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MINISTRY OF WATER AND ENERGY

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AfREC

Africa Energy Commission

LPG and Clean cooking Experience in Ethiopia for the improvement of National Energy Information System (NEIS)

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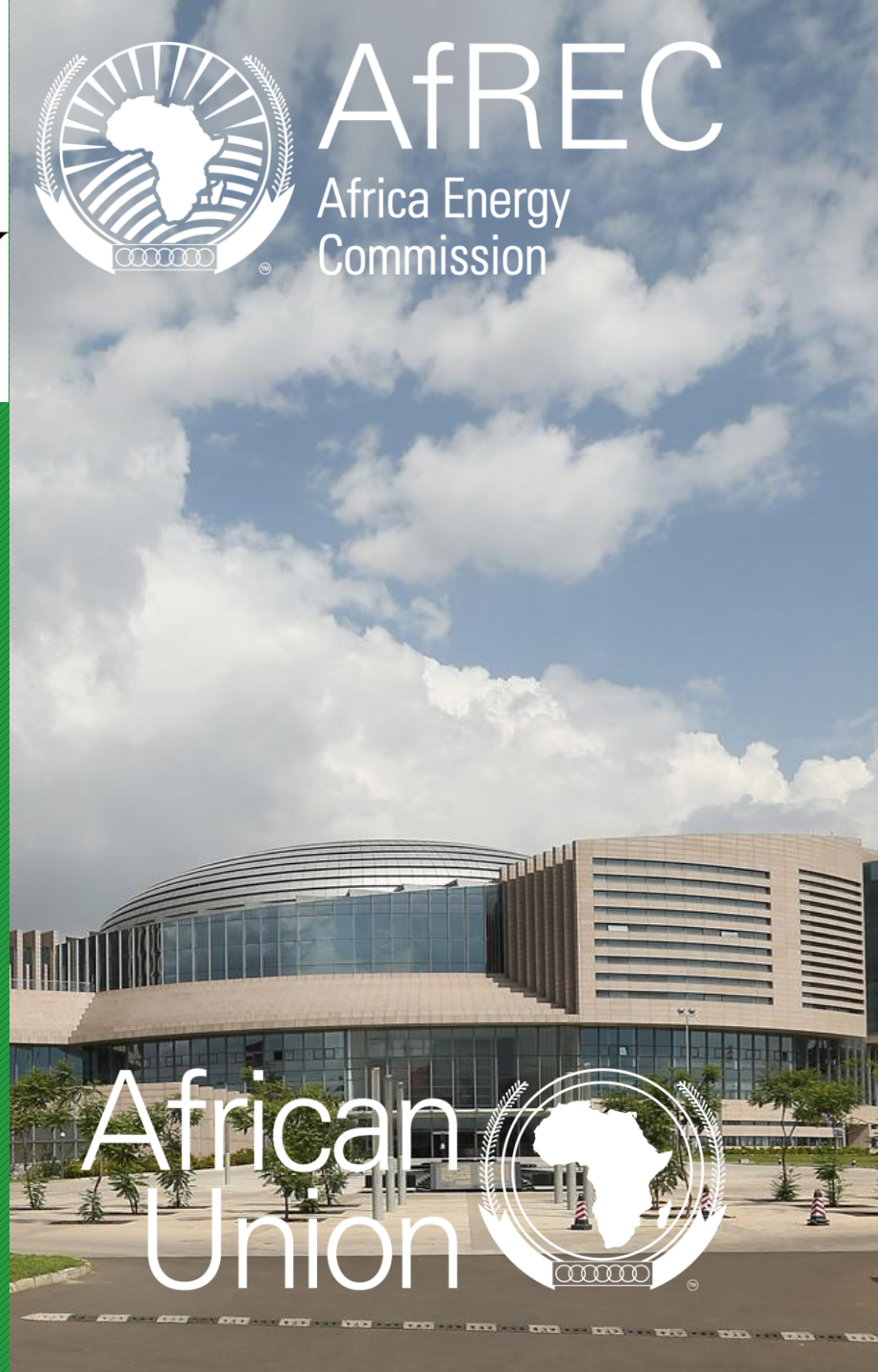

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I. Introduction

- Ethiopia is a large landlocked country of about 120 million people (2nd most populous country in Africa), 2.5% annual growth
- Total area - 1.13 million sq. km.
- Latitudes: 3°and 15°N, and longitudes 33° and 48°E
- Urban population 23% (WB,2023) & 77% Rural
- Access to electricity 52% EEU, 2022, 17% Off-grid & 35% On-grid
- GDP (In bln. USD) 163.7, 2022/23
- GDP Growth Rate 7.2%
- GDP per Capita (In USD) 1,549 NBE
- CO2 emissions per capita were 0.2 metric tons, among the world's lowest (World Bank, 2020).

II. Institutional and Legal Environment

Ministry of (MoWIE) plans, leads, coordinates and monitors overall sector development

❖**Key Energy institutions affiliated to MoWIE**:

- **Ethiopian Electric Power(EEP)**– A public utility that generates, transmits and sells bulk electric power locally and for export
- **Ethiopian Electric Utility(EEU)** –A public utility that constructs and maintains electric distribution networks, buys bulk electric power, and sells electrical energy to customers, and have responsibility for distribution, sales,
- **Petroleum and Energy Authority(PEA)–**A regulator that ensures that power purchase agreements (PPAs) and implementation agreements are consistent with the country's laws and regulations.

III. Ethiopian Clean Cooking Initiative

MoWE has prioritized clean cooking initiatives as part of its broader efforts to improve energy access. A key initiative in this regard is the promotion and dissemination of Improved Cook stoves (ICS) and modern clean cooking solutions.

Main Highlights of the Initiative:

1. **Promotion of Improved Cookstoves (ICS):**

   The government has been actively promoting the adoption of locally manufactured and efficient cook stoves that reduce fuel consumption and emissions. This initiative aims to replace traditional open-fire cooking methods, which are often inefficient and harmful.

Cont ...

2. National Clean Cooking Strategy:

MoWE has developed a comprehensive strategy to scale up clean cooking solutions, focusing on technological innovation, capacity building, and awareness campaigns to encourage households to switch to cleaner alternatives.

3. Biomass Energy Utilization:

The initiative encourages sustainable biomass energy use, including the development of small-scale biomass gasification and briquetting projects, to reduce reliance on traditional fuels and decrease deforestation.

Cont …

4. Targeted Programs:

Specific programs target vulnerable populations, women, and rural communities to ensure equitable access to clean cooking solutions.

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In Summary, the key initiative by MoWE in clean cooking focuses on scaling up improved cook stoves, promoting sustainable biomass use, and integrating clean cooking into national energy and health policies to achieve environmental sustainability and public health benefits.

IV. Energy Resources Potential

Resource	Unit	Exploitable Reserve	Exploited	
			Amount	Percent
Hydropower	MW	45,000	~2459.7	<5%
Solar/day	kWh/m²	5.5	10 MW	<1%
Wind: Power Speed	GW m/s	1,350 > 7	324 MW	<1%
Geothermal	MW	7000	7.3 MW	<1%
Wood	Million tons	1120	560	50%
Agricultural waste	Million tons	15-20	~6	30%
Natural gas	Billion m³	113	-	0%
Coal	Million tons	>300	-	0%
Oil Shale	Million tons	253	-	0%

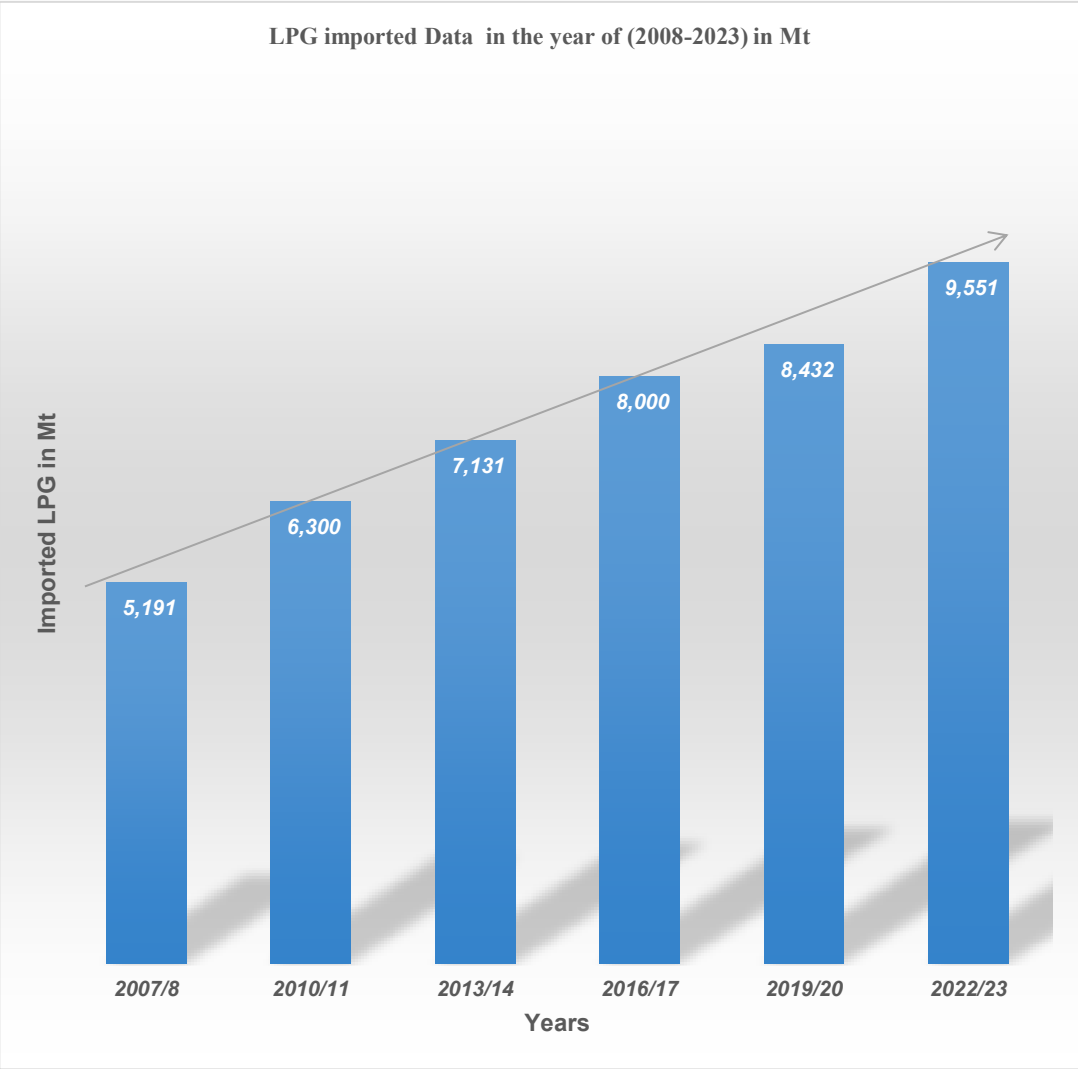
Cont…

- In Ethiopia, while electricity reaches less than half of the population, great progress has been made over the past two decades.
- Ethiopia has immense potential for hydroelectric, geothermal, and wind energy generation.
- The total amount of electric power generated in 2022/23 was about 17.7 billion KWH, showing a 14.2 percent annual increase.
- About 96.7 percent of the electric power was generated by hydropowe and the remaining 3.3 percent by wind & other sources

V. Current status of LPG

- Liquefied Petroleum Gas (LPG) is an increasingly important energy source in Ethiopia. As the country strives to improve its energy accessibility and reliability, LPG presents a viable alternative to traditional biomass and firewood, which are commonly used for cooking and heating.
- Ethiopia faces significant challenges in energy access, particularly in rural areas where the majority of the population relies on biomass for cooking. This dependence is environmentally unsustainable and poses health risks due to indoor air pollution.
- The Ethiopian government has recognized the need for a cleaner and more efficient energy source.
- Strategies have been developed to incorporate LPG into the national energy mix, aiming to reduce reliance on biomass and improve health and environmental conditions.

Cont…
LPG Imported & Consumption Trend



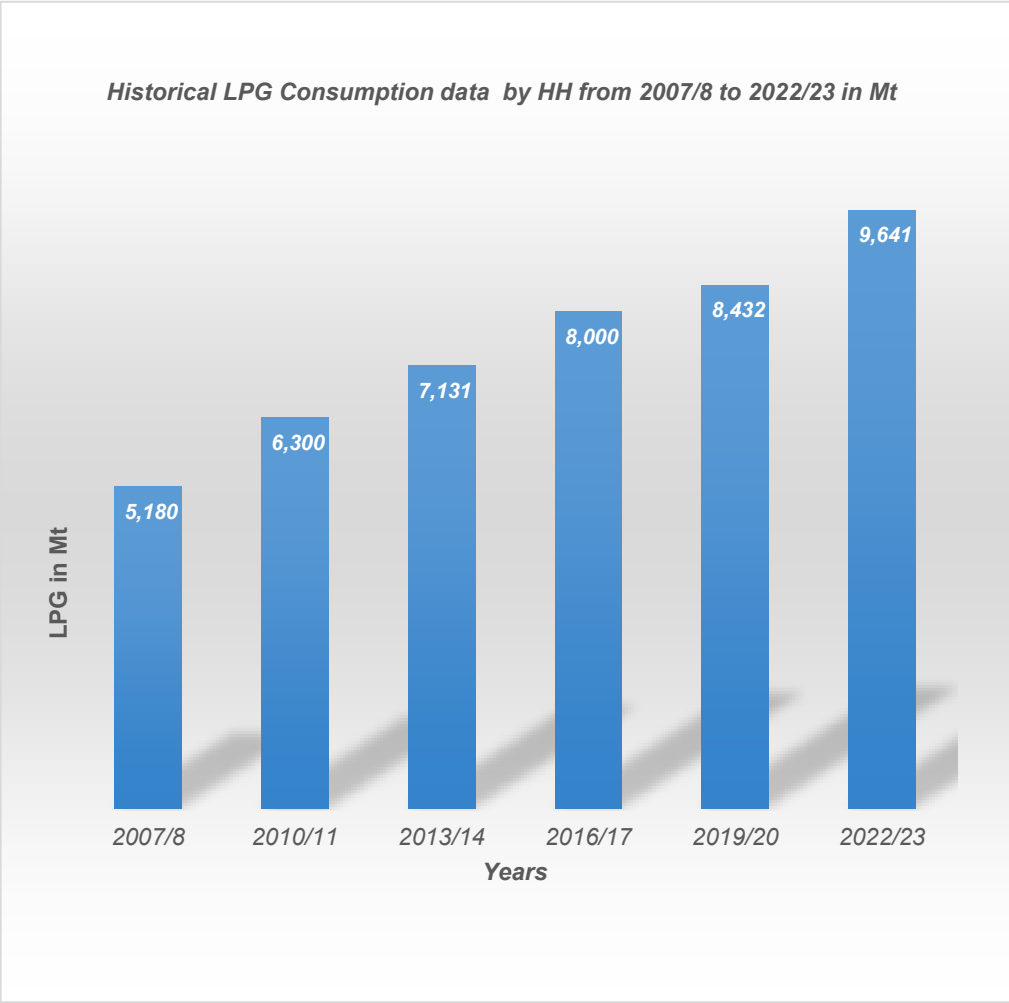
Overall Growth in Imports: Since 2007/08, LPG imports increased from 5,191 Mt to 9,551 Mt in 2022/23. This marks a total increase of approximately 83% over the 15 years.

Periodical Increases:

The growth is characterized by incremental increases, with each period showing higher import levels:

2007/08 to 2010/11: An increase of 21.4% reflects an initial push in LPG demand, which might correlate with increased urbanization or improvements in gas infrastructure.

Cont…
LPG Consumption Trend



Overall Growth in Consumption

From 2007/08 to 2022/23, LPG consumption increased representing a total increase of approximately 86% over these 15 years.

This growth in consumption closely mirrors the growth in imports, suggesting that domestic demand for LPG is being met through increased imports

Cont....

Implications for Supply and Policy

The analysis of LPG consumption data from 2007 to 2023 highlights significant growth, reinforcing LPG's role as an important energy source.

The continued upward trend in consumption is indicative of shifting energy preferences and growing reliance on cleaner fuel alternatives.

This data serves as a valuable indicator for future energy trends and policy formulation aimed at enhancing energy security and environmental sustainability.

Cont…
Government Organizations in Ethiopia's LPG Sector

- **MoWE**-Responsible for energy policy, regulation, and promotion of alternative energy sources, including LPG.
- **EPSE**-State-owned enterprise for the importation, storage, and distribution of petroleum products, including LPG.
- **PEA**-Oversees energy supply regulation, establishing safety standards and regulations for LPG.
- **MoH**-Promotes cleaner cooking technologies to mitigate health risks from indoor air pollution (not directly involved in energy policy).
- **EEFR**I-Assesses environmental impacts of fuel sources and promotes cleaner alternatives.

Cont…
Private Organizations in Ethiopia's LPG Sector

Total Ethiopia

-involved in LPG distribution and promoting cleaner cooking solutions,

Ghon Gas

-specializes in the import, storage, and distribution of LPG for various applications, including cooking

Kuwait Petroleum corporation

-Distributes LPG through its local branch, focusing on increasing urban accessibility.

Demissew Gas -Supplies LPG cylinders and related services.

Bole Lemi Manufacturing Industry -Manufactures LPG cylinders, supporting the local supply chain

Etc

VI. Data collection methodology

A Letter requesting the data is prepared and send to the data provider org/ins, specifying the data needed.

The needed data will be collected through semi-structured and non structured from data sources organization.

The Data Provider/Data Source:

- Ethiopian Electric power
- Ethiopian Electric Utility
- Ministry of Mine
- Ethiopian Petroleum Enterprise
- Sugar Coop oration
- Ethiopian Statistical Service
- Ethio-Djibuti and AA Railway Office
- Ethiopian Customs Commission

VII. Data processing

For Data processing Specifically :

- Excel sheet: data organizing,cleaning, etc
- Energy Balance Studio (ebs), IAEA tools
- AFREC tools for producing Energy Statistics including LPG

VIII. Quality Assurance and validation process

- The Energy staff conducts a rigorous process of testing, verification, and validation of energy statistics before they are released.
- Current energy experts review and enhance the statistics before final approval.
- While the collection and analysis of data ensure a certain level of quality in energy statistics, this process is not sufficient to fully guarantee consistency and meet all quality requirements.

VIIII. Dissemination and Analysis

- Data analysis is conducted based on the results from the Energy Balance Studio (EBS)
- The National Energy Statistics, including LPG, are prepared using the result of the Energy Balance data.
- Finally, it was shared with relevant stakeholders, including research and development institutions, university students, consultants, investors, energy planners, and policymakers, upon request.

IX. Challenges

- **Infrastructure Limitations**: There is often a lack of adequate infrastructure for the storage, distribution, and retail of LPG. This includes a shortage of refilling stations and limited transportation facilities, making it difficult to ensure a reliable supply.
- **Supply Chain Issues**: Delays or disruptions in the supply chain can lead to shortages, which can affect consumers' willingness to adopt LPG as a reliable energy source.
- **Local Production vs. Importation**: Dependence on imported LPG can create vulnerability to price fluctuations and supply chain disruptions.

X. Challenges

- **Market Competition**: Traditional fuels, such as wood and charcoal, are often cheaper or more accessible than LPG, particularly in rural areas. This economic factor can deter consumers from switching to LPG.
- **Awareness and Education**: There is a general lack of awareness about the benefits of LPG as a cleaner cooking alternative. Educating the population about the safety and efficiency of LPG is crucial to increasing adoption, and etc

XI. Conclusions and Recommendations

Conclusions

In general, LPG represents a significant advancement toward a cleaner and more sustainable energy future for Ethiopia. While several challenges must be addressed, the potential benefits—ranging from improved public health and economic development to enhanced environmental sustainability—make LPG a crucial component of the country's energy strategy.

To ensure the successful integration of LPG into Ethiopian households, continued efforts are essential in the areas of infrastructure development, public awareness, and affordability.

By focusing on these key areas, Ethiopia can harness the advantages of LPG and pave the way for a more sustainable energy landscape.

XII. Recommendations

To improve a National Energy Information System (NEIS) specifically for LPG in Ethiopia, several strategic recommendations can help to ensure the system is effective, reliable, and sustainable. For instance,

i. **Infrastructure Development**

Public-Private Partnerships (PPPs): Encourage collaborations between the government and private sector to fund and build the necessary infrastructure. This can include storage facilities, refilling stations, and transportation networks.

Decentralized Distribution: Develop smaller, localized distribution centers to reach rural areas more effectively and reduce transportation costs.

ii. **Financial Accessibility**

Subsidies and Incentives: Implement government subsidies or financial incentives for households to purchase LPG equipment, making it more affordable.

iii. Environmental and Health Awareness Campaigns

Public Awareness Programs: Launch campaigns to inform the public about the health and environmental benefits of using LPG over traditional biomass fuels. Emphasize how LPG can reduce health risks related to indoor air pollution.

Community Engagement: Involve local communities in educational programs to raise awareness of LPG safety and efficiency.

iv. Safety Education and Training

Skill Development Programs: Provide training for technicians and local entrepreneurs on LPG installation, maintenance, and safety protocols to create a skilled workforce.

Community Safety Workshops: Organize workshops to educate consumers on the safe use and handling of LPG, emphasizing the importance of regular maintenance and safety checks, etc.

Cont…

In general by implementing these recommendations, Ethiopia can effectively address the challenges associated with LPG adoption. This will not only enhance energy access but also contribute to improved health outcomes, economic growth, and environmental sustainability in the country.

Thank you!

Merci !