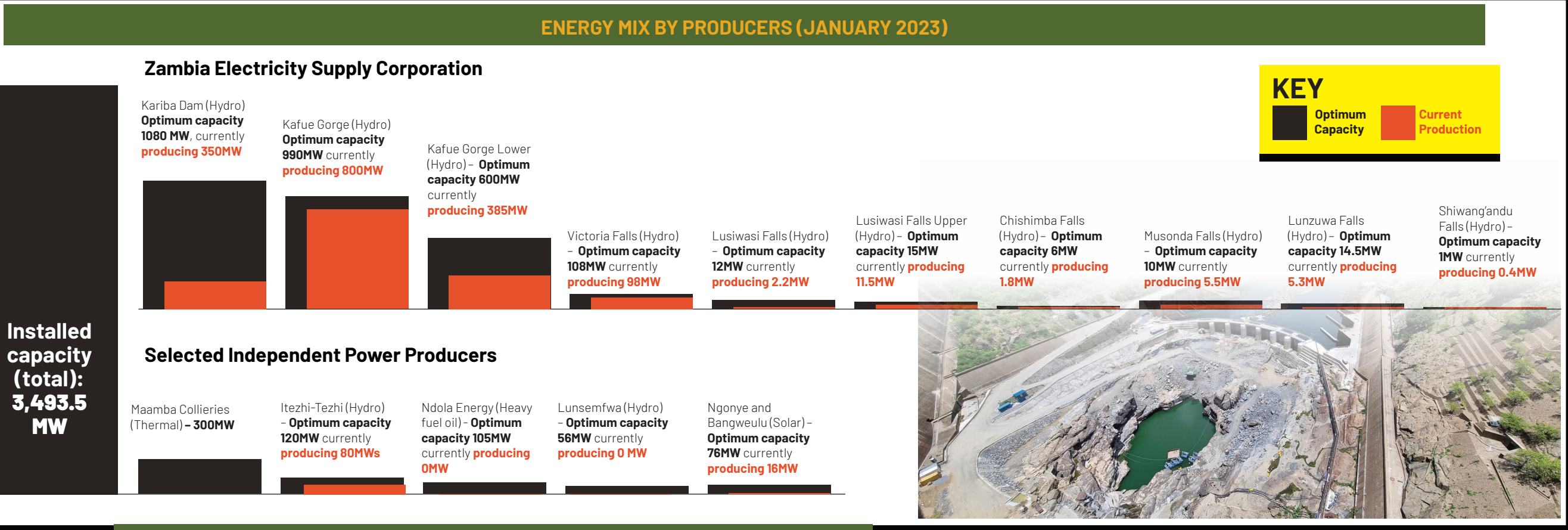


ZAMBIA'S ENERGY MIX AND CLIMATE CHANGE: THE NEED FOR ENERGY DIVERSIFICATION



Access to energy is at the centre of social and economic development around the globe and it is particularly critical in developing countries as the implications for reducing poverty are significant.

Several research studies have shown a correlation between access to reliable energy and the Human Development Index (HDI), which consequently demonstrates that access to reliable energy has positive effects on human development. This is predominantly applicable in rural clinics and schools, especially as energy affects access to clean water and sanitation.

Energy is also critical for driving critical economic sectors such as agriculture, mining and tourism. Recently, Zambia's energy sector (electricity) has been negatively affected by climate change due to an over-dependence on hydro-electric power generation, hence the need for energy diversification.

Electricity generation at full capacity is affected by the water levels at various sources.

ZAMBIA'S ENERGY MIX

- Zambia has **3,493.5 Mega-Watts (MW)** of installed electricity generation capacity, of which **85% is hydro based**.

**3,493.5
Mega-Watts (MW)**

- Like other types of infrastructure, hydropower electricity generation is being negatively impacted by climate change. **Water availability** and hydropower generation are affected by changes in hydrological patterns and extreme weather events.

- As of 2020, national access to electricity averaged 44.52%¹
- Government has set a goal for universal electricity **access for all Zambians by 2030**.
- Energy has been identified as an important driving force behind economic development in Zambia and although there are pockets of private sector activity in generation, transmission, and distribution, the vast majority of power in Zambia is operated by Zambia Electricity Supply Corporation.
- However, the sector is opening up to new Independent Power Producers (IPPs) for on-grid and off-grid transactions. Government expects to bring online additional **Mega Watts of solar, hydro, and thermal power by 2030**.

CHARCOAL USE: DEFORESTATION AND CARBON EMISSION



- Charcoal use makes up a large share of the energy budgets among households in Zambia.** It is primarily used for heating and cooking purposes.

Furthermore, **load shedding is one of the primary drivers of increased production, trade, and demand for charcoal among Zambian households.** Between

2013 and 2015, the number of charcoal kilns produced per person increased, with incomes of charcoal producers increasing by over 53.2% in this time period.

- Preferred tree species [Genera Brachystegia Spp (Musamba, Kaputu, Muombo and Musompa), Julbernardia (Mutondo) and Isoberlinia (Mutobo)]** have

continued to wane, resulting in the harvesting and the use of alternative and unsuitable or even undesirable tree species such as some fruit trees [e.g., Uapaca kirkiana (Masuku) Mull. Arg. and Piliostigma thonningii (Musekese)].

- Ultimately, **the high demand for charcoal** guarantees economic

sustainability of charcoal production. However, ecological sustainability may not be attainable given that the standing stock in the natural forests and woodlands is declining. Further, if unabated, this will worsen climate change impacts due to increased carbon emissions.

THE CASE FOR LIQUIFIED PETROLEUM GAS AS AN ALTERNATIVE TO CHARCOAL (LPG)

Liquefied Petroleum Gas (LPG), is gaining a reputation as the cleanest, most efficient off-grid fossil fuel – and one that is playing a major role in other countries transition towards a cleaner energy mix.

LPG can only be used for heating – LPG is extremely versatile, and its uses include the likes of **cooking, powering breweries and distilleries, fuelling vehicles or even producing hot water.**

This means that LPG can span across a wide variety of markets, such as:

- Manufacturing
- Quarrying
- Farming and agriculture
- Propane enrichment of biomethane
- Leisure and hospitality

LOW HANGING FRUIT: INCREASING THE USE OF LPG IN ZAMBIA

- Adoption of LPG requires investment in infrastructure (import, bulk storage, transportation, and filling facilities and LPG cylinders) and expanded distribution and retailing networks to ensure reliable and affordable supply and safe delivery to end-users. If upstream supply issues are not addressed, LPG stove dissemination programs will not provide long-term benefits.

- At the national government level, an inter-ministerial and multi-stakeholder approach is critical to ensure that planning addresses all relevant issues, including upstream investment and supply chain, health and environmental issues, and affordability. Policy makers must determine pricing regimes, taxes, and subsidies that are well tailored to enable low income households to adopt and use LPG on a sustained basis. E.g.,

Cameroon and India—which aims to expand national LPG use by providing free connections to an additional 50 million households by 2025. To ensure safe adoption and ongoing usage, such approaches must be rolled out together with local awareness campaigns.

- The potential market for LPG for clean cooking is much larger than many people realize. Modeling by the International Energy Agency (2011) has shown that, when made accessible, affordable, and available, LPG can be adopted by millions of rural poor as a primary energy source. The experiences of Indonesia (Budya and Arofat 2011) and Brazil (Coelho and Goldemberg 2013), to a certain extent in Senegal, along with the emerging example of India, help to show what developing countries can achieve.

Creating a strong enabling environment for LPG via a combination of national planning, policy reform and targeted investments across the supply chain is critical. Developing countries that have not done so remained stuck at levels of 2 kilograms per capita or less. In contrast, countries that have done so are maintaining high levels of LPG penetration, with or without long-lasting subsidies. By guiding investments throughout the LPG value chain, India and Senegal have raised LPG use to 10–15 kilograms per capita. Brazil, Indonesia, and Peru have reached at least 40 kilograms per capita.

POLICY OPTIONS FOR ZAMBIA

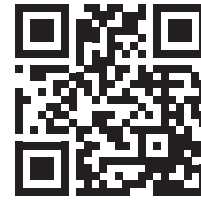
Zambia needs to:

- Implement and rigorously enforce effective, self-consistent LPG market rules, with central emphasis on property rights protection in marketer-owned LPG cylinders and on public safety.
- Ensure stability and continuity of the LPG fuel supply in all regions to be served.

- Implement stable, market-sustaining and market-stimulating policies.
- Ensure high LPG retail density, i.e., open additional outlets and increase distribution models.
- Develop a consensus-based national master plan for coordinated LPG investments and interventions.

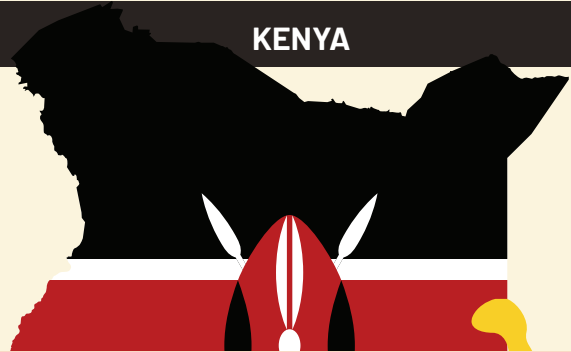
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LESSONS ZAMBIA CAN LEARN FROM OTHER COUNTRIES

KENYA



The Kenyan Government has implemented policies to promote adoption of LPG, including:

- Setting up a program to distribute 6 kg cylinders and cookstoves at a subsidized price to low-income households. This 'Easi-Cooker' has proved practical and popular in other countries such as Tanzania and Nigeria.
- Introducing a new Finance Bill removing the VAT exemption for LPG.

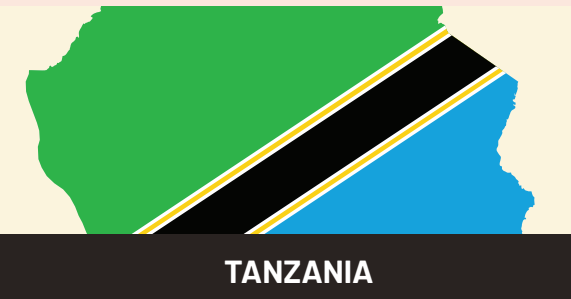
CAMEROON



Cameroon is another such country that Zambia can learn from regarding LPG use. Cameroon has taken steps to:

- Secure clarification of the role of LP Gas in energy planning within a coherent fiscal and legal framework.
- Identify the resources required to implement rehabilitation/expansion strategies in this subsector.
- Identify available skills, quantify the skills/resource deficit, and implement measures to match resources to requirements, especially in the regulatory sector.
- Prepare of a short and medium-term institutional development plan for the LP Gas industry.
- Allow the LP Gas industry to represent itself and to participate in energy and gas strategy planning.
- Investigate the introduction of easy-financing mechanisms to help the poor to overcome the financial entry barrier of costly appliances and cylinders.
- Ensure LP Gas marketers work with manufacturers, local workshops, and vendors to secure suitable, affordable appliances.

TANZANIA



Tanzania is another country that Zambia can learn from. It has taken steps to:

- Adopt and enforce good LP Gas industry standards and practices, such as the Guidelines for Safety and Good Practice published by the World LP Gas Association.
- Promote safety standards and practices through:
 - Seminars for industry players;
 - Securing formal commitment of industry players; and
 - A properly designed and funded consumer safety awareness campaign.

¹ <https://www.macrotrends.net/countries/ZMB/zambia/electricity-access-statistics#:~:text=Access%20to%20electricity%20is%20the,a%201.52%25%20increase%20from%202019.>