role in the region's economic and energy landscape. Currently, the region has sixteen (16) operational ports/terminals, with an additional one (1) undergoing upgrades, and one (1) entirely new port/terminal in the planning phase. These facilities are crucial for facilitating the movement of crude oil and refined petroleum products, particularly given the region's heavy reliance on imports to meet the regional consumption requirements. The region's energy landscape is poised for transformation with plans to increase refining capacity and production, which positions the Eastern Africa region to potentially become a net exporter of these energy commodities. The expansion and upgrade of port infrastructure are integral to realising this vision.

Upgrading existing ports and terminals improves their handling capacity and operational efficiency, reducing congestion and turnaround times. This is especially critical for high traffic facilities such as Hoima, Mombasa and Dar es Salaam, which serve as key trade hubs for multiple landlocked countries. Enhanced efficiency translates to cost savings for importers and exporters, boosting the region's competitiveness. Ports such as Tanga and Lamu, strategically located along the Indian Ocean, are well-positioned to serve global markets. These developments will enable the seamless export of potential surplus energy commodities,

furthering the region's transition from being import-reliant to a net exporter.

The development of ports and terminals complements ongoing pipelines projects by ensuring efficient transfer of energy products from inland production and refining facilities to international markets. For example, the EACOP terminates at Tanga port, enhancing its role as a key energy export hub.

Upgrades and new port developments create significant economic opportunities, including construction-related jobs and long-term employment in port operations. Additionally, increased trade activity promotes growth in ancillary industries such as logistics, shipping, and warehousing. This furthermore creates a business-friendly environment, attracting Foreign Direct Investment ("FDI") in sectors such as manufacturing, energy, and logistics. This investment, in turn, accelerates economic diversification and industrialisation.

Enhanced port infrastructure strengthens intra-regional trade by enabling smoother import and export processes. It also improves connectivity for landlocked countries such as Uganda, Rwanda, Ethiopia, Burundi, and South Sudan, which rely heavily on coastal ports for access to global markets. The development of new ports reduces dependency on a few major facilities, improving the resilience of the region's trade infrastructure. Diversified trade routes minimise the risks associated with geopolitical disruptions or natural calamities affecting port operations.

Table 8: Current export terminals / ports status for crude oil and refined petroleum product within the Eastern Africa region

Name	Country	Description	Status
Bashayer Marine Terminal	Sudan	Serves as Sudan's primary crude export facility.	Operational.
Massawa Port	Eritrea	General cargo and key maritime gateway.	Operational.

Name	Country	Description	Status
Assab Port	Eritrea	Facilitates general cargo operations.	Operational.
Damerjog Oil Jetty	Djibouti	Planned to support oil exports.	Ready but not operational
Doraleh Oil Terminal	Djibouti	Managing imports and exports of petroleum product.	Operational.
Berbera Port	Somalia	Major commercial port for various cargo.	Operational.
Mogadishu Port	Somalia	Principle port for cargo and container shipments.	Operational.
Lamu Port	Kenya	Part of LAPSET corridor.	Undergoing upgrades.
Kipevu Oil Terminal	Kenya	Handles oil imports and exports.	Operational
Tanga Port	Tanzania	Imports oil and oil products from the Northern region of Tanzania and exports for the EACOP project	Operational.
Dar es Salaam Port	Tanzania	Receive oil and oil products for the central region and cross border countries	Operational.
Mtwara Port	Tanzania	Receive oil and oil products for southern regional Tanzania	Operational.
Port of Bujumbura	Burundi	Facilitating trade via Tanganyika.	Operational.
Taomasina Port	Madagascar	Handling majority of international trade.	Operational.
Port of Moroni	Comoros	Principle port for general cargo.	Operational.
Port of Mutsamudu	Comoros	Key port for various cargo.	Operational.
Victoria Port	Seychelles	Main port for imports and exports.	Operational.
Port Louis Terminal	Mauritius	Hub for international trade.	Operational.

Midstream Storage Facility Infrastructure

Energy storage infrastructure is critically important for regional energy security, supply chain stability, and economic growth. In Eastern Africa, most crude oil, refined petroleum product, and LPG storage facilities are developed and operated by private or semi-private entities, resulting in limited publicly available data. Nevertheless, available reports, official documentation, and industry sources provide insight into current capacities and emerging developments across the region. Some of these notable storage facilities, are detailed below:

In Burundi, Société d'Entreposage Pétrolier ("SEP") manages strategic fuel depots at Bujumbura Port and is expanding with a new facility in Gitega. Together these facilities are envisioned to hold approximately eight (8) months of consumption, while the current facilities hold three (3) months of national consumption (UNDP / World Bank, n.d.). Tanzania maintains a 3000 tonne LPG depot in Tanga to supply local and regional markets (AEI, 2023), alongside TIPER's large, refined petroleum product storage terminal in Dar es Salaam with a capacity of 251 983 m³ (Tiper Tanzania, 2023). Meanwhile, Djibouti conducts operations through a network of thirty-one (31) storage tanks for crude oil, refined petroleum products, and LPG, totalling around 399 300 m³. In Madagascar, GPL is constructing a strategic LPG terminal in Toamasina, set to provide 125 000 m³ of storage capacity (Galana, 2023). Uganda operates a long-established Jinja Storage Terminal of 30 000 m³ and is developing the Kampala Storage Terminal aimed to hold up to 320 000 m³ of refined petroleum products. In addition to this, Somalia holds an estimated 62 000 m³ of refined petroleum products across inland depots managed by the National Petroleum Agency (UNOC, 2022).

Rwanda boasts eight (8) storage installations – two (2) private owned and six (6) government-owned – with a combined capacity of 118 000 m³.

By strengthening storage infrastructure across the Eastern African countries, the region can build resilience in energy supply chains, reducing vulnerability to disruptions, and laying the groundwork for investment and economic expansion. Robust storage assets support price stability, enable efficient distribution, and attract public and private sector investment. As Eastern Africa scales its storage capacity, it strengthens its position to support industrial growth, enhance regional integration, and reinforce energy sovereignty.

8.2 NATURAL GAS

8.2.1 Current Situation Gap Analysis

In the Eastern Africa region, two (2) countries, Rwanda and Tanzania, currently produce natural gas. Both countries generate enough natural gas to meet their domestic consumption needs, ensuring energy security within their borders. Notably, neither country engages in natural gas exports, despite maintaining a surplus as shown in Figure 50.

At present, none of the Eastern African countries imports natural gas, leaving the surplus in Rwanda and Tanzania underutilised with respect to intra-regional trade. This surplus therefore presents a strategic opportunity for these countries to establish themselves as regional energy exporters. However, realising this potential will require significant investment in export infrastructure, such as pipelines, liquefaction facilities, and transportation networks, to facilitate the efficient transfer of natural gas to neighbouring countries.

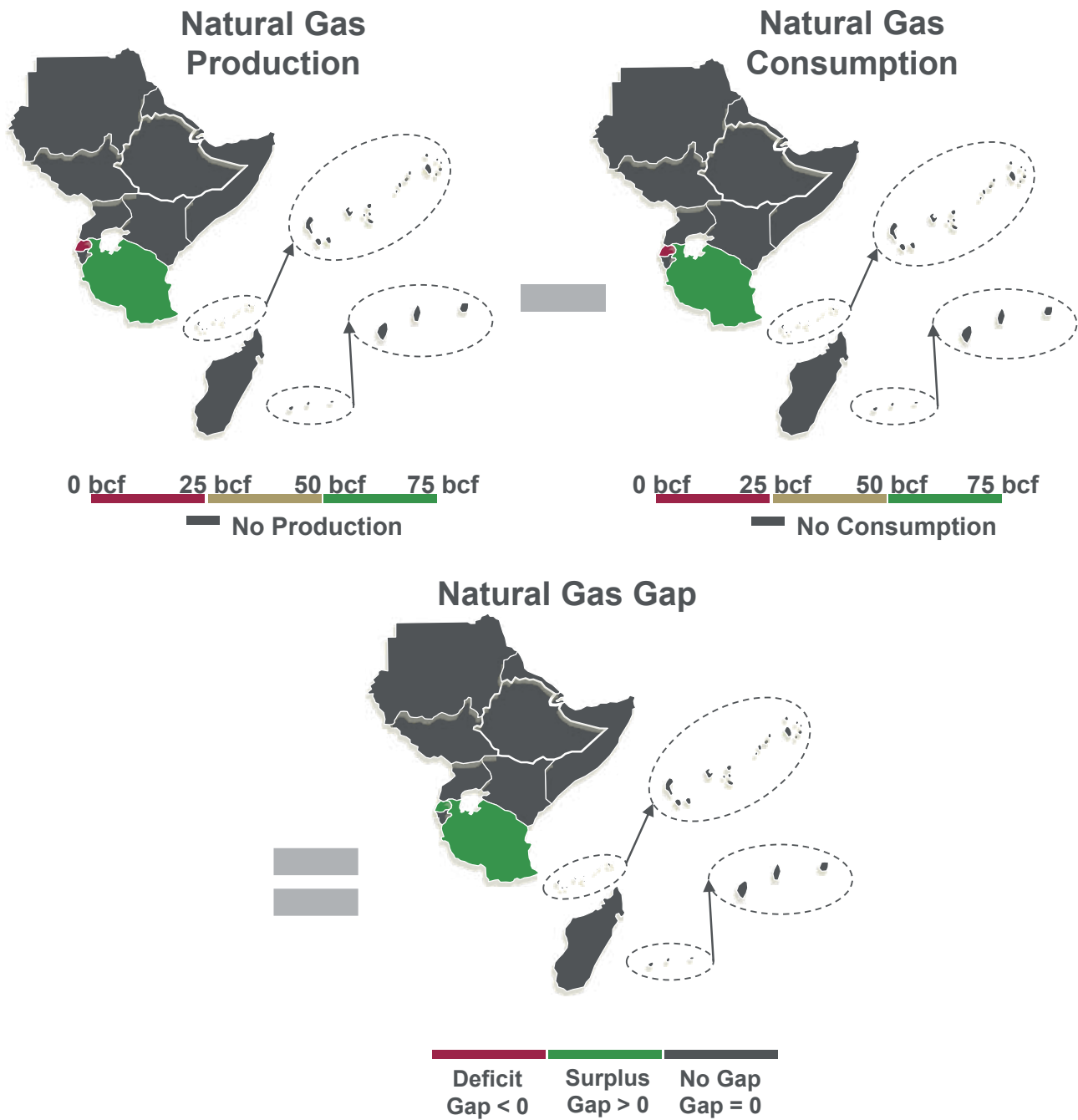


Figure 50: Natural gas gap within the Eastern Africa region

The region also holds considerable potential for expanding natural gas production, as presented in Figure 51. Countries such as Ethiopia, Madagascar, Somalia, South Sudan, and Uganda possess untapped reserves that could

be developed to contribute to regional supply. Harnessing these reserves would not only support energy self-sufficiency across the region but also create opportunities for economic diversification and regional collaboration.

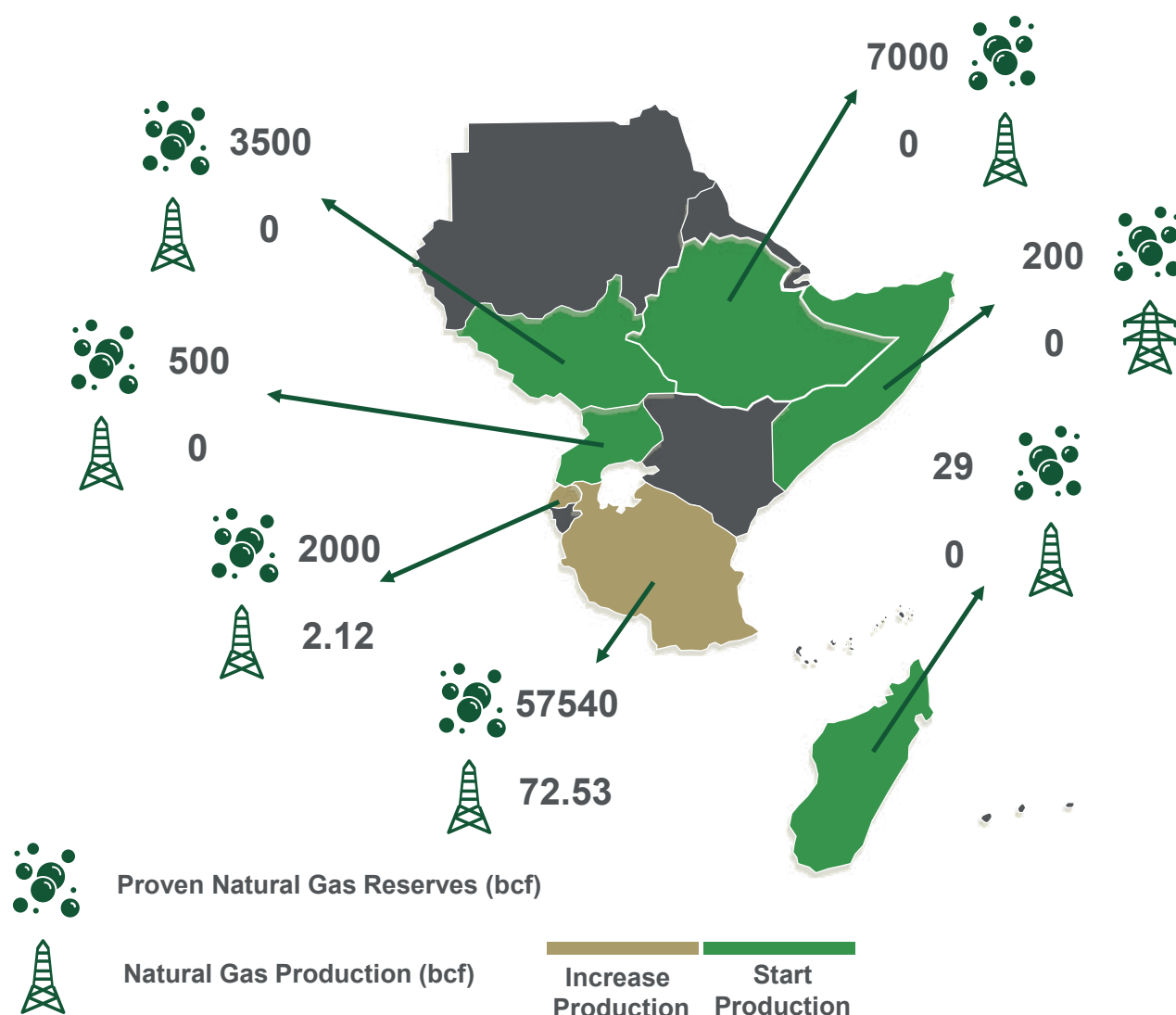


Figure 51: Natural gas production potential in the Eastern Africa region



Figure 52: Natural gas surplus solution

To address the surplus in Rwanda and Tanzania, a concerted effort is needed to develop the necessary export infrastructure and establish trade agreements with deficit countries, as summarised in Figure 52. At the same time, countries with natural gas reserves should prioritise investment in exploration, production and distribution capabilities to maximise their resource potential. By establishing an integrated approach to natural gas production and trade, the Eastern Africa region can reduce energy inequalities, promote economic development, and enhance its position in the global energy landscape.

8.2.2 Current Status of Midstream Infrastructure Developments²

The development of midstream infrastructure for natural gas, including pipelines, processing facilities, and LNG terminals, is critical to unlocking the full potential of the region's natural gas reserves. This section delves into the status of these infrastructure projects, emphasising their role in addressing key challenges and growing opportunities in the natural gas sector. With only two (2) countries in the region actively utilising their natural gas reserves for production and none currently exporting LNG, there exists a significant opportunity to transform surplus natural gas into a strategic resource. By enhancing infrastructure, countries can better harness their reserves, promote intra-regional trade, and enable the export of LNG to international markets. Improved midstream capabilities also pave the way for greater self-sufficiency, reduced dependency on external energy sources, and expanded access to cleaner energy within the region. Such developments not only facilitate trade but also drive economic growth and integration, ensuring a more sustainable and interconnected energy future.

Midstream Pipeline Infrastructure

Figure 53 and Table 9 provides an overview of current operational, under construction, and proposed pipeline developments for natural gas within the Eastern Africa region. These developments highlight progress in the region's natural gas infrastructure, which are crucial for enhancing energy access, promoting regional integration, and supporting sustainable energy initiatives across Eastern Africa.

The Eastern Africa region's natural gas infrastructure is evolving rapidly, with significant strides made in pipeline development to support access and regional trade. Currently, there are three (3) operational natural gas pipelines, all located within Tanzania, spanning a combined total length of 825 km. These pipelines play a critical role in transporting natural gas from production sites such as the Mnazi Bay and Songo Songo gas fields to key consumption hubs, including Dar es Salaam and surrounding industri-

al areas. This infrastructure has been instrumental in promoting domestic energy security and supporting Tanzania's economic growth.

The region has ambitious plans to expand its natural gas pipeline network. There are four (4) planned or under-construction pipelines within Eastern Africa with a combined length of 3051 km, with three (3) being cross-border pipelines. The planned Ethiopia-Djibouti gas pipeline facilitates the export of Ethiopian natural gas from the Ogaden Basin through an export terminal in Djibouti. The project is expected to generate substantial foreign exchange earnings and strengthen economic ties between the two (2) countries. The Tanzania-Uganda gas pipeline is proposed to strengthen regional economic co-operation through the transportation of natural gas from Tanzania to Uganda. The Tanzania-Kenya gas pipeline is proposed to seek a link between Tanzania's natural gas reserves with Kenya's energy market, prompting cross-border energy trade and diversification. The project is anticipated to improve energy availability and affordability in both countries, supporting industrial growth and economic development.

The development of these pipelines presents a transformative opportunity for the natural gas market in the Eastern Africa region. The planned infrastructure will create a more integrated regional energy market, allowing surplus producers to export natural gas to neighbouring countries and reducing reliance on expensive imported energy commodities. This integration will strengthen energy security, stabilise supply chains, and lower energy costs for consumers and industries, promoting economic resilience.

These planned pipelines lay the groundwork for the Eastern Africa region to emerge as a competitive player in the global natural gas market. By connecting inland reserves to coastal terminals, the region could establish export routes for LNG, tapping into growing international demand for cleaner energy sources. This would diversify the region's export portfolio, generate foreign exchange revenue, and enhance its geopolitical significance. These pipelines will unlock opportunities for industrial growth and investment. Reliable access to natural gas is a critical enabler for industries such as power generation, manufacturing, and fertiliser pro-

² To ensure consistency, infrastructure developments reflected in this section is only up to and including 2023

duction. Expanding pipeline networks can attract FDI, spur industrialisation, and create jobs driving broader economic development.

Moreover, these developments align with the global energy transition toward lower-carbon fuels. Natural gas, as a cleaner alternative

to coal and oil, can help the Eastern Africa region reduce GHG emissions, while meeting their growing energy needs. This positions the region as a leader in sustainable energy development, attracting climate-conscious investors and facilitating international partnerships.

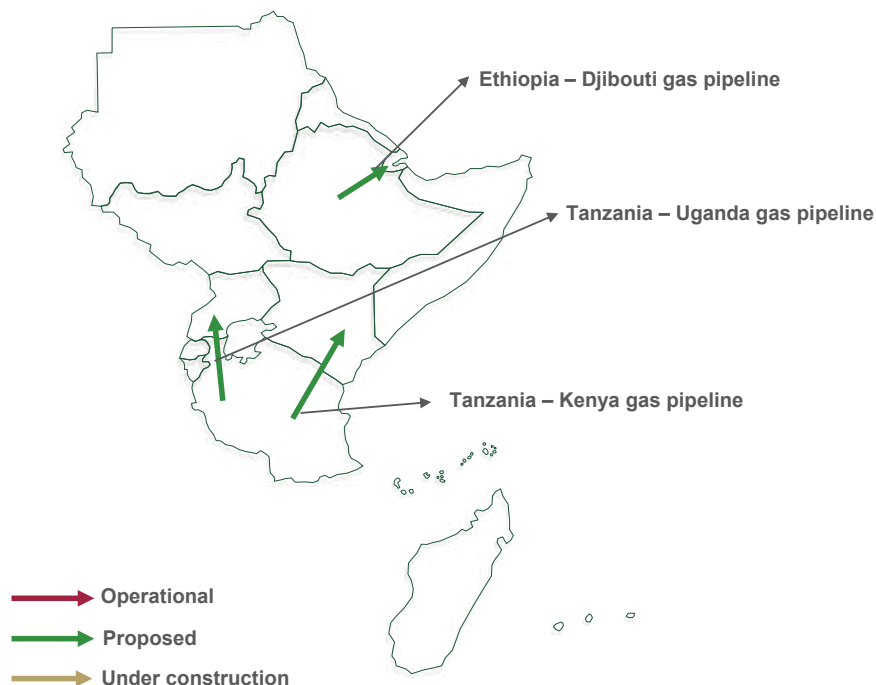


Figure 53: Status of cross-border natural gas pipelines in the Eastern Africa region

Table 9: Current status of pipelines for natural gas in Eastern Africa

Name	Country	Description	Length (km)	Status
Tanzania-Kenya gas pipeline	Tanzania, Kenya	Proposed to transport natural gas.	600	Planning stages.
Tanzania-Uganda Natural Gas Pipeline	Tanzania, Uganda	Proposed to transport natural gas	1716	Planning stages
Ethiopia-Djibouti gas pipeline	Ethiopia, Djibouti	Planned to export natural gas from Ethiopia to Djibouti.	700	Under development.
National Natural Gas Infrastructure	Tanzania	Intra-country pipeline, transports natural gas from Mnazi Bay gas field to Dar es Salaam.	551	Operational
Songo Songo Gas Pipeline	Tanzania	Intra-country pipeline, conveys natural gas from the Songo Songo gas fields to Dar es Salaam.	247	Operational
Mnazi Bay Gas Pipeline	Tanzania	Intra-country pipeline, delivers natural gas to Mtwara pipeline.	27	Operational
Ntorya Gas Export Line	Tanzania	Intra-country planned pipeline, connecting Ntorya gas field to the Madimba processing plant.	35	Proposed (Tendering)

Midstream Processing Facility and Terminal Infrastructure

Figure 54 presents the status of several natural gas processing facilities and LNG terminals in the Eastern Africa region. Table 10 presents a detailed overview of current developments of natural gas processing facilities in Eastern Africa. This provides insights into the region's capacity to process natural gas, which is essential for maximising resource utilisation. Table 11 offers a detailed overview of the status of LNG terminal developments in the Eastern Africa region. The progress and potential of LNG infrastructure in the region is significant for enhancing energy access, supporting economic growth, and facilitating regional energy trade.

The Eastern Africa region's natural gas sector is positioned for transformative growth, with existing and planned infrastructure highlighting the region's potential to meet domestic energy consumption requirements and establish itself as a player in the global energy market. Currently, the region hosts four (4) operational natural gas processing facilities, with a combined capacity of 171.55 bcf per year, one (1) under construction natural gas processing facility, with a capacity of 146 bcf per year, and three (3) planned natural gas processing facilities, in Tanzania, with a combined capacity of 827.4 bcf per year. These operational facilities, at full capacity, can cover 232% of the region's current natural gas consumption, demonstrating a significant surplus that could be leveraged for both domestic and regional benefits.

The surplus presents a dual opportunity: the potential for export to global markets in the form of LNG, and the ability to drive regional energy transformation through increased local consumption and intra-regional trade. Although LNG exports could generate substantial foreign exchange earnings and integrate Eastern Africa into a global energy economy, the priority should be to promote regional consumption. With only two (2) countries currently consuming natural gas, there is significant room to expand its use across the region. Enhanced intra-regional trade could facilitate equitable energy distribution, reduce dependence on expensive imported en-

ergy commodities, and strengthen economic ties among Member States.

Natural gas offers numerous benefits as an energy source in the Eastern Africa region. As a cleaner alternative to coal and oil, it can play a pivotal role in reducing GHG emissions and supporting the region's transition to sustainable energy. Natural gas is particularly well-suited for power generation, industrial applications, and as a feedstock for producing fertiliser and petrochemicals, all of which can drive economic growth and job creation. Moreover, increasing the consumption of natural gas could enhance energy security by diversifying the region's energy mix.

The Eastern Africa region also has critical infrastructure for LNG, with one (1) operational LNG terminal providing the region with the capability to handle imports and exports of LNG, furthermore, there are two (2) planned and one (1) under construction LNG terminals in development. This combination of existing and planned infrastructure positions the region to significantly expand its natural gas market, ensuring energy security while exploring opportunities with trade within the region and beyond.

The opportunities for export should not be overlooked, especially given the surplus capacity of the operational and shelved facilities. The Eastern Africa region can position itself as a significant supplier of LNG to international markets, particularly to regions with growing demand for cleaner energy sources, such as Asia and Europe. Establishing export infrastructure, such as pipelines and LNG terminals would attract foreign investments, create jobs, and generate revenue that could be reinvested in regional development.

Additionally, the focus on expanding natural gas infrastructure aligns with global energy trends and climate goals. Countries investing in natural gas are more likely to attract international financing and partnerships, particularly from institutions that prioritise low-carbon energy projects. This could accelerate the development of critical infrastructure, from pipelines and processing facilities to distribution networks, further integrating the region into the global energy economy.

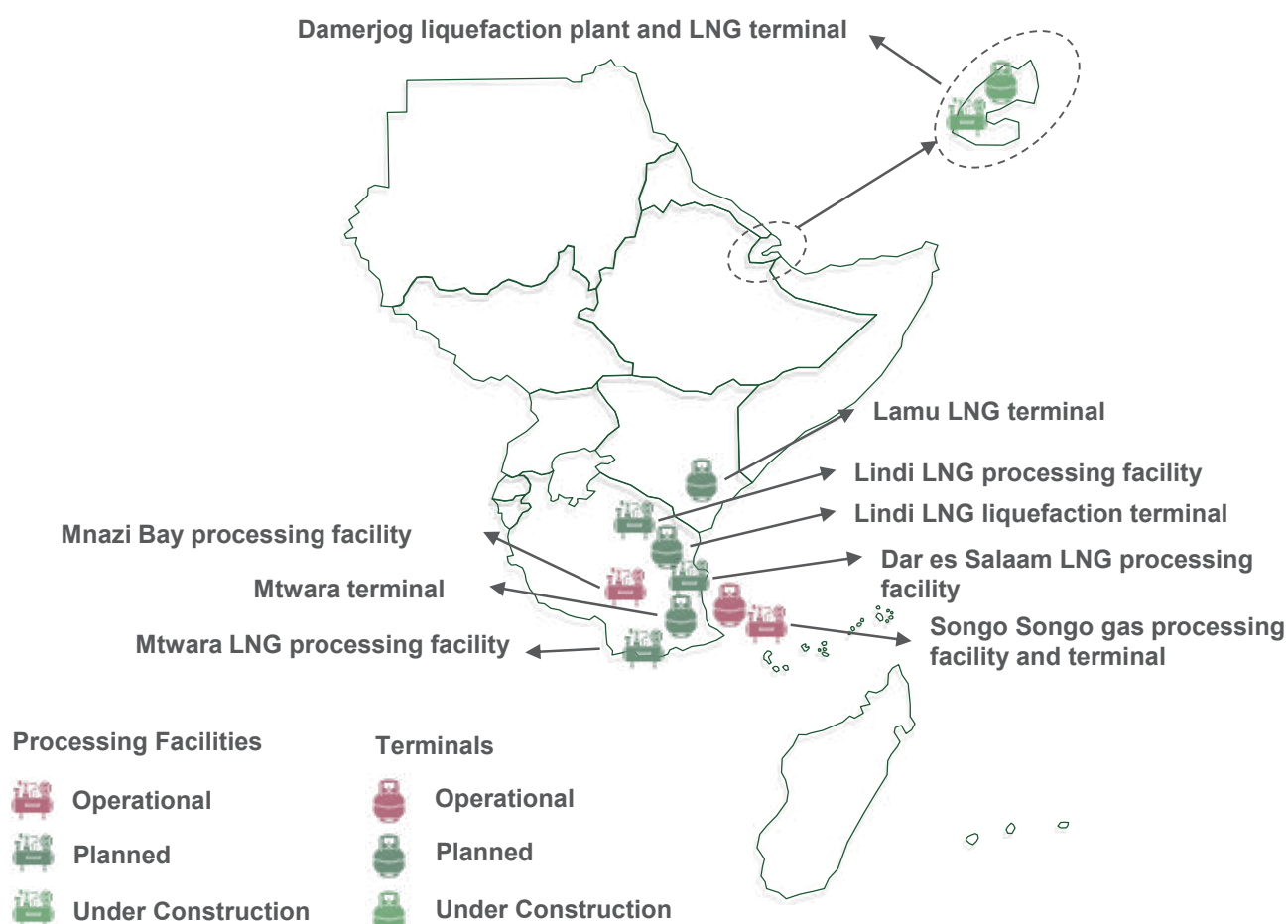


Figure 54: Status of processing facilities and LNG terminals in the Eastern Africa region

Table 10: Status of developments of natural gas processing facilities in the Eastern Africa region

Name	Country	Description	Capacity (bcf per year)	Status
Mnazi Bay Gas Processing Plant	Tanzania	Processes natural gas.	3.65	Operational.
Madimba Processing Plant	Tanzania	Processes natural gas	76.65	Operational
Lindi processing plant	Tanzania	Proposed LNG production plant	730	Planned
Mtwara processing plant	Tanzania	Proposed LNG production plant	48.7	Planned
Dar es Salaam processing plant	Tanzania	Proposed LNG production plant	48.7	Planned
Songo Songo Processing Plant (TPDC/GASCO)	Tanzania	Processes natural gas.	51.1	Operational.
Songo Songo Processing Plant (PAET)	Tanzania	Processes natural gas.	40.15	Operational.
Damerjog Liquefaction Plant	Djibouti	Planned to liquefy natural gas for export.	146	Under development

Table 11: Status of developments of LNG terminals in the Eastern Africa region

Name	Country	Description	Status
Lindi LNG Liquefaction Terminal	Tanzania	Planned to liquefy natural gas.	Planning stage.
Songo Songo gas terminal	Tanzania	Process natural gas.	Operational.
Damerjog Liquefaction LNG Terminal	Djibouti	Planned to liquefy natural gas	Under development
Lamu LNG Terminal	Kenya	Proposed as part of LAPSET corridor for LNG imports and natural gas exports.	Early planning stage.

8.2.3 Current Status of Downstream Infrastructure Developments³

Unlocking petrochemical potential through natural gas utilisation

Eastern Africa's vast reserves of natural gas present an exceptional opportunity for economic transformation through the development of a competitive petrochemical industry. As global demand shifts toward value-added products, the region has a chance to move beyond exporting raw hydrocarbons toward a more diversified industrial base.

One of the most immediate and impactful entry points into this value chain is the production of fertilisers, particularly those requiring ammonia, which is synthesised directly from natural gas. Beyond fertilisers, natural gas serves as a cornerstone feedstock and energy source for a range of petrochemical products, including methanol, plastics, synthetic fuels, and chemical intermediates essential to modern industry. Natural gas can also be used to generate electricity in Gas-to-Power plants and serve as the fuel in the form of Compressed Natural Gas ("CNG") for motor vehicles, public transport, and domestic utilisation.

The role of natural gas in fertiliser manufacturing and processing

Natural gas plays a critical role in the fertiliser sector, both as a chemical feedstock and as a thermal energy source. Its relevance spans

the entire fertiliser value chain, from large-scale ammonia-based manufacturing plants to smaller-scale fertiliser blending and granulation operations. For countries with domestic natural gas resources, such as those emerging in Eastern Africa, this presents a significant opportunity to strengthen agricultural productivity and reduce reliance on imported inputs.

In the context of nitrogen fertiliser manufacturing, natural gas is essential for the production of ammonia. Through steam methane reforming, natural gas is used to produce hydrogen, which is then combined with atmospheric nitrogen in the Haber-Bosch process to form ammonia (NH_3). Ammonia serves as the foundational building block for several nitrogen-based fertilisers, including urea, ammonium nitrate, and diammonium phosphate ("DAP"). Establishing domestic ammonia production facilities therefore allows countries to localise fertiliser production, improve input availability for farmers, and reduce foreign exchange losses associated with fertiliser imports. This is particularly important in regions seeking to transition from import dependency to integrated domestic and regional fertiliser value chains.

While fertiliser blending and processing plants do not require ammonia as a feedstock, natural gas can still play an important role as an energy source. In more advanced processing plants, such as those using steam granulation technology, natural gas-fired boilers are commonly used to generate steam required for the granulation process. This process transforms powdered or partially processed

³ To ensure consistency, infrastructure developments reflected in this section is only up to and including 2023

materials into uniform granules, improving handling, application efficiency, and shelf-life. In addition to granulation, natural gas is frequently used to supply thermal energy for drying and conditioning processes, which are vital for producing stable and market-ready fertiliser products. Even in simpler blending facilities, natural gas can support auxiliary functions such as heating, drying, and potentially on-site power generation.

The broader strategic opportunity lies in the integration of natural gas infrastructure with agricultural and industrial development goals. By aligning fertiliser production with domestic gas supply, governments and investors can support rural livelihoods, reduce agricultural input costs, stimulate industrial growth, and position their economies as exporters of value-added fertiliser products. This approach is especially relevant for countries aiming to im-

prove food security while capitalising on their natural resource base.

The Eastern Africa region has made significant strides in expanding its fertiliser production and processing capacity, driven by growing agricultural demand and national food security priorities. Figure 55, Table 12, and Table 13 presents the existing and planned fertiliser processing and manufacturing plants in Eastern Africa. Countries like Ethiopia, Kenya, and Tanzania have established a network of fertiliser blending and manufacturing plants, with Ethiopia leading the way in site-specific fertiliser blending through a series of regionally distributed plants. These facilities, while largely focused on blending rather than ammonia synthesis, play a vital role in making fertilisers more accessible and better adapted to local soil conditions.

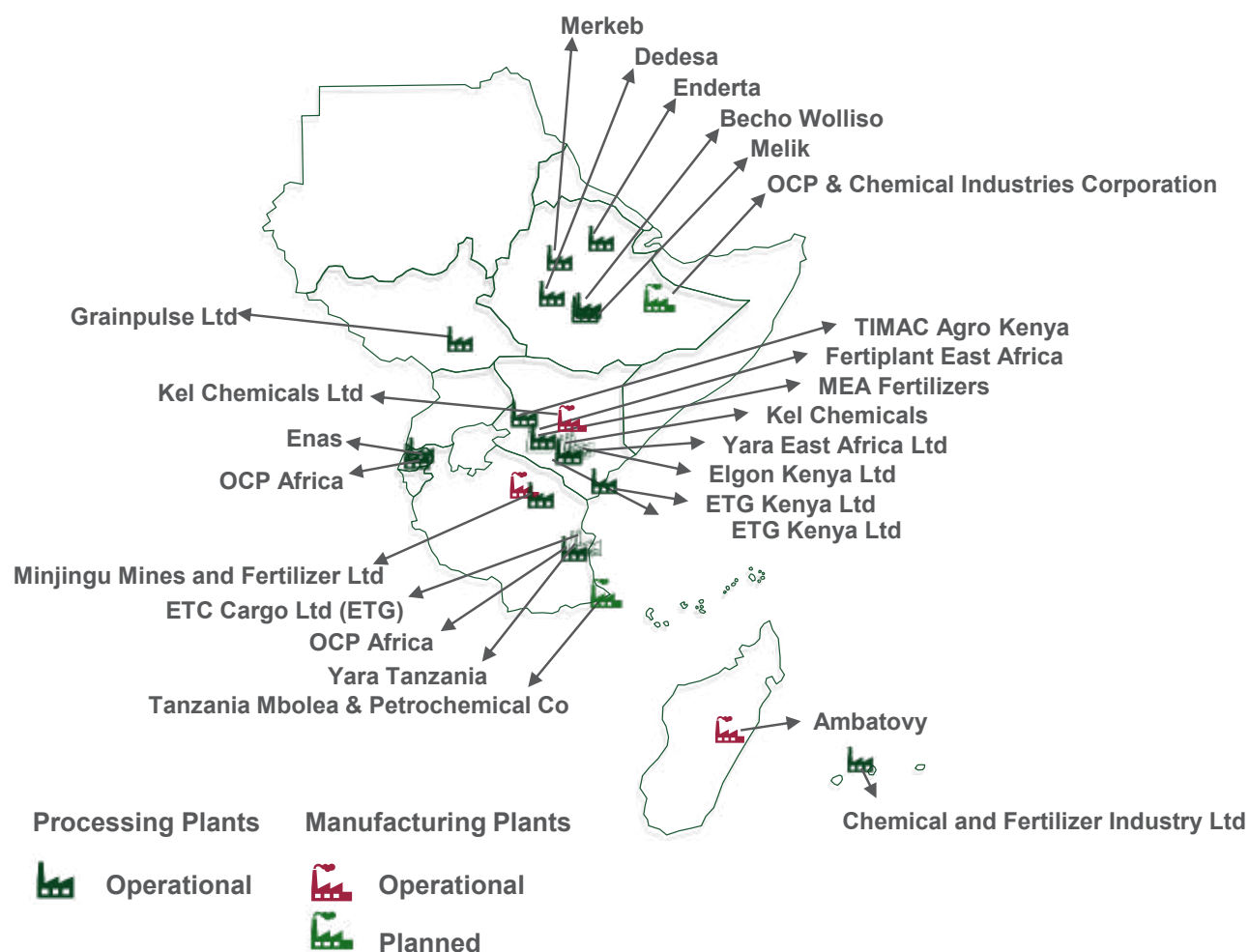


Figure 55: Fertiliser processing plants and manufacturing plants in Eastern Africa

Table 12: Fertiliser processing plants in Eastern Africa

Country	Location	Company Name	Operational since / planned for
Ethiopia	Bahir Dar	Merkeb	2014
Ethiopia	Mekelle	Enderta	2015
Ethiopia	Nekemit Gibe	Dedesa	2015
Ethiopia	Tulu Bolo	Becho Wolliso	2014
Ethiopia	Werabe	Melik	2014
Kenya	Athi River	Maisha Minerals & Fertilisers	2004
Kenya	Eldoret	TIMAC Agro Kenya	2016
Kenya	Mombasa	ETG Kenya Ltd	2017
Kenya	Nairobi	Elgon Kenya Ltd	2022
Kenya	Nairobi	Yara East Africa Ltd	2021
Kenya	Nakuru	Fertiplant East Africa	2021
Kenya	Nakuru	MEA Fertilisers	1977
Kenya	Thika	Kel Chemicals	2020
Mauritius	Port Louis Mauritius	Chemical & Fertiliser Industry Ltd	1975
Rwanda	Kagasa	OCP Africa	2023
Rwanda	Kigali	Enas	2016
Tanzania	Dar es Salaam	OCP Africa	2024
Tanzania	Arusha	Minjingu Mines & Fertiliser Ltd	2008
Tanzania	Dar es Salaam	ETC Cargo Ltd (ETG)	2020
Tanzania	Dar es Salaam	Yara Tanzania	2020
Uganda	Mukono-Kampala	Grainpulse Ltd	2018

Alongside these operational facilities, several large-scale projects — particularly those aimed at manufacturing nitrogen-based fertilisers using domestic natural gas — remain under development. This evolving landscape presents a strategic opportunity to align natu-

ral gas investments with agro-industrial transformation across the region. The existing and planned fertiliser manufacturing plants are listed in excluding the manufacturing of organic fertilisers.

Table 13: Operational and planned fertiliser manufacturing plants in Eastern Africa

Country	Location	Company Name	Operational year	Raw Materials
Tanzania	Arusha	Minjingu Mines & Fertiliser Ltd	2001	Phosphate Rock, NPK
Kenya	Thika	Kel Chemicals Ltd	1977	Single Superphosphate, Sulfuric Acid, Ammonium Sulphate
Madagascar	Toamasina	Ambatovy	2012	Ammonium Sulphate
Ethiopia	Dire Dawa	OCP & Chemical Industries Corporation (CIC)	Planned	Urea, NPS
Tanzania	Mtwara	Tanzania Mbolea & Petrochemical Co	Planned	Ammonia, Urea

Gas-to-Power plants in Eastern Africa

Gas-to-Power plants convert natural gas into electricity, offering a cleaner alternative to other fossil fuels like coal and heavy fuel oil. Eastern Africa has seen growing interest in natural gas as part of its energy mix, driven by discoveries and regional energy policies. The Partnership of Clean Fuels and Vehicles (“PCFV”) and regional bodies like the EAC have influenced energy strategies, but the adoption of gas-to-power varies significantly.

Tanzania has made substantial strides in utilising its natural gas reserves for power generation, aligning with its goal to expand the petrochemical frontier. The country boasts several Gas-to-Power plants, with a total capacity of 1116.5 megawatt (“MW”). Key plants are shown in Figure 56 and their capacities are listed in Table 14. Plants in Dar es Salaam are supported

by the 247 km Songo Songo gas pipeline and 27 km Mnazi Bay gas pipeline, supplying natural gas for power generation and industrial thermal processes, contributing to Tanzania’s energy security and industrial growth.

Uganda does not have operational Gas-to-Power plants, but the planned Nzizi Thermal Power Station presents a significant step towards integrating natural gas into its energy mix. The power station is intended to provide the power for the planned Uganda Oil Refinery and other industrial uses in the area.

Rwanda has adopted Gas-to-Power technology to enhance its energy mix, utilising methane gas from Lake Kivu. The KivuWatt and SPLK power plants contribute to the country’s energy security, supporting Rwanda’s commitment to sustainable and cleaner energy solutions while reducing dependence on traditional fossil fuels.

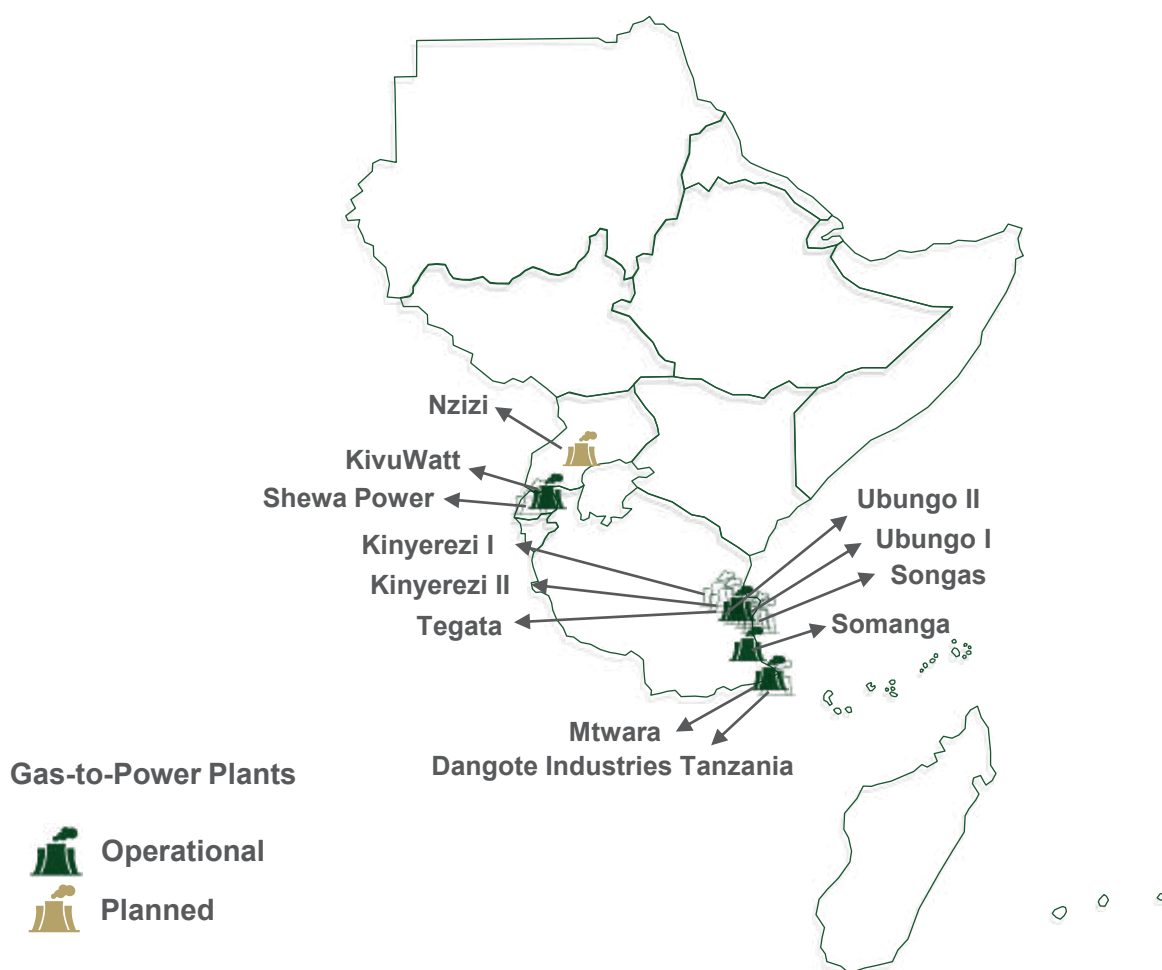


Figure 56: Operational and planned gas-to-power plants in Eastern Africa

Table 14: Natural gas thermal power plants in Eastern Africa

Member State	Location	Thermal power station	Company name	Capacity (MW)	Year completed / completion expected	Fuel Type
Tanzania	Dar es Salaam	Ubungo I	TanESCO	100	2007	Natural gas
Tanzania	Dar es Salaam	Ubungo II	Symbion Power Limited	120	2011	Natural gas
Tanzania	Dar es Salaam	Tegata	TanESCO	45	2011	Natural gas
Tanzania	Mtwara	Mtwara	TanESCO	18	2008	Natural gas
Tanzania	Somanga	Somanga	TanESCO	7.5	2010	Natural gas
Tanzania	Dar es Salaam	Songas	Songas Power Limited	180	2004	Natural gas
Tanzania	Kinyerezi	Kinyerezi I	TanESCO	185	2015	Natural gas/ jet fuel
Tanzania	Kinyerezi	Kinyerezi II	TanESCO	240	2018	Natural gas

Member State	Location	Thermal power station	Company name	Capacity (MW)	Year completed / completion expected	Fuel Type
Tanzania	Mtwara	Dangote Industries Tanzania	Dangote Industries Tanzania Limited	45	2018	Natural gas
Uganda	Nzizi	Nzizi	Tullow Oil & Jacobsen Electro	100	TBD	Natural gas/ heavy fuel oil
Rwanda	Kibuye	KivuWatt	KivuWatt Ltd. – ContourGlobal	26	2015	Natural Gas
Rwanda	Rubavu District	SPLK	Shema Power Lake Kivu Limited	50	2024	Natural Gas

Expanding the petrochemical frontier

While fertiliser manufacturing presents the most immediate opportunity, the petrochemical potential of natural gas extends much further. Methanol production is a logical next step, as it too relies on hydrogen derived from natural gas. Methanol is a versatile chemical used in the production of formaldehyde, acetic acid, plastics, and can serve as a clean-burning fuel. A regional methanol industry could not only meet domestic demand for industrial chemicals but also support downstream manufacturing of consumer and industrial goods.

Another major opportunity lies in the production of plastics and polymers. Ethane, a natural gas derivative, is a key input in the manufacture of ethylene, which is then polymerised to produce polyethylene — one of the most widely used plastics globally. Access to competitively priced natural gas would allow African producers to enter the global plastics market and support the growth of local packaging, construction, and consumer goods industries.

Synthetic fuels and Gas-to-Liquids (“GTL”) technologies also represent promising applications. These technologies convert natural gas into diesel, naphtha, and jet fuel, offering a pathway to improve energy security while leveraging existing gas reserves. GTL projects, while capital intensive, can help reduce the continent’s dependence on imported refined fuels and create domestic refining capacity aligned with cleaner fuel standards.

Blue hydrogen offers a compelling opportunity for Eastern Africa to accelerate industrialisation while leveraging its growing natural gas reserves. Produced through Steam Methane Reforming (“SMR”), blue hydrogen involves extracting hydrogen from natural gas and capturing the resulting carbon dioxide through Carbon Capture, Storage and Utilisation (“CCSU”) technologies. This process enables the production of low-carbon hydrogen using existing gas infrastructure, aligning with global decarbonisation goals. Blue hydrogen represents a strategic industrial feedstock that could power domestic fertiliser production, support the emergence of cleaner industries, and reduce reliance on imported fuels.

The background is a deep green color. Overlaid on this is a map of the African continent, which is a lighter shade of green. The map is composed of a network of white dots connected by thin white lines, creating a web-like pattern. The dots are of varying sizes, and the lines are of varying thicknesses. The overall effect is a modern, technological, and interconnected look.

9

SHORT-, MEDIUM-, AND LONG-TERM DEVELOPMENT ROADMAP

This chapter presents a strategic roadmap to unlock the potential of the Eastern Africa region's oil and gas sectors by 2050. Informed by the SWOT and PESTEL analyses, as presented in Appendix B, the roadmap leverages the region's abundant reserves (strength), addresses infrastructure gaps (weakness), capitalises on growing energy demand (opportunity), and mitigates political and economic risks (threats), such as regulatory delays and global price volatility. It outlines short-, medium-, and long-term milestones for crude oil, refined petroleum, and natural gas, as well as strategic recommendations for LPG, supported by key enablers such as trade and investment.

During the 2022 study, several action items were developed for the public and private sectors as part of the action plan. This study continued to build on and address these actions, with several examples including:

- The development of an analysis on the PPP frameworks including the method to evaluate PPP frameworks to aid the Member States in the formation of PPPs.
- The Identification of technologies for decarbonisation across the value chain which the Member States can implement to attract capital and consumers.
- An in-depth discussion on the different financing mechanisms which are available, to aid the Member States in the promotion of upstream, midstream, and downstream investment opportunities.
- The development of a gap analysis to identify where areas of surplus and deficit are within the region to promote intra-Africa trade, based on the recognition of growing domestic markets.

9.1 CRUDE OIL AND REFINED PETROLEUM PRODUCTS

This analysis provides a comprehensive overview of the crude oil and refined petroleum products landscape, focusing on short-, medium-, and long-term projections for reserves. It evaluates the requirements necessary to meet projected demand, considering factors such as imports, exports, and domestic production, while assessing their impact on the reserves. This analysis builds up to a strategic roadmap towards self-sufficiency, outlining critical milestones to be achieved.

9.1.1 Analysis of Regional Potential

The Eastern Africa region's crude oil and refined petroleum sectors hold transformative potential, driven by significant reserves and a growing energy demand, yet currently face a stark mismatch between production, refining capacity, and consumption needs. This analysis examines the region's proven crude oil reserves of 4.7 Bbbls, current crude oil production of 189 kbpd, and refining output of 19.8 kbpd against a backdrop of rising demand, projected to reach 744.1 kbpd by 2050, as discussed in Chapter 7. The interplay between these factors reveals both vulnerabilities and opportunities across the short-term, medium-term, and long-term, setting the stage for a strategic shift from import dependency to a self-sustaining energy market.

As shown in Table 15, production is concentrated in South Sudan and Sudan, with South Sudan's reserves facing depletion by 2043 at 149 kbpd – accounting for 79% of regional output – while Sudan's 1.25 Bbbls, at a lower output of 40 kbpd, offers longer-term stability until 2111.

Table 15: Current crude oil reserves and production (2025 baseline)

Country	Proven Reserves (Bbbls)	Production (kbpd)	Reserve Life
South Sudan	1.0	149	18 years (2043)
Sudan	1.25	40	86 years (2111)
Uganda	1.7	0	N/A
Kenya	0.75	0	N/A

Figure 57 illustrates this contrast: South Sudan's reserves drop steeply from 1.0 Bbbls to zero by 2043, a rapid decline within the long-term timeframe, while Sudan's gradual fall from 1.25 Bbbls to 0.9 Bbbls by 2050 im-

plies its reserve longevity at current production rates. Non-producing countries – Uganda, and Kenya – hold over half the region's reserves (2.45 Bbbls), signalling untapped potential.

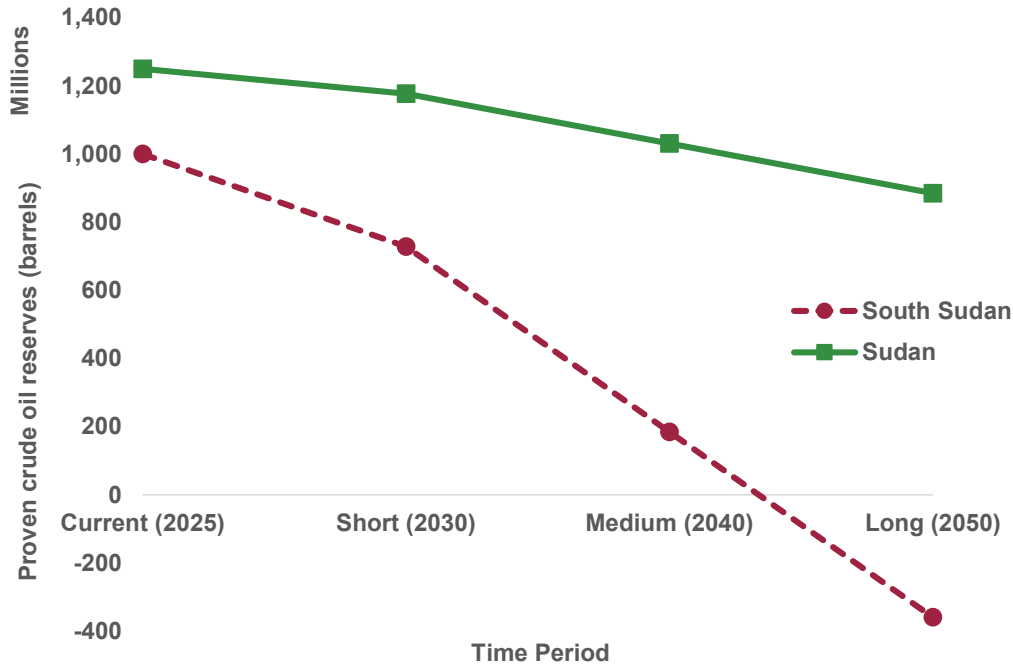


Figure 57: Proven crude oil reserves outlook for crude oil producing countries at current crude oil production rates

Currently, the region produces 189 kbpd of crude oil, far below the 554.9 kbpd required to meet the current refined petroleum demand of 416 kbpd if fully processed domestically. Utilised refining capacity, at 19.8 kbpd, covers only a fraction of this need, driving reliance on imports. The total imports for the region is 490 kbpd, of which 396.4 kbpd is used to meet regional consumption. Exports of 91 kbpd imply that a level of refined petroleum products is maintained, potentially due to legacy contracts, re-exports to neighbouring countries, or niche market advantages. However, the overall picture is one of import dependency, with local refining production accounting for only a small fraction of supply. This imbalance highlights a structural gap: crude oil production and refining lag consumption, exposing the region to external price volatility and supply risks.

Over time, demand trends amplify this challenge. By 2030, refined petroleum product demand is forecast to rise to 480.9 kbpd, requiring 641.1 kbpd of crude oil for full domestic refining. By 2040, refined petroleum demand climbs to 614.3 kbpd (needing 819.1 kbpd of

crude oil), and by 2050, it peaks at 744.1 kbpd (requiring 992.1 kbpd). Meanwhile, refining capacity could scale dramatically if the underutilised refining capacities (adding to a total of 234 kbpd) and the planned refining capacities (adding to a total of 910 kbpd) come online, reaching a potential 1170 kbpd – exceeding long-term demand by 178 kbpd. The countries in the region with underutilised refining capacity are Eritrea (18 kbpd), Kenya (90 kbpd), Madagascar (15 kbpd), South Sudan (2.5 kbpd), and Sudan (108 kbpd). The countries in the region with planned refining capacity projects are Djibouti (300 kbpd), Kenya (130 kbpd), South Sudan (170 kbpd), Sudan (250 kbpd), and Uganda (60 kbpd). Figure 58 stacks these components: current output, underutilised and planned refining capacities. This bar exceeds the 744.1 kbpd long-term demand line (corresponding to a required refining capacity of 992.1 kbpd), illustrating a surplus that hints at a future where the region could shift from importer to exporter, provided crude oil supply keeps pace.

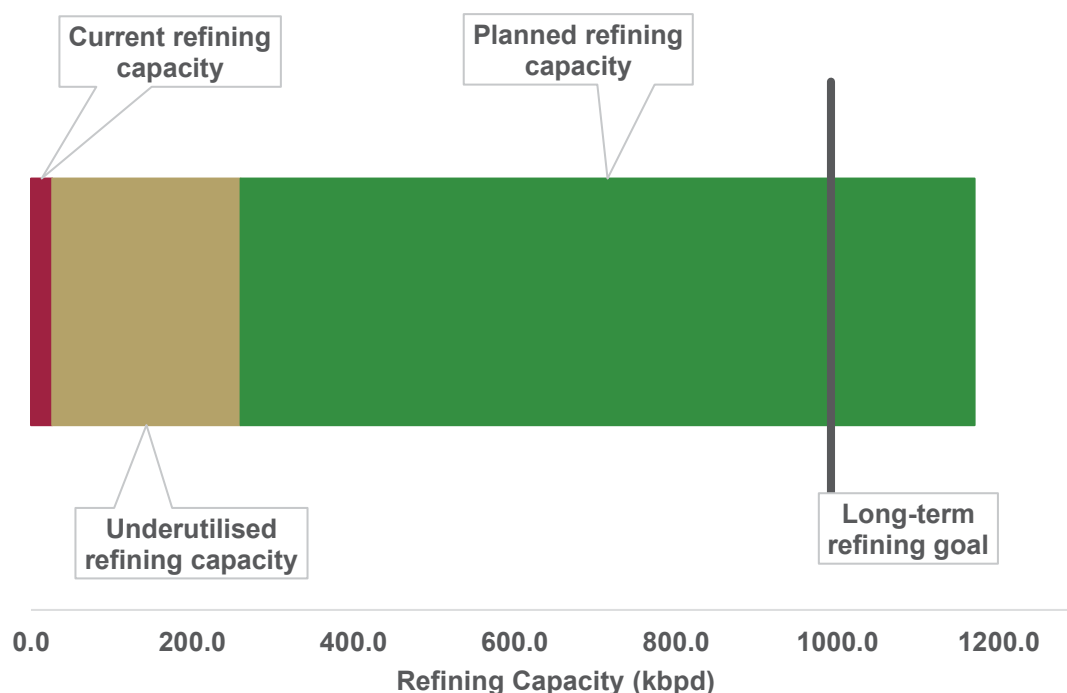


Figure 58: Currently utilised, underutilised, and planned regional refining capacities

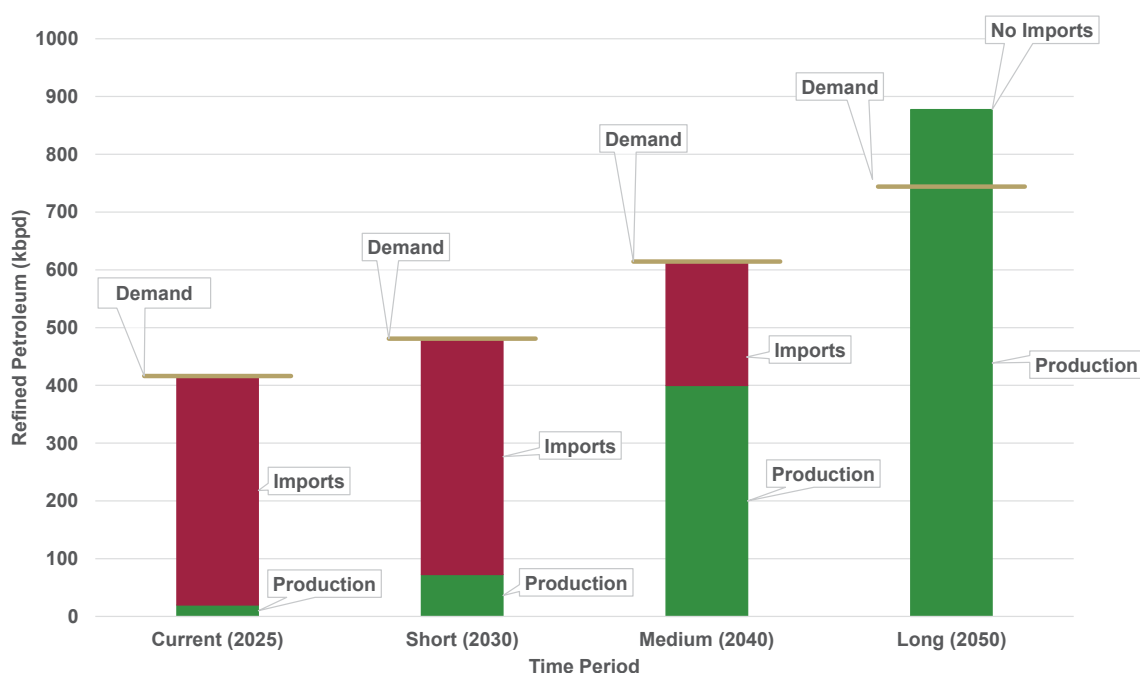


Figure 59: Portion of refined petroleum consumption demand met through regional refining versus imports

The evolution of the demand-supply dynamics for refined petroleum products is illustrated in Figure 59, which delineates the proportion of consumption met through regional production versus imports over time. In 2025, regional consumption of refined petroleum products totals 416.2 kbpd, with regional refining capacity contributing 19.8 kbpd. The remaining

demand, amounting to 396.4 kbpd, is satisfied through imports. By 2030, demand is projected to increase to 480.9 kbpd, with regional production rising to 72.4 kbpd, while imports, totalling 408.5 kbpd, continue to bridge the gap. Despite the growth in regional refining capacity, the reliance on imports is expected to persist in the short-term, underscoring the

region's significant dependence on external sources of refined petroleum products.

Looking further ahead, by 2040, demand is anticipated to climb to 614.3 kbpd. At this juncture, regional production is expected to expand substantially to 399.8 kbpd, reducing the import requirement to 214.6 kbpd. By 2050, regional production is forecasted to reach 877.5 kbpd, fully eliminating the need for im-

ports and generating a surplus of 133.4 kbpd in refined petroleum products. This trajectory reflects a marked decline in import reliance, culminating in the region achieving net exporter status by 2050. The demand-supply gap progressively narrows as refining capacity expands, reaching a pivotal inflection point where production not only aligns with but ultimately surpasses demand.

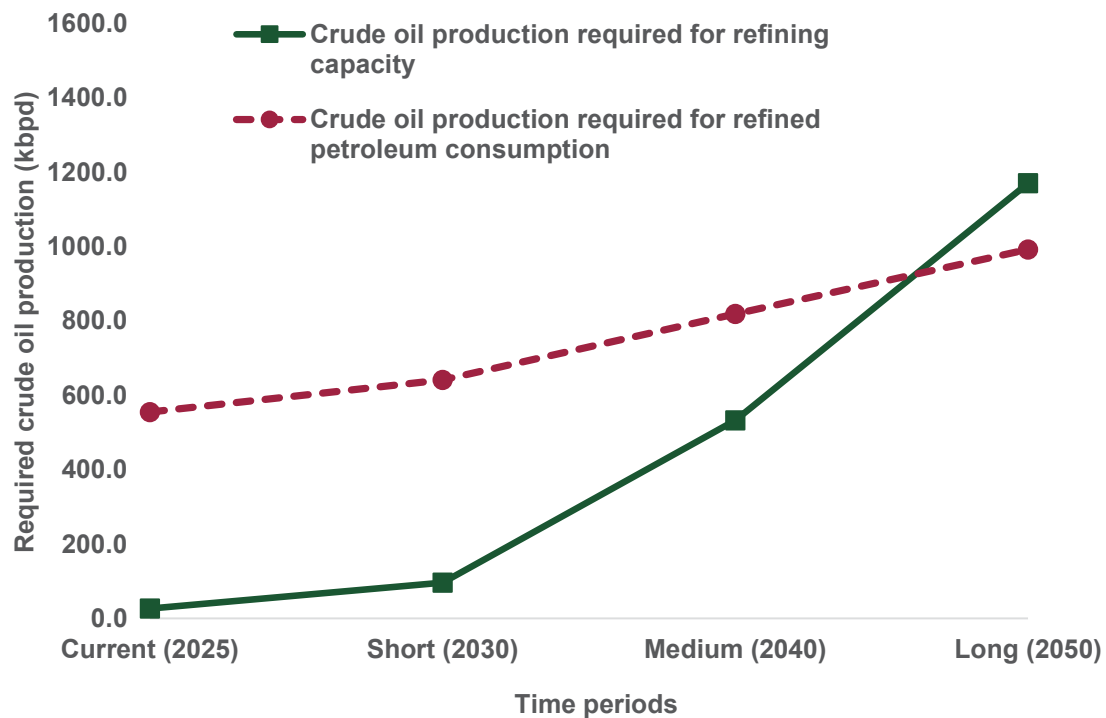


Figure 60: Crude oil production requirements to support regional refining goals and consumption demand

The crude oil supply needed to support this refining growth is captured in Figure 60, plotting two lines: crude oil production required to meet the requirements of growing refining capacity (26.4 kbpd in 2025 to 1170 kbpd by 2050), and crude oil production required to meet growing refined petroleum demand (554.9 kbpd in 2025 to 992.1 kbpd in 2050). South Sudan's looming depletion by 2043 in the absence of new discoveries, poses a risk to supply, as it drives 79% of current output. Sudan's reserves, while longer lasting, contribute less due to lower production. Non-producers, particularly Uganda with 1.7 Bbbls of proven reserves, represent a latent reserve base, but their lack of production underscores delays in upstream development. Contingent resources – 30 Bbbls in Somalia, 12.8 Bbbls in Madagascar, 7.33 Bbbls in Ethiopia, and 6.5

Bbbls in Uganda – suggest broader potential, though unproven.

Reserve sustainability is explored in Figure 61, charting depletion under various conditions. In Scenario 1 (proven reserves at current 189 kbpd production), reserves last beyond 2050, but South Sudan's 2043 exhaustion cuts output earlier. Scenario 2 (proven reserves with production ramping to 1170 kbpd to meet refining needs) depletes reserves by 2045. Scenario 3 (progressive availability of proven reserves – 5% Uganda short-term, 20% others medium-term, all by 2050) exhausts reserves by 2042. Scenario 4 (adding 1.5% of contingent resources in the medium-term and 3% of contingent resources in the long-term to the regional proven reserves) just sustains production to 2050. This highlights that contingent resources are critical to long-term viability.

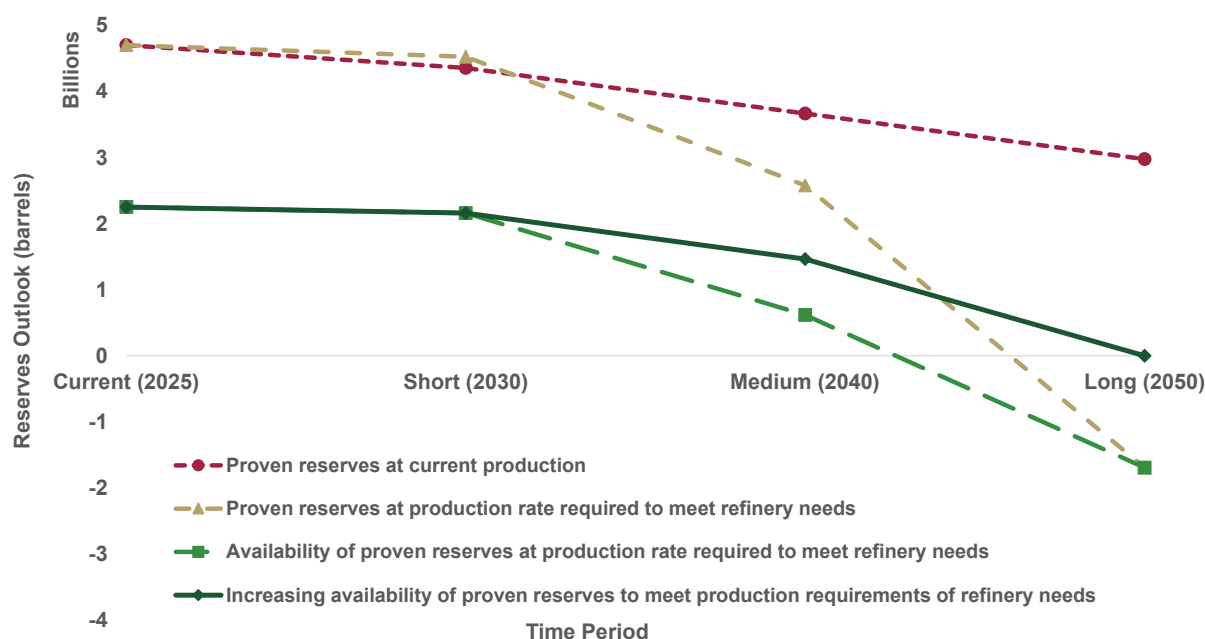


Figure 61: Crude oil reserve outlook evaluated for four (4) scenarios

In summary, the Eastern Africa region's crude oil and refined petroleum landscape reveals a region rich in resources yet constrained by limited production and refining infrastructure. The data point to a trajectory where demand outpaces supply in the near term, but untapped reserves and planned refining capacities offer a pathway to close this gap by 2050, potentially unlocking energy security and economic gains. The following sections explore these trends over time.

Short-Term (2025 – 2030)

The short-term period marks an initial phase where the Eastern Africa region's crude oil and refined petroleum sectors grapple with growing demand against static production and limited refining capacity. Refined petroleum product demand is projected to rise to 480.9 kbpd, requiring 641.1 kbpd of crude oil to meet demand fully through domestic refining. Yet, crude oil production holds steady at 189 kbpd, sourced entirely from South Sudan (149 kbpd) and Sudan (40 kbpd), unchanged from the 2025 baseline. This leaves a significant gap, as current production satisfies only 29% of the crude oil needed for demand.

Refining capacity sees modest growth, potentially increasing from 19.8 kbpd to 72.4 kbpd if 30% of the underutilised capac-

ity (70.1 kbpd of the 233.6 kbpd) becomes operational. This requires 96.5 kbpd of crude oil, still just 15% of the 641.1 kbpd needed to meet the projected refined petroleum product demand, highlighting the lack of regional refining capacity. With crude oil production and refining falling short:

- Domestic refining production of 72.4 kbpd covers 15% of projected refined petroleum demand;
- Imports required to meet regional consumption rises slightly to 408.5 kbpd (12.1 kbpd increase from the current 296.4 kbpd) to meet the projected 480.9 kbpd refined petroleum product demand.

South Sudan's 1.0 Bbbls decline to approximately 0.73 Bbbls by 2030, a loss of 0.27 Bbbls over five (5) years at the current crude oil production rate of 149 kbpd, while Sudan's 1.25 Bbbls dip to 1.21 Bbbls, a reduction of 0.04 Bbbls at the current crude oil production rate of 40 kbpd. Non-producing countries with proven reserves – Uganda, Kenya, and Ethiopia – retain their full 2.45 Bbbls if no crude oil production is initiated. In Scenario 3 and 4 from, it is envisioned that 5% of Uganda's proven crude oil reserves are to be brought online, given Uganda's imminent production plans, which will make another 85 million barrels

of crude oil reserves available for extraction; however, the maturation of these crude oil reservoirs is anticipated to be a protracted process, and may not yield successful production outcomes in the short-term.

This phase reflects a transitional state, where modest refining gains and static crude oil production reinforce reliance on imports to bridge the supply-demand gap.

Medium-Term (2031 – 2040)

The medium-term period signals a shift toward greater regional reliance, as projected refined petroleum product demand climbs to 614.3 kbpd, requiring 819.1 kbpd of crude oil for full domestic supply. Refining capacity expands markedly, potentially reaching 399.8 kbpd if all underutilised capacity (233.6 kbpd) and 30% of planned refining capacity (273 kbpd of 910 kbpd) come online. This requires 533 kbpd of crude oil – 65% of the 819.1 kbpd needed to meet the projected refined petroleum demand – indicating a substantial leap in regional processing capabilities. This increase in crude oil required for regional refining emphasises the importance of bringing new crude oil producers online – such as Kenya, and Uganda that have proven reserves – to prevent crude oil supply becoming a critical limiting factor. Key implications include:

- Domestic refining output of 399.8 kbpd meets 65% of projected refined petroleum product demand, a sharp rise from 15% by the end of 2030;
- Refined petroleum imports required to meet regional demand drop to 214.6 kbpd (from the current 396.4 kbpd – 181.8 kbpd reduction) to cover the projected 614.3 kbpd consumption.

Reserve dynamics shift as South Sudan's 1.0 Bbbls near depletion, falling to 0.18 Bbbls by 2040, approaching exhaustion by 2043. Sudan's reserves decrease to 1.08 Bbbls while maintaining its 40 kbpd crude oil production. The proven reserves in non-producing countries become critical to meet crude oil production requirements.

This period reflects a turning point, with refining capacity outpacing demand coverage, though crude oil supply constraints may arise and the need for imports persist.

Long-Term (2041 – 2050)

The long-term period presents a vision of potential self-sufficiency, with projected refined petroleum demand reaching 744.1 kbpd, requiring 992.1 kbpd of crude oil for full domestic refining. Refining capacity could reach 1170 kbpd if all underutilised (233.6 kbpd) and planned (910 kbpd) projects are realised – exceeding projected regional crude oil consumption by 177.9 kbpd. Crude oil production must scale significantly to leverage refining fully.

At this scale, the region's supply profile transforms:

- A refining output of 877.5 kbpd meets the projected 744.1 kbpd regional demand for refined petroleum products, leaving 133.4 kbpd surplus;
- Refined petroleum product imports could fall to zero, eliminating the current reliance, aligning with a vision of energy independence;
- Refining capacity of 1170 kbpd exceeds projected refined petroleum product demand by 118%, offering export potential if crude oil supply keeps pace.

Reserve trends highlight a vulnerability to crude oil supply becoming a limiting factor in the region's energy independence. South Sudan's 1.0 Bbbls likely deplete to zero 2043, ending its 149 kbpd production if new crude oil reserve discoveries are not made and developed. Development of crude oil reserves in non-producing countries becomes pivotal to replace the production lost in South Sudan. Contingent resources (such as Somalia's 30 Bbbls, Madagascar's 12.8 Bbbls, Ethiopia's 7.33 Bbbls, and Uganda's 6.55 Bbbls) offer unproven potential that could provide long-term stability in crude oil supply in the region. 4.5% of these contingent resources are required to be proven and developed by the long-term to ensure regional self-sufficiency.

This phase positions the region for self-sufficiency by 2050, with refining outstripping demand, but hinges on a massive crude oil production increase.

Key Insights

The analysis of the Eastern Africa region's crude oil and refined petroleum sectors reveals a region poised for transformation, constrained by current limitations yet rich with long-term potential. These insights distil the critical trends shaping the short-term (2025-2030), medium-term (2031-2040), and long-term (2041-2050) outlook:

- South Sudan's 1.0 Bbbls of proven reserves, driving 79% of the region's 189 kbpd production, is projected to decline to 0.73 Bbbls by 2030 and likely exhaust by 2043 at the current 149 kbpd production, posing a significant crude oil supply risk. Sudan's 1.25 Bbbls, at 40 kbpd crude oil production, fall to 0.9 Bbbls by 2050, offering stability but limited volume. Non-producers with proven reserves – Uganda and Kenya – hold 2.45 Bbbls of untapped reserves, their potential unrealised through 2050 if there is no development. Contingent resources (Somalia's 30 Bbbls, Madagascar's 12.8 Bbbls, Ethiopia's 7.33 Bbbls, Uganda's 6.5 Bbbls) remain unproven but suggest broader reserve potential in the region.
- As discussed in Chapter 7 refined petroleum product demand is projected to grow from 416 kbpd in 2025 to 480.9 kbpd in 2030, 614.5 kbpd by 2040, and 744.1 kbpd by 2050, requiring crude oil production of 992.1 kbpd by 2050 to meet this demand through regional refining.
- Utilised refining capacity could rise from 19.8 kbpd in 2025 to potentially 72.4 kbpd in 2030 (covering 15% of projected refined petroleum product demand), 399.8 kbpd by 2040 (covering 65% of projected refined petroleum demand), and 1170 kbpd by 2050 (covering 118% of projected refined petroleum demand) if underutilised (233.6 kbpd) and planned (910 kbpd) projects are brought online. This growth shifts the crude oil requirement for refining to 1170 kbpd, outpacing demand-based requirements by 177.9 kbpd in the long-term.
- The following countries in the region have underutilised refining capacity: Eritrea

(18 kbpd), Kenya (90 kbpd), Madagascar (15 kbpd), South Sudan (2.5 kbpd), and Sudan (108 kbpd). The following countries in the region have planned refining projects: Djibouti (300 kbpd), Kenya (130 kbpd), South Sudan (170 kbpd), Sudan (250 kbpd), and Uganda (60 kbpd).

- Imports required to meet consumption slightly from 396.4 kbpd in 2025 to 408.5 kbpd by 2030 to meet rising demand, then decline to 214.6 kbpd by 2040 as refining ramps up, potentially reaching zero by 2050 with a refined petroleum product surplus. This reflects a transition from heavy reliance on imports to possible self-sufficiency.
- Current crude oil production of 189 kbpd meets 29% of short-term demand needs (641.1 kbpd), potentially 61% in the medium-term (819.1 kbpd) if rising to 500 kbpd and must reach 992.1 kbpd or higher by 2050 to eliminate imports. The gap between refining needs and production highlights the critical need for new supply sources as South Sudan's reserves dwindle.

The region's resource wealth contrasts with short-term constraints, offering a long-term path to self-sufficiency if crude aligns with refining growth. The next section explores the roadmap to self-sufficiency in the crude oil and refined petroleum product sectors for the Eastern Africa region.

9.1.2 Roadmap to Self-Sufficiency for Crude Oil and Refined Petroleum Product

Strategic Vision & Purpose of the Roadmap

The Eastern Africa region is dependent on imported refined petroleum products, exposing its economies to price volatility, supply chain disruptions, and foreign exchange risks. However, with proven crude oil reserves and contingent resources, underutilised refining capacity, and growing regional demand, the opportunity exists to transform the sector into a self-sustaining and competitive regional market.

From import reliance to independence: Transforming the Eastern African region's crude oil and refined petroleum product sector into a self-sustaining and competitive market through strategic production, refining, and regional collaboration.

Energy security for the Eastern Africa region by 2050 hinges on meeting the projected refined petroleum product demand of 744.1 kbpd through regional self-sufficiency, ensuring affordable supply via local refining, and building resilience against global market shocks and price volatility by eliminating the current 396.4 kbpd reliance on imports to meet regional consumption. Scaling refining capacity by 2050 could lower retail fuel prices by reducing reliance on imported products, which currently incur logistics and currency costs, enhancing affordability.

The roadmap for crude oil and refined petroleum products, as summarised in Figure 62, outlines the necessary steps to shift from reliance on external sources to regional self-sufficiency, ensuring the Eastern Africa region extracts, refines, and distributes its own petroleum resources efficiently and competitively.

This roadmap summarises the minimum steps required to ensure self-sufficiency up until the end of the long-term period (2050), based on the full potential within the region for both crude oil reserves and refining capacity, as discussed in Section 9.1.1. The roadmap for crude oil is expanded on in Figure 63 and Figure 64, while the roadmap for refined petroleum product is expanded on in Figure 65 and Figure 66. Key enablers to the successful implementation of the roadmap are identified as enabling trade and attracting investment, which are discussed in Section 9.4.

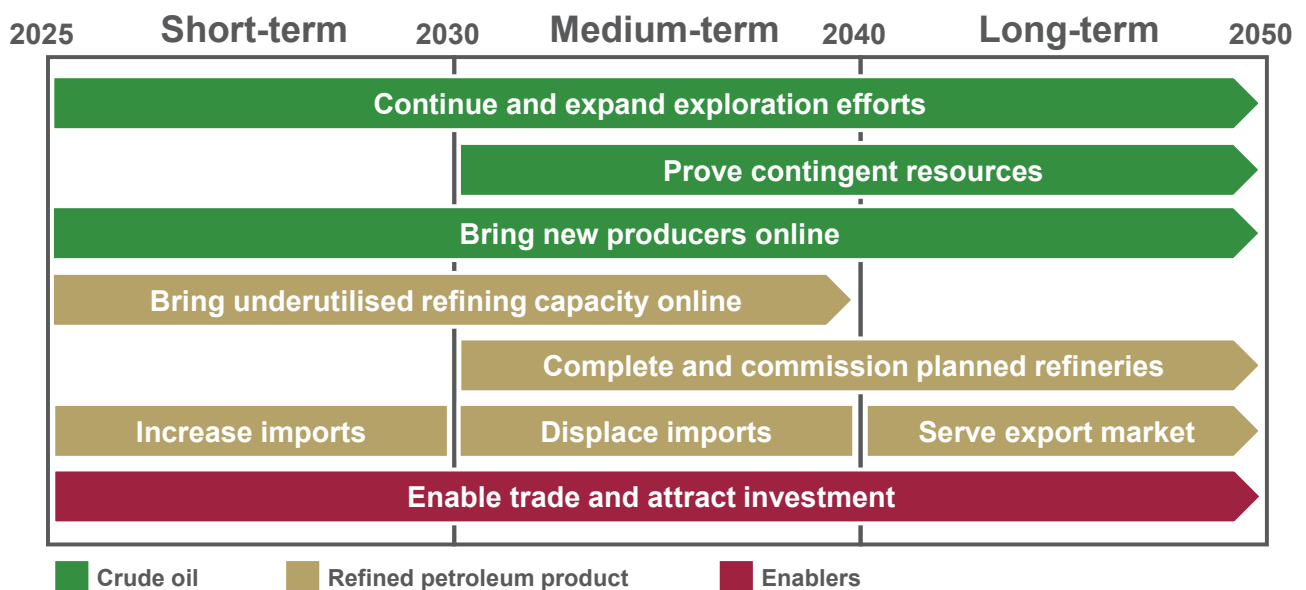


Figure 62: Summary of crude oil and refined petroleum product roadmap

Roadmap to Sufficient Crude Oil Production

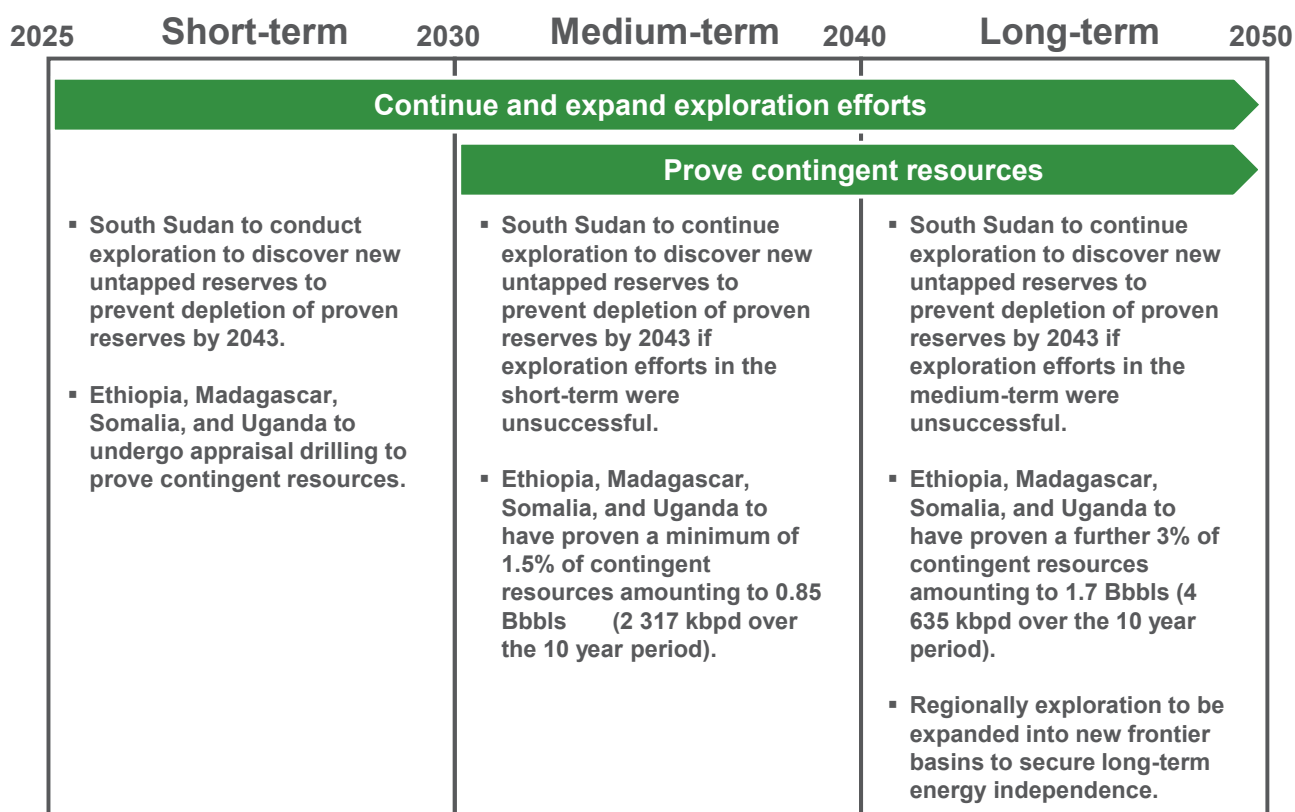


Figure 63: Crude oil roadmap for expanding exploration and proving crude oil reserves

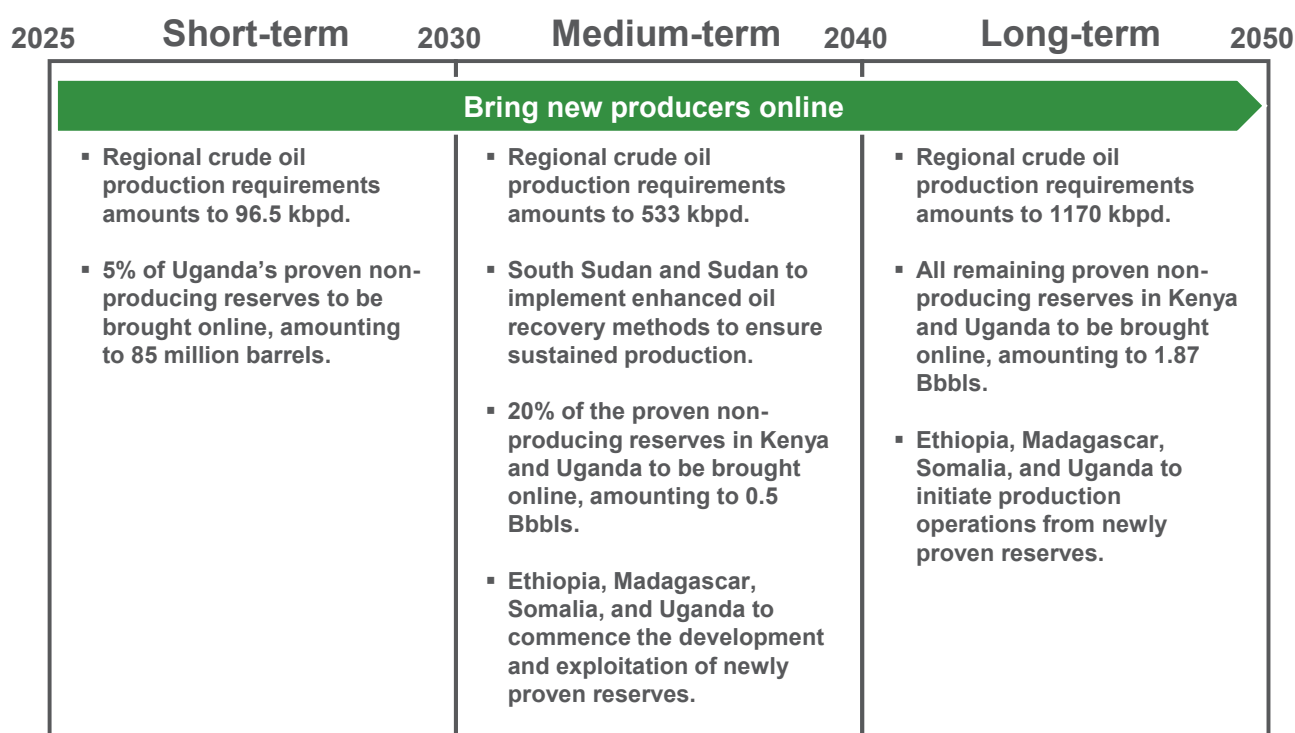


Figure 64: Crude oil roadmap for bringing new crude oil producers online

Roadmap to Refining Self-Sufficiency

2025	Short-term	2030	Medium-term	2040	Long-term	2050
Bring underutilised refining capacity online			Complete and commission planned refineries			
- Regional refining capacity required amounts to 96.5 kbpd. - Eritrea, Kenya, Madagascar, South Sudan, and Sudan to bring 30% of underutilised refining capacity online, amounting to 70.1 kbpd.			- Regional refining capacity required amounts to 533 kbpd. - Eritrea, Kenya, Madagascar, South Sudan, and Sudan to bring remaining 70% of underutilised refining capacity online, amounting to 163.5 kbpd. - Djibouti, Kenya, South Sudan, Sudan, and Uganda to complete and commission 30% of planned refineries, amounting to 273 kbpd.			- Regional refining capacity required amounts to 1170 kbpd. - Djibouti, Kenya, South Sudan, Sudan, and Uganda to complete and commission remaining 70% of planned refineries, amounting to 637 kbpd. - There is a surplus refining capacity of 177.9 kbpd in excess of the refining capacity of 992.1 required to meet refined petroleum product demand.

* Regional utilised refining capacity, amounting to 26.4 kbpd, to remain operational.

Figure 65: Refined petroleum product roadmap for increasing regional refining capacity

2025	Short-term	2030	Medium-term	2040	Long-term	2050
Increase imports		Displace imports		Serve export market		
- Regional refined petroleum product consumption is projected to amount to 480.9 kbpd. - Regional refined petroleum product production amounts to 72.4 kbpd. - Regional refined petroleum product imports required to meet consumption requirements amounts to 408.5 kbpd, which equates to an increase of 12.1 kbpd from current imports.		- Regional refined petroleum product consumption is projected to amount to 614.3 kbpd. - Regional refined petroleum product production amounts to 399.8 kbpd. - Regional refined petroleum product imports required to meet consumption requirements amounts to 214.6 kbpd. Regional production to displace 181.8 kbpd of refined petroleum product imports.		- Regional refined petroleum product consumption is projected to amount to 744.1 kbpd. - Regional refined petroleum product production amounts to 877.5 kbpd. - Regional self-sufficiency achieved through domestic production. Regional refined petroleum production supply independent of imports. - Region projected to be established as a net exporter with an excess refined petroleum production of 133.4 kbpd available for export.		

Figure 66: Refined petroleum product roadmap for imports and exports

9.2 NATURAL GAS

This analysis delves into the natural gas sector, providing a detailed examination of short-, medium-, and long-term reserve outlooks based on current production rates. It evaluates the minimum requirements necessary to meet projected demand. Additionally, the analysis explores the significant opportunity to develop the regional natural gas market, based on the notable production potential of natural gas in the region. This discussion highlights the essential milestones that contribute to meeting the minimum demand requirements as well as the enhancement of the natural gas market.

9.2.1 Short-, Medium-, and Long-Term Potential Analysis

Natural Gas Reserve Outlook

The Eastern Africa region has significant natural gas reserves, yet its utilisation remains extremely low. Currently, only Rwanda and Tanzania produce natural gas, while other countries with substantial reserves—such as Ethiopia, Somalia, South Sudan, and Uganda—have yet to begin production. Tanzania is in discussions with IOCs on how to develop its vast deep-sea discoveries of natural gas, which will facilitate export in the form of LNG. Currently, there is no natural gas trade within the region, and consumption remains confined to the producing nations.

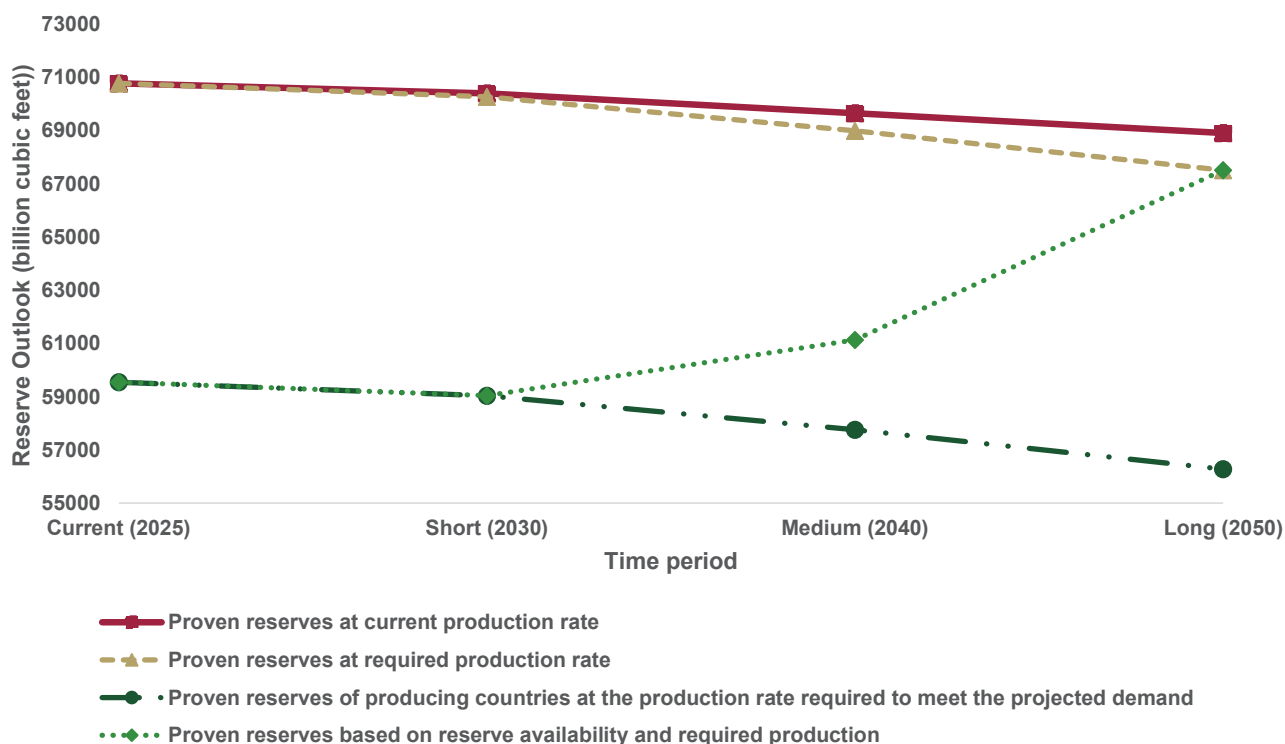


Figure 67: Short-, Medium-, and Long-term natural gas reserves outlook for Eastern Africa

To assess the sustainability and potential role of natural gas, different reserve outlook scenarios were analysed and presented in Figure 67 based on current production, projected demand growth, and reserve development timelines.

Scenario 1: Proven Reserves at Current Production Rate

With Tanzania producing 72.53 bcf per year and Rwanda producing 2.12 bcf per year, their reserves are projected to last for 793 years and 943 years, respectively at these rates. While this suggests abundant reserves, it also highlights

the extremely low production and utilisation of natural gas in the region.

The key takeaways from this scenario are as follows:

- Proven reserves far exceed current production needs, meaning supply is not a constraint;
- Low production levels reflect limited domestic consumption and a lack of trade within the region;
- There is no urgency for additional natural gas reserve development under current consumption trends.

This scenario, however, is not realistic in the long-term, as demand for natural gas is projected to rise.

Scenario 2: Proven Reserves at Required Production Rates

Using the ExxonMobil model, projected natural gas demand for the Eastern Africa region is expected to increase to 100.2 bcf in the short-term, 127.9 bcf in the medium-term, and 148.4 bcf in the long-term.

If production increases accordingly to meet the growing demand:

- Proven reserves remain plentiful, despite higher extraction rates;
- The reserve outlook remains secure in the long-term, meaning there is no risk of depletion at projected consumption rates; and
- The availability of reserves will not pose a concern, but rather the lack of production and trade mechanisms.

While this scenario shows that proven reserves can easily sustain future production growth, it does not consider the availability of reserves for production as not all proven reserves are being extracted.

Scenario 3: Proven reserves of producing countries at the production rate required to meet the project demand

Since only Rwanda and Tanzania currently produce natural gas, their combined proven

reserves must support the production levels required to meet projected demand.

At the projected long-term production rate of 148.4 bcf, we see that Rwanda and Tanzania's proven reserves in these two (2) countries would decrease substantially in the long-term; however, there are sufficient reserves to maintain the required production in the region.

Scenario 4: Proven Reserves Availability and Required Production

Since natural gas development takes time, this scenario assumes that new reserves will progressively become available. In the short-term only the proven reserves of producing countries are considered, while in the medium-term 30% of the other regional proven reserves are considered to have become available for production, and in the long-term, all the proven reserves in the region are considered as available.

At the projected production rates reserves remain abundant, and supply of natural gas far exceeds demand, indicating there is ample room for expansion. New production hubs must be established to reduce the risk of dependency on a single natural gas producing country as natural gas utilisation infrastructure in the region expands.

The Role of Natural Gas in Diversifying Eastern Africa's Energy Mix

Natural gas is increasingly recognised as a cleaner hydrocarbon that can significantly contribute to diversifying the Eastern Africa region's energy mix. Despite the region's considerable natural gas reserves, its potential remains underutilised, with only Rwanda and Tanzania currently producing the commodity. As the demand for energy grows, particularly in electricity generation, industrial development, and clean cooking, natural gas offers a viable and cleaner alternative to other fossil fuels. Its use can address key regional challenges, including energy security, economic growth, and environmental sustainability.

Energy Diversification and Security

One of the major advantages of introducing natural gas into the energy mix is its ability to

diversify energy sources. Currently, the region heavily depends on hydropower, biomass, and imported refined petroleum products. This reliance makes the region vulnerable to droughts (which impact hydropower) and global oil price fluctuations. By incorporating natural gas into the mix, the Eastern Africa region can increase its energy security. This shift would reduce dependence on imported fuels, create more resilient energy systems, and provide a more stable long-term supply. Additionally, gas-fired power plants are highly efficient and can be used in a baseload or peaking capacity, making them an ideal backup for more intermittent renewable sources.

Economic Growth and Job Creation

As natural gas infrastructure expands, it will create jobs in exploration, extraction, processing, and distribution. The development of gas-related industries will also support local manufacturing, agriculture, and transportation, stimulating the overall economy. Countries with large natural gas reserves can see significant revenue generation from the domestic production and potential export of natural gas, boosting public finances and economic growth.

Environmental Benefits and Sustainability

Natural gas is a cleaner fossil fuel compared to coal and oil, emitting lower levels of carbon dioxide, nitrogen oxide, and sulphur dioxide. As a result, transitioning to natural gas can help the region meet its climate goals and reduce the environmental footprint of its energy sector. Natural gas infrastructure can be deployed relatively quickly and with lower capital costs than large-scale renewable energy projects, helping address urgent energy needs.

Natural gas can serve as a transition fuel in the Just Energy Transition by providing a lower-carbon alternative, supporting energy security while enabling the gradual integration of renewable energy sources. Natural gas with decarbonisation technologies can serve as a bridge to a low-carbon future, allowing for cleaner energy production while facilitating a smooth transition to more sustainable energy systems. This integration can help the region

decarbonise without losing access to reliable energy sources during the interim phases.

Uses and Benefits of Natural Gas for the Region

With the growing electricity demand across the region, gas-fired power plants offer an efficient, scalable, and cleaner alternative to coal and oil-fired plants. Compared to these traditional fuels, natural gas emits significantly fewer GHGs and air pollutants. As renewable energy sources increase, gas plants can provide grid stability by serving as backup during periods of low renewable output.

The industrial sector can also benefit significantly from natural gas as a feedstock for fertilisers, petrochemicals, and other chemicals. Fertiliser production relies on ammonia (which can be produced from natural gas) and is key to agricultural growth in the region. Natural gas can fuel industrial processes such as heating, drying, and manufacturing.

In many Eastern African countries, LPG is used for cooking, but it is largely imported and subject to volatile prices. Natural gas may offer a cleaner, cheaper, and more reliable option for cooking in both urban and rural areas. By expanding the use of natural gas for domestic cooking, the region can reduce the widespread use of biomass.

CNG can play a significant role in the transportation sector. CNG vehicles, including buses, taxis, and trucks, are more fuel-efficient and emit fewer pollutants than those powered by traditional fuels. In urban areas, where air quality is often a concern, transitioning to CNG-powered public transport can improve public health. The availability of local natural gas for transportation purposes can reduce dependence on imported fuels, enhancing fuel security.

Regional Natural Gas Production Potential

The Eastern Africa region possesses vast natural gas reserves, yet the region's current production and utilisation remain limited. Only Rwanda and Tanzania currently produce natural gas, while other nations with substantial proven reserves, such as Ethiopia, South Sudan, and Uganda,

have yet to develop their resources. The lack of natural gas trade, infrastructure, and domestic utilisation has kept production at minimal levels, leaving enormous untapped potential in the region's energy landscape.

This section serves as a demonstration of the full potential of the Eastern Africa region's natural gas sector, assessing how much natural gas could theoretically be extracted if the entirety of current proven reserves were utilised by the end of the long-term. While this will not feed directly into the roadmap, it provides context for understanding the scale of the region's natural gas resources, reinforcing the idea that natural gas can play a far greater role in the regional energy mix.

Theoretical Production Potential Based on Proven Reserves

To gauge the maximum possible production capacity for the region, an analysis was conducted to determine how much natural gas could be produced beyond what is required to meet the projected demand. The key approach taken was to examine:

- The projected natural gas demand across the short-term, medium-term, and long-term;
- The availability of reserves for production assuming only proven reserves from producing countries are available in the short-term, 30% of non-producing reserves are available in the medium-term, and the

remaining 70% of non-producing reserves are available in the long-term; and

- A hypothetical ramp-up in production levels, designed to determine the scalability of regional extraction capacity and assess how quickly reserves could be depleted.

The Scale of Potential Natural Gas Production in the Region

The findings from the described analysis are shown in Figure 68. In the short-term, the regional production is doubled from what is required to meet the natural gas demand projection. Large amounts of proven reserves would remain untouched, indicating immense room for expansion.

In the medium-term, the regional production potential is approximately 1500% of the production required to meet regional projected natural gas demand. With more reserves becoming available and production scaling up, output could increase fifteenfold beyond demand requirements, further demonstrating the abundance of natural gas in the region.

In the long-term, natural gas production potential is more than 3000% the required production to meet regional natural gas demand projection. If production were to scale-up at these rates, proven reserves could theoretically be depleted by 2050, but this scenario is not a goal—rather, it highlights the enormous capacity for production that exists.

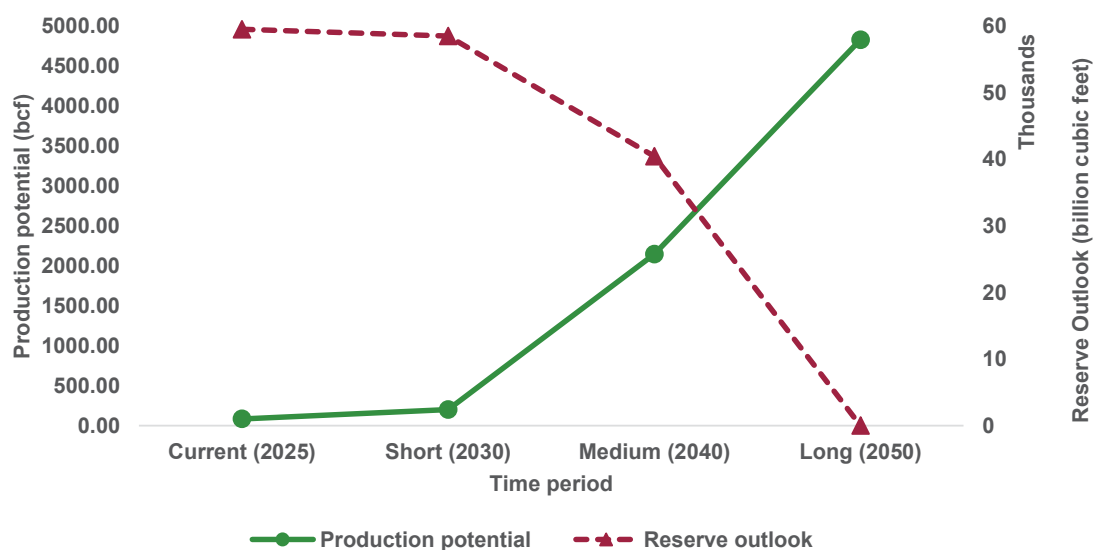


Figure 68: Regional natural gas production potential based on reserve availability in the short-, medium-, and long-term

Key Takeaways Regarding the Region's Natural Gas Potential

The Eastern Africa region is vastly underutilising its natural gas reserves. Even with large-scale production growth, the reserves remain sufficient for long-term exploitation. The fact that production could expand approximately thirty (30) times more than required to meet projected long-term demand to deplete proven reserves by 2050 highlights that natural gas resources are more than sufficient to support regional energy needs for decades to come. This presents a significant opportunity for energy security and economic development, as the sheer scale of available supply makes natural gas an attractive option for export markets, industrial applications, electricity generation, and clean cooking solutions. Countries with proven but underdeveloped reserves have strong incentive to begin production and leverage these opportunities.

9.2.2 Roadmap to Natural Gas Utilisation

The natural gas development roadmap for the Eastern Africa region, as presented in Figure 69, outlines two (2) strategic scenarios aimed at optimising resource utilisation and meeting regional energy demands. Scenario 1, with its detailed roadmap presented in Figure 70, is designed to meet projected natural gas consumption requirements based on the production capabilities of the two (2) producing and consuming countries in the region, namely Rwanda and Tanzania. Scenario 2, with its detailed roadmap presented in Figure 71, takes a demand-driven approach by focusing on increasing the utilisation of natural gas through the identification and prioritisation of gas monetisation strategies.

To support the successful implementation of both scenarios, key enablers have been identified and are presented in Section 9.4. These enablers focus on promoting trade and attracting investment, which will address the financial and regulatory frameworks which stimulate market growth.

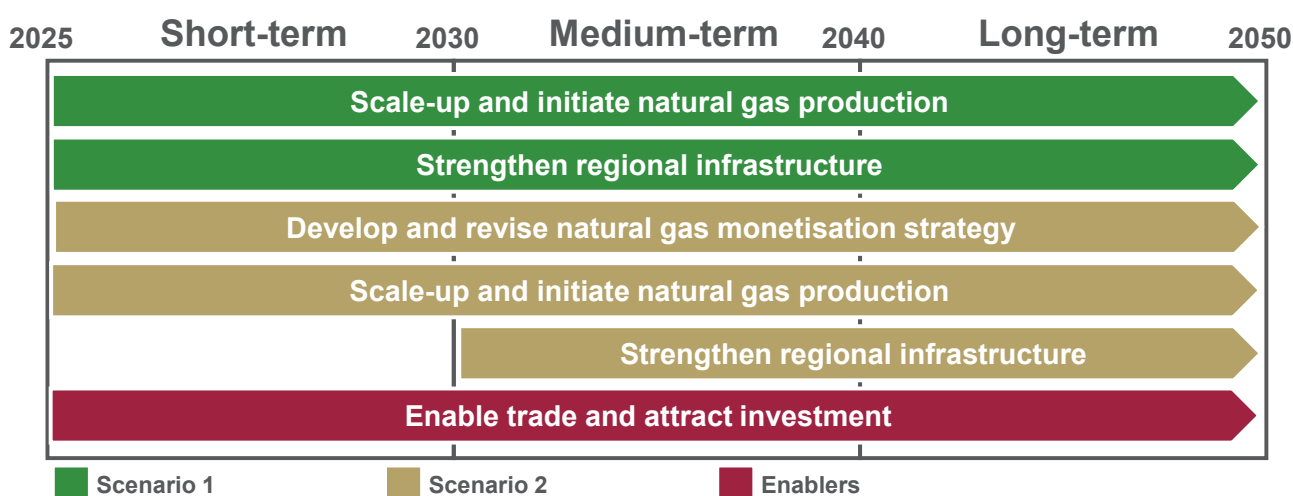


Figure 69: Summary of natural gas development for two (2) scenarios

Scenario 1: Meeting Demand

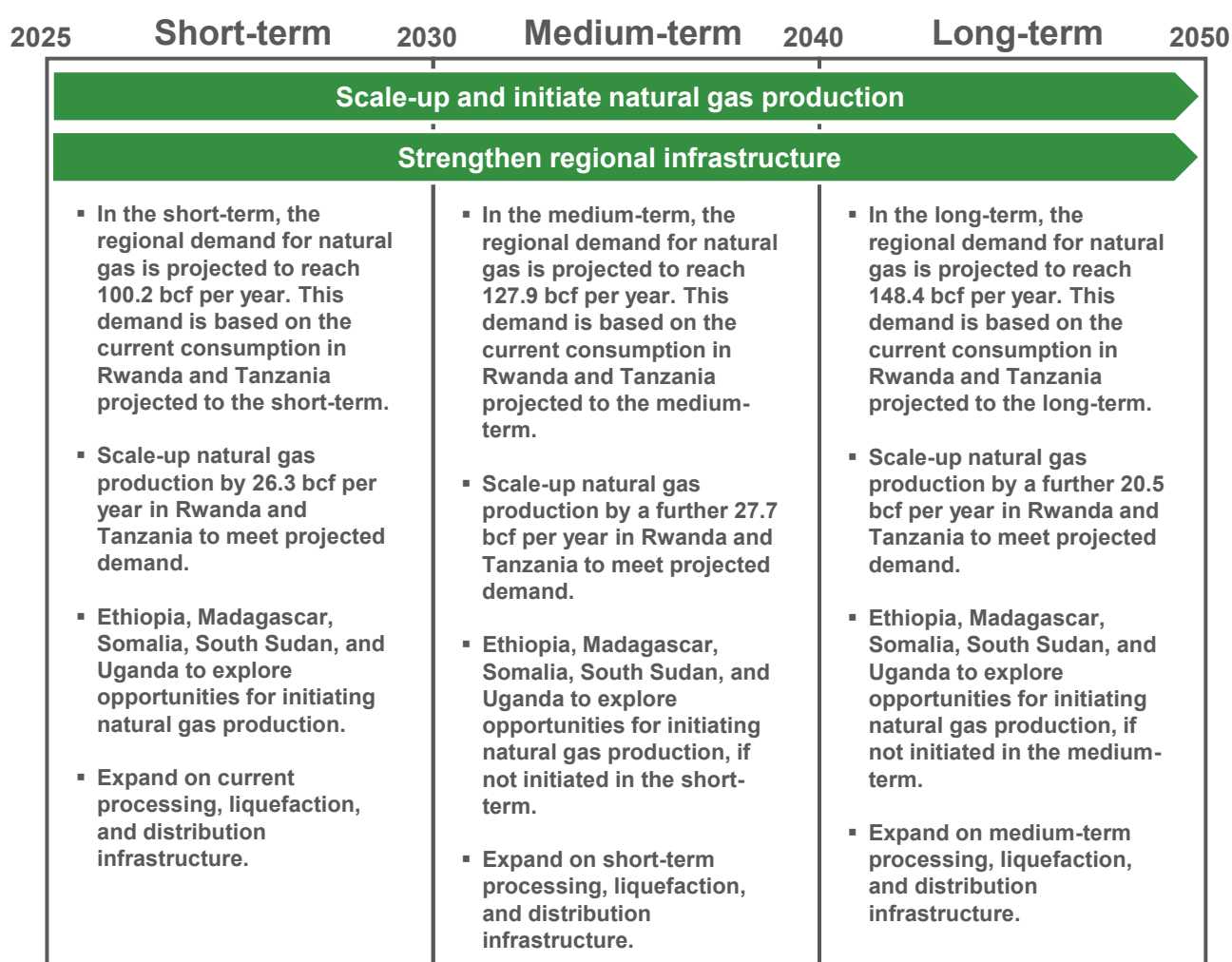


Figure 70: Roadmap for natural gas scenario 1: meeting production demand

Scenario 2: Creating Demand

To increase demand and guarantee offtake for natural gas at a country- and regional level, effort is required to identify and prioritise opportunities for natural gas monetisation. These monetisation opportunities may arise from displacing imported refined petroleum or leveraging the inherent value and diverse

applications of natural gas. As discussed in 9.2.1, there are numerous economic and environmental benefits to the utilisation of natural gas over heavier carbon fuels. It is recommended that a study be conducted in the short-term to identify and prioritise natural gas monetisation opportunities and determine the feasibility thereof.

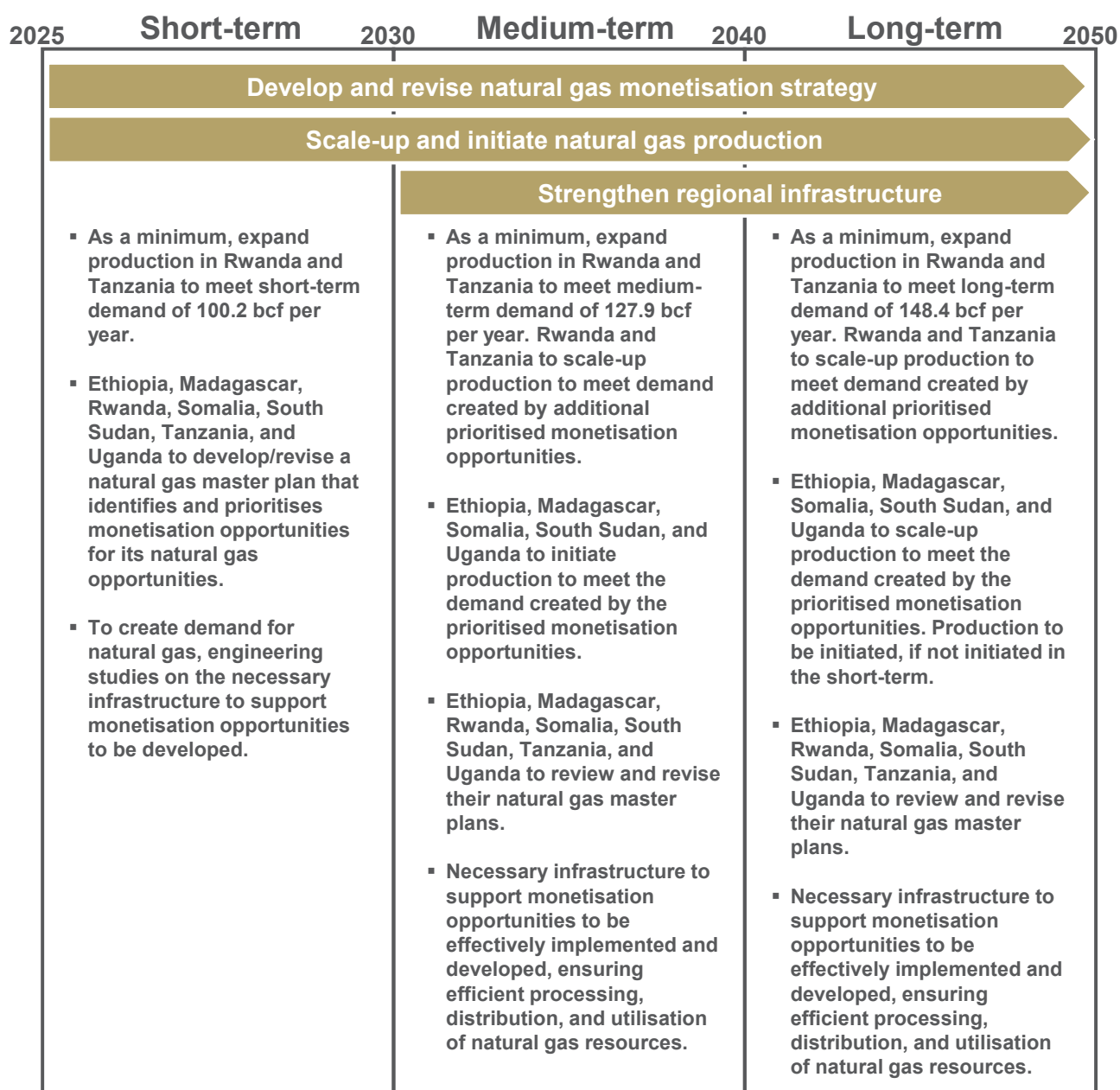


Figure 71: Roadmap for natural gas scenario 2: increasing demand

Some displacement opportunities for natural gas to replace imported refined petroleum products and heavier carbon fuels is presented in

Table 16. While some of the applications for leveraging the inherent value of natural gas is presented in Table 17 for the Eastern Africa region.

Table 16: Displacement Opportunities for natural gas

Displacement Opportunity	Description
Power Generation	Existing coal-fired power plants can be retrofitted with Combined Cycle Gas Turbines ("CCGT") or replaced by new natural gas plants. Existing oil-fired power plants can be converted to burn natural gas.
Transportation	Vehicles can be retrofitted with CNG or LNG conversion kits or specially designed to replace diesel or petrol with CNG or LNG.
Industrial Processes	Displace oil/refined petroleum products in manufacturing processes by switching to natural gas for boilers, kilns, furnaces and/or heating systems.

Displacement Opportunity	Description
Back-up Generators	Natural gas generators can be installed for emergency power supply as an alternative to diesel generators.
Residential Heating	Install natural gas furnaces or boilers to replace heating oil or traditional biomass.
Marine Fuels	Substitute bunker fuel in shipping with LNG.

Table 17: Opportunities for leveraging the inherent value of natural gas

Leveraging Opportunity	Description
Power Generation	Use natural gas in CCGT or simple cycle gas turbines for gas-to-power initiatives.
Cooking	Utilise natural gas stoves and ovens.
Combined Heat and Power ("CHP")	Implement CHP systems that use natural gas to generate electricity while capturing waste heat for heating purposes.
Gas-to-Liquids ("GTL")	Utilise GTL technology to transform natural gas into synthetic fuels like diesel and petrol.
Natural Gas Liquids	Separate components like ethane, propane, and butane for use in petrochemical production and as fuels.
Fertiliser Production	Utilise natural gas in the Haber-Bosch process to synthesise ammonia, which is then used to create fertilisers, among other applications.
Hydrogen Production	Use natural gas in SMR to extract hydrogen.

Once natural gas demand nodes have been prioritised according to economies of scale,

gas supply chain. The demand created by the monetisation opportunities will determine the required production/supply of natural gas at a country- and regional level.

9.3 STRATEGIC RECOMMENDATIONS FOR LPG DEVELOPMENT

This study predominantly focuses on the roadmaps for crude oil, refined petroleum product and natural gas. However, owing to the significance of LPG for the region the section below captures broader strategic recommendations for LPG development in the region in the absence of a roadmap. The enablers discussed in Section 9.4 are therefore relevant to the advancement of not only crude oil, refined petroleum product, and natural gas, but also LPG.

logistics and transportation recommendations can be made to optimise the natural

Identifying Key Players in the LPG Market

A study on the LPG market for each nation in the region at a country-level is recommended to ensure transparency regarding the key players involved, including wholesalers, retailers, and importers. This will empower stakeholders to identify market participants requiring regulation, highlight potential vulnerabilities, and establish the necessary frameworks to enhance market efficiency and transparency. Unregulated or informal players in the market create disparities in service quality and pricing, making it difficult for legitimate businesses to thrive. A thorough understanding of these dynamics is crucial for implementing effective regulatory measures and cultivating a competitive, transparent landscape within the LPG sector. Understanding the structure of the LPG market is a crucial step to inform decision-makers on how to further develop the market at both a country- and regional level.

Adopt LPG Regulations

As discussed in section 4.1.2 of this study, not all countries in the region have incorporated LPG-specific regulations into their hydrocarbon laws. The lack of clear regulatory frameworks poses challenges for market development, investment, and safety compliance, potentially slowing sector growth and limiting benefits for households, businesses, and industries. With the region advancing clean energy goals, there is a strong case for governments to prioritise LPG policies covering storage, distribution, pricing, and safety.

Developing Standard Cylinder Exchange Procedures

A prominent factor in the efficiency of the LPG market within the region and each country is a streamlined LPG cylinder exchange procedure that follows industry best practices. Standard practices for cylinder exchange should be developed and regulated. To mitigate disparities in service quality and pricing. These standards can be developed on a regional level to ensure all the Member States of the Eastern Africa region can benefit from a cohesive approach that enhances market efficiency, improves safety, and boosts consumer confidence in LPG usage across the region.

Education on the Safe Use of LPG

LPG cylinders involve multiple safety concerns throughout the lifecycle, including cylinder integrity, handling, transportation, and refilling. Empowering all stakeholders on the best practices surrounding LPG transportation, storage, and usage can boost confidence in LPG adoption across the supply chain at a regional and country-level. Engaging a consultant to develop a comprehensive safety plan for LPG based on industry standards can provide the foundation for running educational programmes to empower residents, retailers, wholesalers, bulk storers, and transporters. By promoting awareness and understanding of LPG safety and industry best practices among all parties, these programmes can nurture a culture of safety and encourage broader adoption of LPG over traditional biomass fuels.

9.4 KEY ENABLERS FOR ROADMAP SUCCESS

Enablers have been identified to be key drivers to the successful implementation of the development roadmaps. Enabling trade and attracting investment, are fundamental pillars to supporting the execution of the above oil and gas development roadmaps in the region. These two pillars will be supported by market transparency, infrastructure, carbon emission reduction, regulatory frameworks, and regional security, as shown in Figure 72.

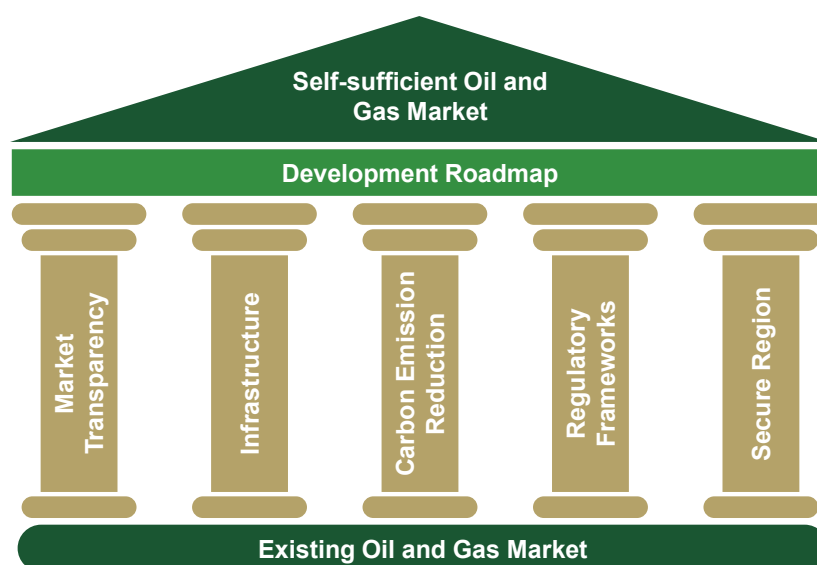


Figure 72: Enablers supporting the development roadmap towards a self-sufficient region

9.4.1 Market Transparency

At the inception of a nascent industry, it is crucial to establish a comprehensive understanding of the key players, ensuring market transparency at both a country- and regional level. This involves identifying and mapping potential buyers (off-takers), sellers (producers), and intermediaries while also gaining a clear, data-driven quantification of market size, transaction volumes, and potential growth trajectories. Such insights will provide a strong foundation for market development, investment decisions, and trading agreements.

A critical first step in establishing a regional oil and gas trade hub is the systematic mapping and quantification of supply and demand nodes. By consolidating demand into strategic nodes that achieve critical mass, viable trade linkages can be identified and established, promoting a more interconnected and efficient market, across key sectors, including gas-to-power, transport, and both domestic and regional consumption.

A regional master plan for oil and gas market development should be formulated to consolidate demand, enabling economies of scale and attracting investment in infrastructure and logistics. This will provide a structured basis for interconnecting supply and demand through efficient transport networks that will lay the foundation for connecting trading partners.

9.4.2 Infrastructure

Once supply and demand nodes are clearly defined, infrastructure requirements can be planned to optimise logistics, minimise costs, and ultimately connect buyers and sellers and thus enabling trade. The establishment of infrastructure will further aid in making the region more attractive for potential investors.

Pipeline and Distribution Networks

A well-integrated regional pipeline network will facilitate cross-border energy trade and improve market connectivity. Completing ongoing pipeline projects—listed in Table 4, Table 5, and Table 8 for crude oil, refined petroleum product, and natural gas respectively—and planning new infrastructure, as well

as improving railway and road networks, will enhance the efficiency of crude oil, refined petroleum product and natural gas distribution to demand centres.

A regional oil and gas transportation master plan is necessary to develop a harmonised logistics network, utilising pipelines, railways, and shipping. Establishing inland crude oil hubs will enhance supply chain stability, while integrating regional pipeline infrastructure into a broader continental energy corridor will support long-term energy security. Furthermore, expanding port facilities for refined petroleum exports and LNG terminals for natural gas export, will strengthen the region's capacity to participate in global markets.

Storage Infrastructure Development

Strengthening crude oil and refined petroleum product storage capacity is critical for handling long-term production volumes and mitigating supply disruptions. Strategic fuel reserves should be established to ensure energy security, particularly in regions vulnerable to market fluctuations. Small island nations, such as Comoros, Seychelles, and Mauritius, may need to explore innovative solution, such as offshore storage, to increase their storage potential and reduce import frequency from mainland or global suppliers.

9.4.3 Carbon Emission Reduction

International investors have shown increasing scepticism toward oil and gas projects due to concerns over climate change, sustainability, and shifting regulatory landscapes. The global shift towards cleaner energy sources, coupled with a heightened focus on ESG criteria, is prompting the industry to adopt more sustainable practices. This evolution is reshaping the attractiveness of traditional fossil fuel investments, as stakeholders increasingly prioritise greener and more responsible energy solutions.

As Eastern Africa continues to expand its oil and gas industry, addressing the environmental impact of this growth will be crucial. Given that the region currently has relatively low emissions levels compared to other areas,

it presents a unique opportunity to integrate emissions mitigation strategies early in the development process. While the expansion of oil and gas production will inevitably increase emissions, there is an effectively “blank slate” on the worldwide scale at this stage that allows the region to proactively adopt emissions control measures that could mitigate the environmental impact and position the region as a leader in decarbonisation efforts. By focusing on sustainable energy solutions and promoting green investments, Eastern Africa can balance development with environmental responsibility, paving the way for a resilient and equitable future.

Early Adoption of Decarbonisation Technology

With oil and gas infrastructure still in the early stages of development, the region has an opportunity to integrate advanced decarbonisation technologies from the outset. Technologies like CCSU and methane emissions reduction tools (such as LDAR systems) can be integrated at various stages of exploration, production, and refining. Early implementation can ensure that emissions are controlled from the start, avoiding the heavy environmental impact that might otherwise come with rapid industrial expansion and growth of fossil fuels production.

Explore Carbon Credit Mechanisms

Introducing carbon credit mechanism could serve in offsetting emissions from oil and gas activities. By allowing companies to trade emissions reductions, the region could create additional incentives for reducing GHG emissions. For example, carbon credits could be generated through investing in cleaner technologies, as mentioned earlier in this report. Countries in the region could align their frameworks with global carbon markets, thus attracting international investors and supporting the transition to a lower-carbon economy. With a low baseline of emissions, Eastern Africa can take advantage of early-stage emissions reduction investments to support the

decarbonisation of its energy sector while achieving sustainable growth.

Set Emission Reduction Standards for New Exploration and Production Contracts

As the region moves forward with new exploration and production contracts, it is important to set stringent emissions reduction criteria in the terms of these contracts. This could include mandates for companies to implement carbon capture technologies or adopt methane leak reduction systems as a requirement for licensing (See Chapter 6). By embedding these requirements early on, the region will ensure that all new oil and gas projects adhere to a sustainable framework that limits environmental impacts. This proactive approach ensures that while oil and gas production increases, emissions remain controlled and minimised. It may also be beneficial to introduce specific emissions compliance clauses in licensing rounds for exploration.

9.4.4 Continued Optimisation of Regulatory Frameworks

Governments must revise their regulatory frameworks to create a more conducive environment for cross-border investment, enabling deeper economic integration and sustainable development. As the region positions itself as an attractive destination for global capital, outdated or fragmented policies can hinder investor confidence and slow the pace of industrialisation.

Investment Codes

Investment codes, for instance, need to be harmonised across the region and amongst the Member States to provide a clear, predictable, and investor-friendly environment. Aligning these regulations would reduce bureaucratic hurdles, create uniform incentives, and enhance the ease of doing business, ensuring that cross-border investments are not stalled by inconsistencies in legal and institutional frameworks. By modernising investment policies, EAC can collectively attract more FDI while ensuring that domestic investors also benefit from a level playing field.

Special Economic Zone Regulations

Special Economic Zone (“SEZ”) frameworks play a crucial role in driving industrialisation and promoting investment. SEZ could be useful in creating service zones to support large-scale projects in the oil and gas industry. Reviewing and potentially revising these frameworks to allow for greater flexibility, streamlined approvals, and cross-border SEZs would enable businesses to operate seamlessly across multiple jurisdictions. This is especially critical for industries such as oil and gas, where economies of scale and regional value chains are key to competitiveness.

PPP Frameworks

PPPs have become a favoured financing model, effectively balancing risk between public entities and private investors while promoting local content that bolsters regional industries and workforce capabilities. This approach not only optimises financial resources but also ensures that project goals are in harmony with national development objectives, yielding a synergistic effect throughout the economy.

Significant strides have been made, with over two-thirds of member states developing formal PPP frameworks to facilitate structured collaborations. Nonetheless, nations without dedicated PPP legislation encounter substantial challenges. These include uncertainties in project management and risk allocation, which deter private investment and impede the progress of essential infrastructure. This scenario underscores the critical need for robust, transparent legal frameworks that can attract enduring investment and enhance regional economic integration and energy security.

9.4.5 Regional Security

As Eastern Africa continues to develop its energy infrastructure, particularly in the oil and gas sectors, ensuring the security of trans-border infrastructure is paramount. This infrastructure, including pipelines, refineries, storage facilities, and transport networks, is essential for facilitating regional energy trade and achieving energy self-sufficiency. However, given the region’s complex political landscape and ongoing conflicts, the security of such infrastructure presents significant challenges that need to be addressed proactively to enable trade and investment.

Regional Security Cooperation

Governments in the region should strengthen cooperation on security issues, particularly around the protection of trans-border infrastructure. This could include creating joint security forces, sharing intelligence, and establishing rapid response mechanisms for dealing with threats to energy infrastructure. Agreements like for example EAC’s Protocol on Cooperation in Defence Affairs includes provisions for mutual defence and security as well as joint operations and intelligence sharing and Conflict Early Warning and Response Mechanism (“CEWARN”) from the IGAD trade bloc countries could be leveraged to ensure regional stability and collaborative security efforts.

Clear and Enforceable Legal Frameworks

Establishing strong legal frameworks that protect the ownership and operation of trans-border infrastructure will be key to preventing disputes. Ensuring that laws governing the region’s energy infrastructure are clear, enforceable, and respected across borders will also help mitigate the risks of conflicts and political instability impacting security.





10

FURTHER STUDIES

This study on the opportunities for a regional domestic oil and gas market of provided valuable insights into the current state of crude oil, refined petroleum product, and natural gas in the Eastern Africa region. Furthermore, the study offered a forward-looking perspective on the sector's potential for development through 2050.

While the analysis was comprehensive, certain limitations were identified within the scope of this study, highlighting the need for further studies. These additional studies would help to refine market projections and provide a more detailed understanding of the region's evolving energy landscape. By expanding on the findings of this study, the potential arises to not only enhance the outlook of the oil and gas market in Eastern Africa but also contribute to a more strategic and informed approach to market development across the African continent.

10.1 LONG-TERM OUTLOOK OF LPG

The current study provides a comprehensive short-, medium-, and long-term outlook on crude oil, refined petroleum product, and natural gas within the region. Through this analysis, the study has also identified the need for a similar assessment focused on LPG, given its growing importance as a cleaner energy source for households, industries, and transportation.

A dedicated study on LPG would involve developing a detailed demand outlook, enabling projections of LPG consumption over short-, medium-, and long-term timeframes. Establishing a robust demand model will be instrumental in creating a strategic roadmap for LPG market development. This roadmap would assess key factors such as infrastructure requirements, investment opportunities, trade dynamics, and energy access potential – ultimately contributing to enhanced energy security and economic growth across the region.

Given the diverse energy landscape across Africa, this research presents an opportunity for two separate studies. The first would ana-

lyse LPG market potential individually within each of Africa's five regions – Eastern, Western, Southern, Northern, and Central Africa – accounting for region-specific demand drivers, supply constraints, and policy frameworks. The second phase would build upon these regional findings to develop a continent-wide assessment, offering a holistic view of Africa's full LPG potential. This integrated approach would provide policymakers, investors, and industry stakeholders with valuable insights to support strategic decision-making and promote sustainable energy development across Africa.

10.2 CLEAN ENERGY POTENTIAL

Clean energy is crucial to Africa's sustainable development, economic growth, and environmental protection. With a growing population and increasing energy demand, transitioning to cleaner energy sources such as LPG and natural gas can reduce reliance on traditional biomass and fossil fuels, lowering carbon emissions and improving air quality.

LPG plays a critical role in promoting clean cooking across Africa, providing a safe and efficient alternative to traditional biomass and kerosene. By reducing harmful indoor air pollution and improving cooking efficiency, LPG enhances public health and environmental outcomes. While natural gas, in the form of LNG and CNG, offers potential for broader household and industrial applications. Natural gas can be used for heating and lighting, amongst other factors, through piped networks or bottled supplies, reducing dependency on wood or charcoal.

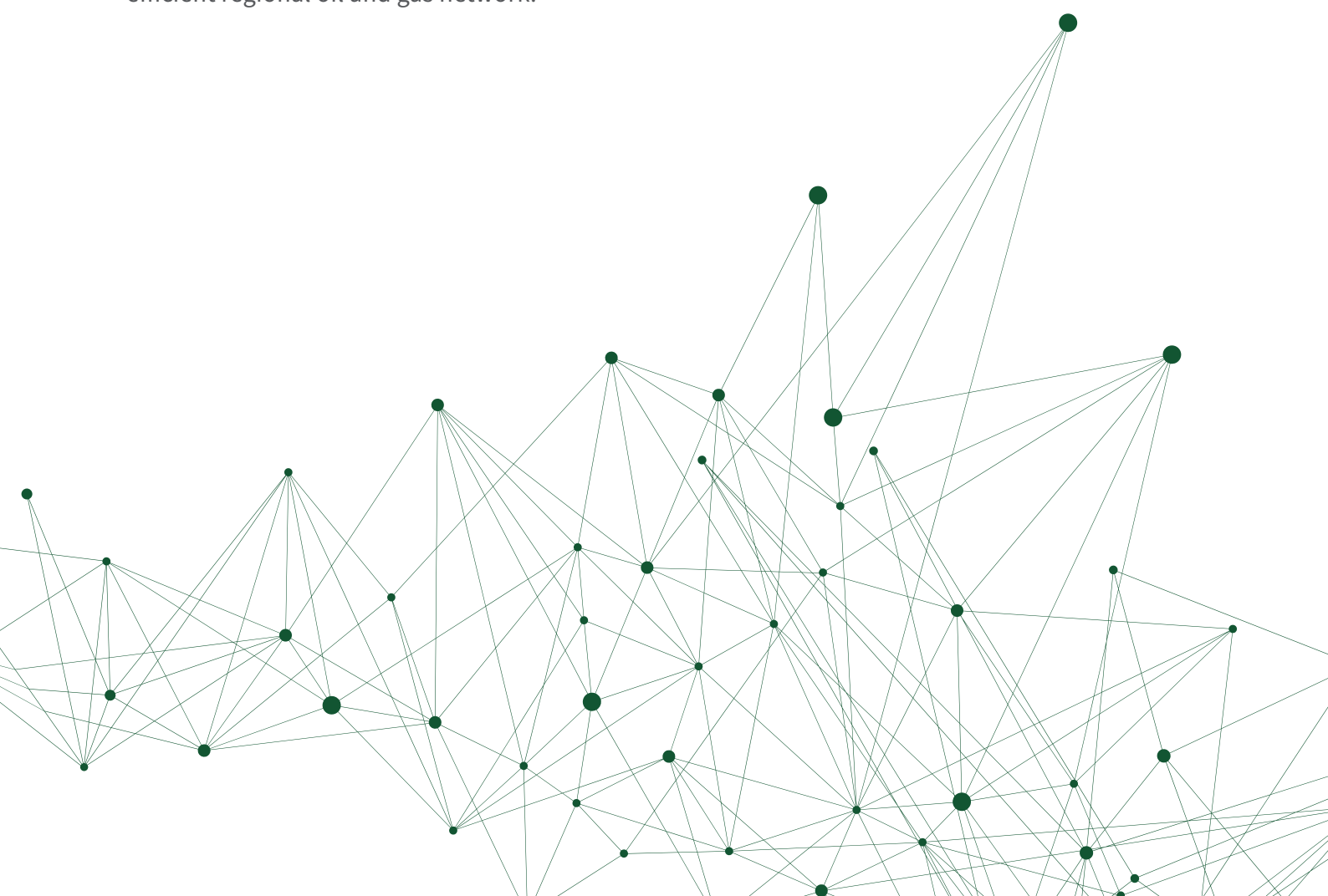
A study on the clean energy alternatives will focus on resource management and distribution structures, ensuring affordability, accessibility, and supply chain efficiency. Key areas of this analysis would include infrastructure development, investment needs, and policy frameworks to support widespread adoption across each of Africa's five regions – Eastern, Western, Southern, Northern, and Central Africa – accounting for region-specific consumption requirements, supply constraints, and policy frameworks.

10.3 REGIONAL INFRASTRUCTURE MASTER PLAN

The study has developed a strategic framework and road map for key abilities required for advancing the oil and gas sector across the Eastern Africa region. The next phase involves pinpointing specific projects, determining the underlying cause for the status of projects, performing detailed sizing assessments for future projects, and estimating Capital Expenditure (“CAPEX”) and Operating Expenditure (“OPEX”) per facility, which will be integrated into a comprehensive master infrastructure plan for the region. This plan will detail individual project evaluations and assess how they contribute to the broader regional infrastructure. By evaluating and planning the necessary infrastructure and optimising logistics, this approach will provide crucial guidance for strategic investments, facilitating the development of a unified and efficient regional oil and gas network.

10.4 ENHANCING PUBLIC SECTOR READINESS FOR OIL AND GAS PPPs

As a follow-up to the study on the opportunity for a regional oil and gas market in Eastern Africa, the proposed project will focus on advancing the implementation of PPP dedicated units within key public institutions. It will aim to strengthen the Eastern Africa region’s capacity to negotiate, structure, and sign oil and gas projects with private sector partners. The project will identify institutional gaps and opportunities for targeted capacity building, including technical training, legal and financial advisory support, and the development of standardised frameworks for PPPs. Emphasis will be placed on equipping government entities with the tools and expertise needed to manage complex transactions and ensure transparent, sustainable resource development.



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