



Powering Uganda's Future?



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For Ugandan Policymakers and Parliamentarians
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Executive Summary

Uganda stands at a pivotal moment. Endowed with some of the most abundant and diverse renewable energy resources on the African continent, a youthful population and large deposits of strategic minerals that are central to the global energy transition, the country has the ingredients for a genuinely transformative green industrial future. Yet these opportunities are constrained by a persistent financing gap, fragmented governance, inadequate transmission infrastructure and a profound tension at the heart of government policy: the simultaneous pursuit of oil extraction that will be transported via the East African Crude Oil Pipeline (EACOP) and a credible low-carbon energy transition.

The country's electricity grid is already overwhelmingly renewable, drawing nearly all of its power from hydro, solar and other low-emissions sources. Yet barely half the population has access to electricity, with rural access rates remaining below 45 per cent. Over 90 per cent of Ugandans rely on biomass for cooking, with devastating consequences for forest cover and public health, with disproportionate impacts on women and children.^[3] The gap between Uganda's renewable endowments and the lived reality of its citizens represents both a challenge to justice and equity, as well as an economic imperative.





Through this analysis, which combines a policy analysis, energy system assessment and interviews with citizens around Uganda, this report offers the following key insights:

Uganda's solar resources are world-class and significantly underexploited. With average solar irradiation exceeding that of global benchmark countries such as Spain, solar represents the single greatest opportunity for rapid, low-cost electricity generation across Uganda.^[1] Combined with geothermal potential estimated at up to 1,500 MW and substantial hydropower headroom, Uganda has the resource base to become a clean power hub for East Africa.

Solar adoption is already delivering tangible benefits, but barriers persist. Where households have adopted solar, interviewees reported consistent gains in child education, household safety, small business continuity, and crime reduction. However, upfront cost, counterfeit products, and a technical capacity gap continue to exclude the poorest communities, while EACOP pipeline construction has caused land displacement, road damage, and livelihood loss for affected households in Kakuto and Kyotera.

Uganda's high energy costs limit its industrialisation. The country has some of the highest electricity costs in Africa, posing a major challenge to more energy-intensive industrial processes and hurting the competitiveness of energy-intensive exports.

Energy access remains deeply unequal and costly. Across all interview sites, households reported that grid electricity is unaffordable, unreliable, and geographically patchy, forcing most families to rely on biomass for cooking and leaving some communities entirely unconnected despite grid infrastructure passing through their area

The biomass and clean cooking crisis demands urgent and coordinated action from the government. With over 90 per cent of households dependent on firewood and charcoal, the health, environmental and social costs of inaction are immense. Clean cooking cannot be treated as a secondary concern, but as central to Uganda's energy transition strategy. The IEA estimates universal clean cooking could prevent 50,000 premature deaths annually.

EACOP poses a fundamental threat to Uganda's green transition credibility and fiscal resilience. The pipeline's projected lifetime emissions – estimated at 379 million tonnes of CO₂-equivalent – dwarf Uganda's current national emissions.^[2] It carries growing stranded asset risk, is entangled with human rights abuses,^[4] and diverts political attention and capital from the clean energy investments the country urgently needs.

Uganda's strategic mineral deposits can be the foundation of green industrialisation, but only if governed well. Deposits of graphite, cobalt, copper, lithium and other rare earth elements position Uganda as a potential supplier to global clean energy supply chains. But without robust governance, value addition mandates and investment in processing capacity powered by affordable clean energy, these resources risk replicating extractive patterns of the past.

The cost of capital remains the most formidable barrier. Eastern Africa carries the highest weighted average cost of capital on the continent, estimated at over 15 per cent, compared to between 2 and 5 per cent in North America. This makes clean energy projects significantly more expensive than in comparable markets. Blended finance, concessional lending and new forms of domestic financing mechanisms are essential to bridge the estimated annual energy financing shortfall of US\$1.4 billion.

Public institutional capacity must be strengthened and reoriented towards green industrialisation. Uganda requires empowered, mission-oriented public agencies with clear mandates, multi-year budgets and the technical capacity to plan, procure and oversee energy investments at scale.

Regional energy integration through EAPP offers Uganda significant leverage. As a member of the Eastern Africa Power Pool (EAPP), Uganda is already interconnected with Kenya and is developing further cross-border linkages. Deepening these ties and leveraging surplus renewable generation for export could generate revenue, reduce costs and accelerate the clean energy transition across the continent.

The gender dimension of Uganda's energy transition demands explicit acknowledgment that it has not always received. The burdens of energy poverty fall disproportionately on women and girls: the hours spent collecting firewood, the health costs of indoor air pollution, the safety risks of inadequate lighting, the exclusion from compensation processes that favour male landholders and the confinement to informal labour in construction zones while formal employment in the energy sector remains male-dominated. Any green industrialisation strategy that does not deliberately address these structural inequities will replicate them at a larger scale.



Introduction

Uganda's unfolding energy story is one of the country's paradoxes. The country's electricity grid is among the most renewables-based in the world, with approximately 98 per cent of electricity generation sourced from renewables such as d from hydroelectric, solar and biomass. Yet it serves barely half the population, as merely 18.9 per cent of the population is connected to the electricity grid, with the majority of the connections in urban settings. The nation sits atop some of Africa's most promising solar irradiation zones, geothermal belts and strategic mineral deposits. Yet it imported over US\$1.6 billion in petroleum products in 2022 alone. Its government has published a detailed Energy Transition Plan (ETP) charting a path to net zero by 2065, while simultaneously backing the East African Crude Oil Pipeline (EACOP), which, if completed, will become the world's longest heated oil pipeline and generate nearly 380 million tonnes of lifetime carbon emissions.

These contradictions are not simply technocratic failures. They reflect deep tensions in Uganda's approach to the energy transition: between the developmental aspirations of a rapidly growing nation and the structural pressures of global commodity markets. Between elite interests tied to fossil fuel extraction and the energy access needs of rural communities. Between the short-term logic of infrastructure investment and the long-term imperatives of climate stability.

Uganda's population of approximately was 51 million, in 2025, and is among the youngest on the continent, with a median age of 17 years. Economic growth has averaged around 5 per cent annually over recent decades, underpinned by agriculture, services and a growing urban economy. The country's Vision 2040 sets out an ambition to reach upper-middle-income status, with its energy strategy inseparable from that goal.^[3] As the government itself acknowledges, energy is the lifeblood of economic transformation. Without affordable, reliable and clean power at scale, Uganda's green industrial potential will remain stubbornly constrained.



An Incomplete Grid

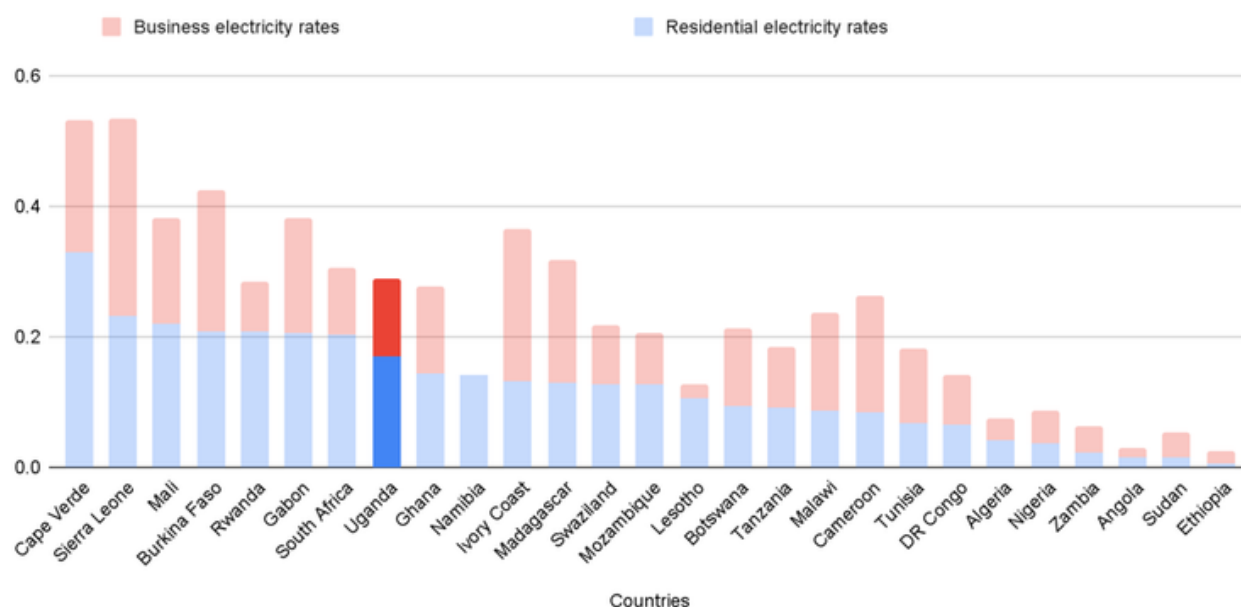
Uganda's existing electricity grid is, by global standards, remarkably clean. As of 2025, approximately 95.2 per cent of grid electricity is generated from renewable sources, with hydropower accounting for the overwhelming majority, at around 82 per cent of installed capacity, supplemented by small-scale solar, biomass cogeneration and heavy fuel oil plants used only for times of peak demand and backup.^[1] The completion of the 600 MW Karuma Hydropower Dam in September 2024, the largest hydropower installation in Uganda, brought total installed capacity from 1,400 MW to approximately 2,000 MW, against a peak demand of around 985 MW, leaving a substantial surplus.

Yet this apparent abundance is illusory. In 2023, only 52 per cent of Ugandans had access to electricity when off-grid solutions were included, but the figure for rural areas dropped to approximately 32 per cent which is far lower still. Total energy losses in the distribution system were estimated at 17 per cent in 2024. At the same time, demand is growing at around 17 per cent annually in terms of energy sales, driven by urbanisation, industrialisation and expanding commercial activity.^[5] Industry experts project that achieving Uganda's 'tenfold growth' ambition by 2040 would require installed capacity of between 15,000 and 20,000 MW. The gap between where Uganda is and where it needs to be is clearly vast.

Perhaps the biggest problem, however, is the high cost of energy: Uganda's electricity costs are among the highest in Africa. Between 2023 and 2026, Ugandan households paid USD 0.17 per kilowatt hour of electricity, making Uganda the eighth most expensive African country in terms of residential electricity costs. In a bid to encourage greater industrialisation President Museveni

Figure 1. Ugandan residential and business electricity rates, USD/kWh, 2023–2026 average

Residential and business electricity rates
in USD/kWh,
2023–2026 average



The Biomass Burden

For most Ugandans, energy poverty is not primarily about grid electricity, but cooking. Over 90 per cent of the population relies on biomass, such as firewood and charcoal, as their primary cooking fuel.^[1] This makes Uganda one of the countries most dependent on solid biofuels in the world. Only around 4 per cent of households use clean cooking fuels, a figure that had barely moved in decades before modest recent improvements.^[2] The consequences are severe. The IEA estimates that universal access to clean cooking could prevent approximately 50,000 premature deaths annually from indoor air pollution, save households up to two hours per day in fuel collection (time that disproportionately falls on women and girls) and reduce net global greenhouse gas emissions by up to 17 million tonnes of CO₂-equivalent by 2030.

Clean cooking has historically been treated as an afterthought in Uganda's energy planning - a welfare issue separate from the core business of electricity generation.

Uganda's National Integrated Clean Cooking Strategy (NICCS), launched in 2024, represents a significant step forward, projecting that a systemic transition away from biomass could reduce its use by 64 per cent and halve cooking-related

greenhouse gas emissions by 2040. But government ambition must be matched by action in the form of investment in cooking infrastructure on the ground.

An Oily Shadow: EACOP

Overshadowing Uganda's clean energy ambitions is the East Africa Crude Oil Pipeline (EACOP), a fossil fuel megaproject that has become one of the most contested infrastructure developments in Africa. EACOP, a 1,443-kilometre heated pipeline that will transport crude oil from Uganda's Lake Albert oilfields to the Tanzanian port of Tanga, is a joint venture between TotalEnergies (62 per cent), the Uganda National Oil Company (15 per cent), the Tanzania Petroleum Development Corporation (15 per cent) and China's CNOOC (8 per cent). Commercial oil production from the Tilenga and Kingfisher fields was subsequently expected to begin in 2025, and is now projected to start in July 2026 since the pipeline itself faces ongoing financing challenges and construction delays.

The government's position is that oil revenues, which are projected at US\$1.5–3 billion per year at peak production between 2032 and 2050, will be essential for funding the country's development, including renewable energy investment. Critics, however, point to the projected lifetime emissions of 379 million tonnes of CO₂-equivalent (over 25 times Uganda's current annual emissions), the document documented displacement of communities along the pipeline corridor, the suppression of peaceful protest and other human rights abuses and the growing stranded asset risk as global oil demand peaks and is destroyed by geopolitical realignments and war.^[1] The pipeline has attracted sustained international opposition, including the withdrawal of major European and North American financial institutions and faces growing legal exposure in the wake of the International Court of Justice's (ICJ) landmark 2025 advisory opinion on climate obligations.

This report argues that Uganda's energy transition planning must honestly confront the contradiction between fossil fuel expansion and the low-carbon future its own government has publicly endorsed. Revenue projections for EACOP are contingent on market conditions that are increasingly uncertain given global events, while the social and environmental liabilities are concrete and immediate.^[2] The opportunity cost, in terms of capital, political attention and institutional capacity diverted from renewable energy, is real and significant. The Ugandan government must acknowledge this.

Enter Renewables

Despite these tensions, Uganda's renewable energy potential is genuinely extraordinary. The country is endowed with solar, hydropower and geothermal resources that together offer a credible pathway to universal energy access, green industrialisation and clean power export – if the right policy and financing conditions are established.

Solar: Uganda's Greatest Opportunity?

Uganda's solar resources are, by global standards, exceptional. Average daily solar irradiation across the country exceeds 5.1 kWh per square metre, a figure that surpasses benchmark countries such as Spain and Germany and remains consistent throughout the year due to Uganda's equatorial location. The IEA has described Uganda's solar resources as 'better than global leaders' and identifies solar as the leading source of low-cost generation in its ETP. Government targets envision solar contributing up to 5,000 MW of the projected 41,700 MW cumulative capacity by 2040.

Despite this potential, installed solar capacity remains modest at around 4 per cent of total installed generation. However, the domestic solar market is growing rapidly, driven particularly by off-grid solar home systems in rural areas. Utility-scale solar projects have also been announced, including a 20 MW solar PV project in North-Western Uganda and a 24 MW solar PV project in Ombachi village in the West Nile Sub-region, expected to power around 193,000 households. Still more ambitious are in the works: in August 2025, the Ugandan government announced the construction of a 100 MW solar PV plant with a 250 MWh battery storage system in Kapeeka, to be developed by US company Energy America. In all, Uganda plans to deploy over 1 GW of solar and storage capacity by 2040 in its Energy Policy for Uganda 2023 document.

Hydropower: A Foundational Technology, Out With A Limited Future

Hydropower has been the foundation of Uganda's electricity system for decades, accounting for the overwhelming majority of current generation. Uganda's hydropower potential has been estimated at over 4,500 MW. The Karuma (600 MW) and Isimba (183 MW) dams, both completed in recent years, represent the largest recent additions. However, over-reliance on hydropower carry real risks.

Uganda's hydropower output is vulnerable to climate variability: declining rainfall and reduced lake levels, as experienced dramatically during the early 2000s droughts. This can constrain generation precisely when demand is highest. The IEA notes that diversifying the generation mix beyond hydro, to alternative energy sources such as geothermal energy, is an energy security imperative as well as a climate one. Hydropower will remain essential for dispatchable baseload generation in Uganda, but it cannot remain the sole pillar of the country's power system.

Geothermal: Underexplored With High Potential

Uganda's potential for geothermal is estimated at a significant 1,500 MW, with the majority of geothermal sites located in western Uganda's Rift Valley.^[1] In June 2024, the Ugandan government announced that it would begin generating electricity from four geothermal sites at Kibiro, Buranga, Katwe and Panyimur; a total of 27 sites are slated for development. The first plant to be constructed, Kibiro Geothermal Power Plant, will have a total capacity of 150 MW and is expected to enter into commercial operation in 2027.





Regional Energy Hub in Waiting

Uganda is a member of the Eastern Africa Power Pool (EAPP), established in 2005, which includes Burundi, Democratic Republic of Congo, Djibouti, Egypt, Ethiopia, Kenya, Libya, Rwanda, South Sudan, Sudan, Tanzania and Uganda. Uganda already has functioning grid interconnections with Kenya, a relationship that dates back to the 1958 132 kV line from the Owen Falls hydropower station to Nairobi and as of May 2024 was in advanced discussions over a long-term power purchase agreement that would enable Uganda to export surplus renewable electricity to its eastern neighbour.

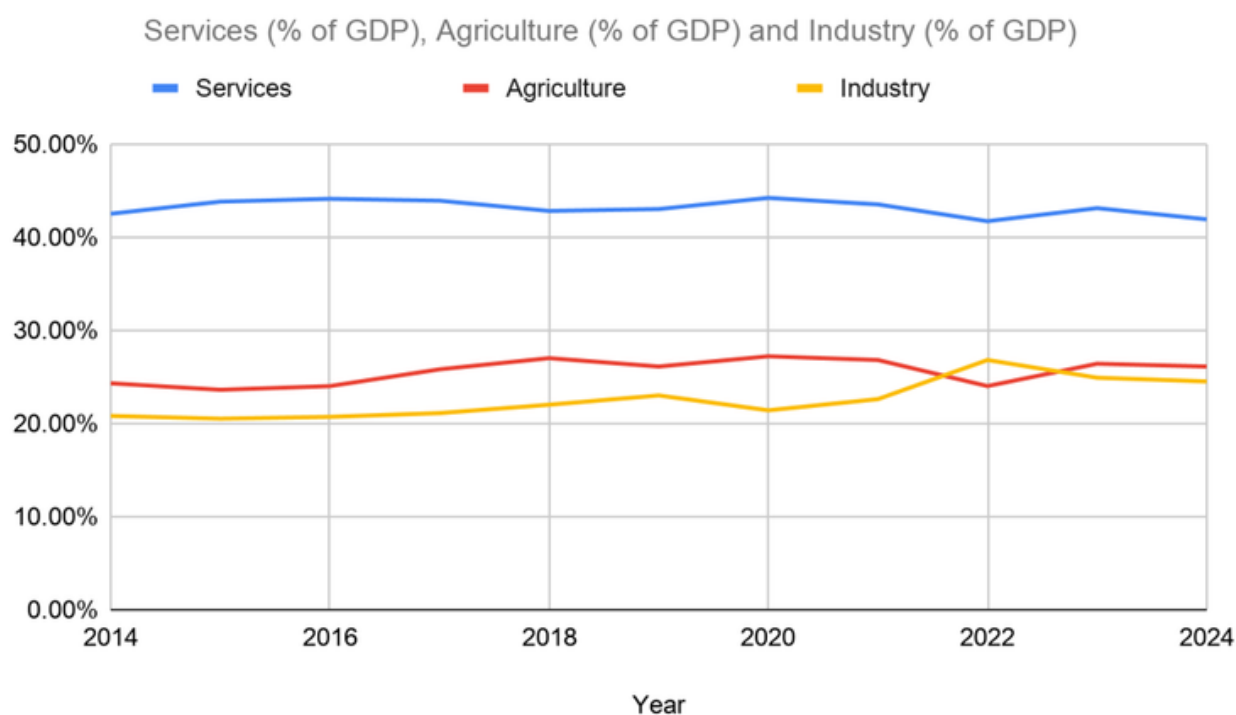
The EAPP framework also enables participation in the World Bank's Mission 300 initiative, which targets electricity access for 300 million Africans by 2030 and includes specific provisions for grid expansion and regional interconnection financing. Uganda is well-positioned to benefit from this initiative, both for domestic electrification and for the associated transmission infrastructure upgrades that would underpin regional power trade. Realising these export opportunities could generate significant foreign exchange revenues and provide the stable demand signal needed to justify accelerated investment in generation capacity.



Ugandan Green Industrialisation

Uganda is forging ahead with plans to industrialise. Uganda's industrial sector has significantly increased its share of GDP since 2020, increasing from 20.8 percent in 2014 to 24.5 percent in 2024 (Figure 1). With that said, much of the increase in industry has been driven by a construction boom and oil sector investment, with limited investment in other productive sectors.

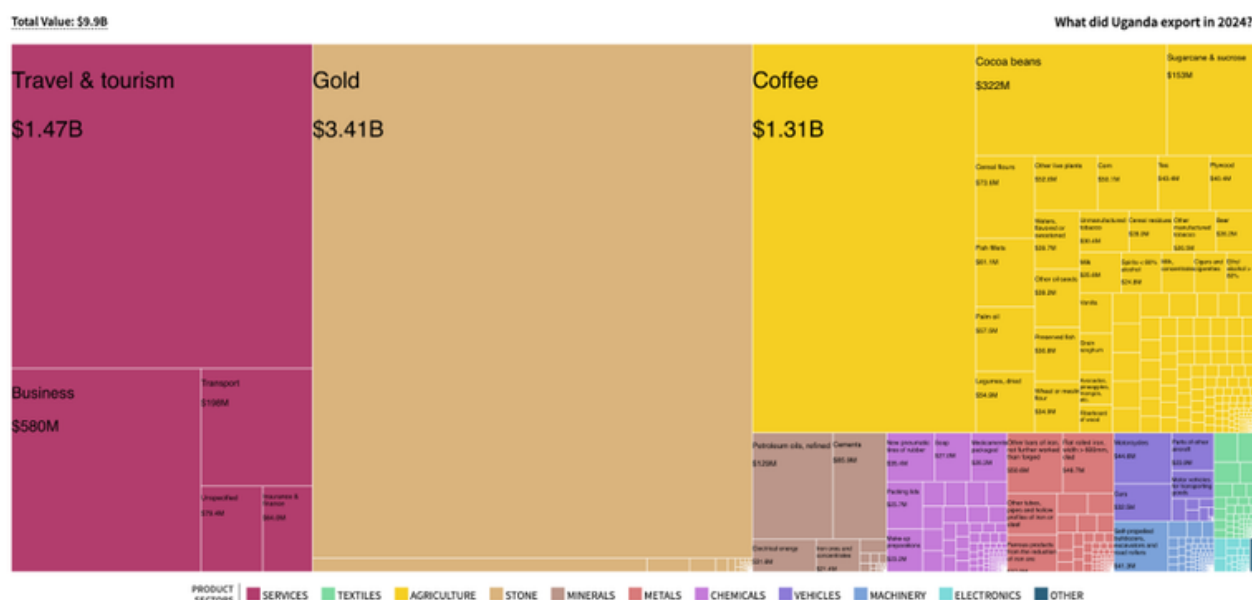
Figure 1. Uganda value-added sectors



To support greater industrialisation, the Uganda Investment Authority (UIA) has announced the development of a further 25 industrial parks across the country. The UIA, which already already operates eight industrial parks, is aiming to create 400,000 jobs per year through the construction of industrial parks, in line with its strategic plan, “‘Accelerating Domestic and Foreign Direct Investment for Sustainable Industrial Industrialization’ and the country’s Third National Development plan, which also emphasises sustainable industrialisation.

Yet despite these efforts to industrialise, Uganda’s economy continues to depend largely on services and unprocessed agricultural exports. In 2024, Uganda derived the majority of its GDP from travel and tourism services, business services and raw goods such as gold, coffee and cocoa beans (Figure 2). Yet Uganda increased industry’s share of GDP from 10 percent in 1990 to 21 percent in 2000 by adopting a series of long-term national industrial strategies such as the Industrialisation Policy and Framework (1994-1999) and the establishment of key industrial support institutions such as the Uganda National Bureau of Standards and the Uganda Industrial Research Institute. Subsequent efforts have been less successful, with researchers attributing this to a lack of a coherent national plan.^[1] Also problematic are the high costs of infrastructure, a limited technically-qualified workforce, the high cost of transport and the high cost of investment capital.

Figure 2



Agriculture

Agriculture employs approximately 68 per cent of Uganda's working population and in FY 2024/25 accounted for approximately 26.5 per cent of GDP and 36 per cent of export earnings. Agro-processing already underpins the country's manufacturing base, accounting for approximately 60 per cent of its total output, Finance and the government's ten-fold growth strategy sets a target of US\$20 billion in annual export earnings from agro-industrialisation by 2040. Yet the gap between Uganda's agricultural endowment and its agro-industrial performance remains large. Coffee illustrates both the opportunity and the constraint: in FY 2024/25, Uganda earned a record US\$2.2 billion in coffee export revenue, yet the overwhelming majority is exported as raw or lightly processed bean rather than as a roasted, packaged or branded product. The structural barriers are well-documented: sector growth is impaired by insufficient storage facilities, poor post-harvest handling practices, a shortage of agricultural credit, high freight costs and the absence of all-weather feeder roads. Post-harvest losses are severe: inadequate post-harvest handling results in losses of 25–30 per cent for livestock products and 40–50 per cent for roots, tubers, fruits and vegetables.^[1] In the dairy sector alone, Uganda produced 5.3 billion litres of milk in the first quarter of 2024, with 20–40 per cent of the surplus reportedly wasted due to insufficient processing and cooling capacity.

This is precisely where the green industrialisation and agro-industrial agendas converge: renewable energy is central to solving these constraints. Solar water pumps give farmers reliable access to irrigation without the burden of fuel costs; solar dryers cut spoilage and open higher-value markets; and solar cooling allows dairy farmers to preserve milk longer, replacing diesel generators that previously consumed thousands of euros in monthly fuel costs. Pilots have demonstrated what is possible at scale: solar-powered milk coolers deployed at the Dwaniro Dairy Farmers Cooperative in Kiboga District have enabled 400 farmers to chill milk and extend its shelf life,^[4] a model replicable across Uganda's dairy-producing regions if financing and extension support can be mobilised. In April 2025, President Museveni announced a ban on the export of raw agricultural produce as part of the government's efforts to increase value addition activities – a policy direction consistent with Uganda's minerals export ban and its wider green industrialisation ambitions. But the ban will only deliver its intended results if the processing infrastructure, reliable clean power and cold chain logistics needed to add value domestically are built in parallel.



Strategic Minerals In Uganda

Uganda has around 27 types of mineral deposits, including iron ore, gold, copper, cobalt and uranium.^[1] Despite these significant deposits, the Ugandan mining sector remains relatively underutilised, with vermiculite and iron ore accounting for 83 percent of the total mineral export value for 2022-23. Overall, the mining sector contributed 1.47 percent to Ugandan GDP in the same year, with informal mining and quarrying accounting for around two-thirds of this figure. A October 2023 report by the Ugandan Ministry of Finance concluded that the mineral development programme would benefit from significant investment and remains under-prioritised in Uganda's development strategy.

Uganda also plays host to rare earth metals, including the flagship Makuutu Rare Earths Project, which has emerged as a globally significant deposit estimated at around 532 million tonnes of rare earth metals. Ionic Rare Earths, an Australian mining company, owns at least 60 percent of the project and, in January 2024, was granted a large-scale mining license by the Ugandan government under the 2022 Mining Act. Production is expected to begin in 2026. While the scale of the deposits suggests that Uganda could challenge China's dominance of the rare earth mineral sector, sector commentary suggests that developing the resources could take a decade.

A Proposed 27year Makuutu rare earths project in the eastern region of Uganda. Located in Bugweri County, Makuutu is a sub-county within the newly established Bugweri District that stretches from Igombe Sub-County in Bugweri district; Bulamogi, and Nakigo in Iganga district; Manyiro and Buwaaya in Mayuge district Spread over 298km².

Copper and cobalt deposits, located at the Kilembe copper mine, could be used to supply Uganda's nascent battery and EV car industry. However, operations at the mine remain in abeyance following the Ugandan government's termination of a contract with a Chinese mining company, Tibet Hima. Having received bids for operating the mine from four companies, the Ugandan government signed a Mineral Production Sharing Agreement with Sarrai Group in March 2025. However, it remains unclear whether the cobalt and copper extracted will be for export or used to support the production of Ugandan batteries for use in companies such as Kiira, a Ugandan state-owned car manufacturer.

President Museveni's introduction of a export ban on unprocessed minerals is a signal that Uganda intends to capture a greater share of value-added industry instead of 'donating jobs'.

Potential Green Industrial Zones

Uganda's green industrial potential is concentrated in regions where renewable resources, mineral deposits, agricultural activity and transport connectivity intersect. Three distinct zones merit particular attention:

Region	Key Industries	Renewable Anchors
Western Uganda (Albertine Graben)	Geothermal development, mineral processing (cobalt, copper), agro-processing, oil transition management	Geothermal, solar, small hydro
Central Uganda (Kampala)	Manufacturing, rare earths beneficiation (Makuutu), electric mobility, financial services, agro processing	Coastal proximity, best offshore wind potential

Northern Uganda	Graphite mining and processing (Orom), solar irrigation, livestock biogas, community mini-grids, clinker (for cement production)	Utility-scale solar, off-grid systems
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In western Uganda, the development of geothermal power plants, solar installations and small hydro could provide the clean, reliable energy required for copper and cobalt extraction and processing at Kilembe. The mine, dormant since the early 1980s, sits on estimated reserves of over 6.5 million tonnes of copper ore and 5.5 million tonnes of cobalt-bearing ore at the foothills of the Rwenzori Mountains – minerals that sit at the heart of the global energy transition. In March 2025, Uganda signed its first Mineral Production Sharing Agreement for Kilembe's redevelopment, with \$230–250 million in investment anticipated and a mandate to produce grade A copper cathodes at 99.99% purity and cobalt metal at 99.8 percent purity. Smelting and refining operations at that scale are highly energy-intensive, making low-carbon power supply a precondition for the zone's green industrialisation.

The Ministry of Energy has identified four geothermal sites ready for development—Kibiro in Hoima, Buranga in Bundibugyo, Katwe in Kasese and Panyimur in Pakwach—with a combined potential ceiling of 1,500 MW across all 27 identified sites. Katwe is located in the same district as Kilembe, meaning geothermal power could theoretically be generated and consumed locally, reducing transmission losses and eliminating reliance on a grid that currently suffers from 187 percent energy losses nationwide. Small hydro, drawing on the Rwenzori's river systems and distributed solar could further backstop baseload demand, forming an integrated clean energy cluster that decarbonises extraction from the outset rather than retrofitting later.

In central Uganda, the rare earths beneficiation process at Makuutu could be significantly decarbonised through a combination of utility-scale solar and expanded biomass cogeneration. The Makuutu deposit covers approximately 300 km² in the Busoga region of eastern Uganda, with a mineral resource estimate of 532 million tonnes and a projected 35-year , need for more research as of me i know its a 27yr mine life ,we need to harmonise mine life, producing a basket of magnet and heavy rare earth oxides including neodymium, praseodymium, dysprosium and terbium, all crucial for electric vehicle motors and offshore wind turbines.

The processing route involves heap desorption leaching, membrane purification and staged carbonate precipitation, each requiring consistent power. Importantly, Makuutu already sits close to a 132kV transmission corridor, reducing grid connection costs, but grid-connected renewables and on-site generation would improve energy security and lower the carbon intensity of the mixed rare earth carbonate (MREC) product, which matters increasingly to Western offtake partners seeking traceable, low-carbon supply chains.

The biomass anchor for this zone is already operational: Kakira Sugar Works' cogeneration plant currently generates 52 MW of electricity from sugarcane bagasse, selling up to 32 MW to Uganda's national grid and making it the largest biomass cogeneration facility in the country. Uganda's five sugar manufacturers together hold around 110 MW of total cogeneration capacity, of which approximately half is available for sale to the grid. Dedicating a portion of this surplus to anchor clean power supply for the Makuutu beneficiation cluster would create a renewable industrial energy system with no new feedstock requirements and low marginal cost, while simultaneously giving the sugar industry a premium off-taker and a stronger commercial rationale for further cogeneration investment.

In northern Uganda, utility-scale solar and off-grid systems could decarbonise graphite mining and processing at Orom-Cross in Kitgum district, while also addressing the energy and water access deficits that constrain the wider Acholi and Karamoja economies. Blencowe Resources' Orom-Cross project has a free-dig, no-blast mining method and relatively low processing energy requirements compared to hard-rock mines, making it well-suited to solar-powered operations. Meeting the ESG thresholds demanded by the European export market will likely require demonstrable low-carbon operations, making co-located solar not merely an economic option but a commercial necessity. Beyond the mine itself, solar irrigation would provide a reliable water supply for crop production in a region acutely vulnerable to drought, offering smallholder farmers an affordable alternative to diesel-powered pumps. Northern Uganda's solar irradiation of around 5–6 kWh/m²/day is among the highest in the country and off-grid mini-grid systems could extend clean energy access to communities across Acholi and Karamoja simultaneously with the industrial scale-up.

Obstacles To Opportunities

The success of these zones requires coordinated infrastructure investment, regulatory streamlining and targeted financing to become functional green industrial hubs. Each depends on the same enabling conditions: transmission upgrades that allow renewable power to flow between generation sites and industrial consumers, mining regulations that reward domestic value addition over raw ore export and blended finance instruments including development finance institution grants, concessional loans and private capital capable of absorbing the early-stage risk that currently deters private investors.

Transmission upgrades must take place to receive the higher volumes of electricity being introduced onto the grid. The Ugandan government plans to build 13,000 kilometres of new transmission lines over the next 20 years as well as substations, switching stations and transformer capacity, at a total estimated cost of \$4.8 billion. These infrastructure upgrades offer significant employment opportunities, although social and environmental impact assessments must be conducted to ensure communities are consulted and the impacts to natural habitats are mitigated.

Institutional coordination remains a binding constraint. Without a mechanism to align the Ministry of Energy, the Directorate of Geological Survey and Mines, Uganda Investment Authority and district governments around shared zone-level development plans, infrastructure investments risk arriving out of sequence, duplicating costs and missing the window created by current global demand for battery-critical minerals. Fortunately, Uganda's new Mineral Production Sharing Agreement model, piloted at Kilembe and the Mining and Minerals Act of 2022 provide more enforceable mineral rights than previously existed.

Uganda could do significantly more to bring its institutional resilience to the fossil fuel economy in line with international recommendations. EACOP will bring income and jobs to Uganda, but becoming an oil producer will expose Uganda to the risks inherent to any fossil-fuel based economy such as the Dutch disease and hot money flows into the country. Uganda has already instituted several legal frameworks to mitigate these concerns, including the 2015 Public Finance Management Act (PFMA), which governs the collection, deposit and use of petroleum revenues, as well as the Charter for Fiscal Responsibility, which requires newly-elected governments to set out medium-term fiscal objectives for oil revenues. However, Uganda could strengthen its institutional resilience to the risks posed by fossil fuel revenues influxes and consider adopting the recommendations provided by the Natural Resource Governance Institute, which include:

requiring that oil revenues are spent on diversifying the economy; legislating a stronger limit on recurrent spending; and clarifying the government's approach to revenues deposited in the Petroleum Revenue Investment Reserve, including by prioritising paying off high-interest debt and considering a stabilization buffer to use for significant shocks.

Finally, a skills gap and the question of the just transition must be addressed.

Uganda currently lacks significant numbers of the skilled workers needed for the sectors involved—engineers, technicians and others—and these workers must be trained to fully enable the country's green industrialisation. Beyond developing a responsible investment policy for its fossil fuel economy, Uganda must also plan for the world of low or zero fossil fuel demand and implement an incipient just transition plan for workers in its fossil fuel sector. Just transition plans are increasingly recognised as an essential component for countries wishing to ensure social and economic justice for citizens involved in the energy sector. A harbinger of this lies in the experience of Ugandans forcibly displaced by EACOP; survey data indicates they are extremely displeased at the perceived inadequacy of the compensation programme provided by the Ugandan government's Resettlement Action Plan.

Fixing The Finance

Mobilising sufficient finance for green industrialisation in Uganda is arguably the central constraint facing the country's transition ambitions. Uganda's total cost of implementing its climate change mitigation and adaptation commitments under the updated Nationally Determined Contribution is estimated at \$28.1 billion, or more than half of the country's current GDP, while the government has committed to mobilising domestic resources to cover only \$4.1 billion, or 15 per cent of that total.^[1] At the sectoral level, the World Bank estimates Uganda's annual energy financing shortfall at roughly \$1.4 billion and industry experts argue that true industrialisation with mechanised factories and automated processes will require between 15,000 and 20,000 MW of generating capacity, far beyond current installed levels.

A core reason the gap persists is the cost of capital itself. Costs of capital are generally at least two to three times higher in developing countries than in Europe or the United States, driven by complex political, economic and institutional risk factors and while emerging and developing economies excluding China comprise two-thirds of the global population, they represent less than one-fifth of global clean energy investment. For Ugandan solar projects, the OECD estimates the cost of debt at 30.2 percent, while the required rate of equity return is estimated at 35.8 percent.^[2] For East Africa more generally, the weighted average cost of capital for the sub-region stands at approximately 15.88%, significantly above the 10% rate often used in standardised global assumptions, with equity costs averaging twice debt costs, reflecting greater perceived risk by equity investors.

Concessional capital is therefore not merely preferable but structurally necessary to make green industrial projects commercially viable. Since the cost of capital for utility-scale clean energy generation projects in Africa is at least two to three times higher than in advanced economies and China, renewables projects in African

countries are often either fully or partially reliant on the involvement of concessional capital, with most projects commissioned to date requiring multiple credit enhancements including guarantees and risk sharing with development finance institutions. Uganda has demonstrated that concessional instruments can work at scale: the GETFiT programme used partial guarantees and viability-gap funding to add 158 MW of renewable capacity, attracting private developers and lowering tariffs. However, the volume of concessional capital available remains structurally misaligned with the scale of need, while the broader investment environment remains challenging: Uganda is generally perceived as a risky investment destination, with low feed-in tariffs, high perceived offtaker risks and a lack of long-term commercial financing at acceptable terms and conditions.

Public institutional capacity is the third pillar of the problem and in some respects the most fundamental. The World Bank's "Scaling Up to Phase Down" framework (2023) frames it explicitly: 'weak energy sector fundamentals, especially institutional capacities', prevent developing countries from accelerating their energy transition, alongside high upfront capital costs and a high cost of capital that distorts investment choices away from renewables.^[1] The IEA's 2023 Uganda Energy Policy Review identifies a specific domestic manifestation of this: small and medium-sized enterprises in the off-grid space rely heavily on local commercial banks, but these banks often struggle to assess the risk of off-grid solutions and can only provide loans at prohibitive rates, while there is potential for domestic institutional investors – especially pension funds – to play a greater role that remains largely unrealised. Addressing this will require structural reform rather than project-by-project fixes: attracting private sector climate finance demands a combination of strategic legal, regulatory, policy and institutional frameworks, including stable regulatory environments to reduce investment risks and public-private partnerships to leverage both financial and technical expertise.

The following section, which summarises findings from interviews conducted with Ugandan residents from different communities across the country, highlights the urgency of the challenge.

Qualitative Findings

Qualitative interviews were conducted across Kakuto sub-county (Kyotera District), Rakai District, Kasensero and Masaka with a range of community members including local council (LC) chairpersons, teachers, small business owners and households. Thirteen interviewees contributed, covering energy access, renewable energy attitudes and experiences, the impacts of fossil fuel infrastructure and expectations of political leadership.

Energy Access: Affordability, Reliability And Exclusion

The most consistently raised concerns across all interviews were the high cost, unreliability and uneven geographic reach of the national electricity grid. Grid electricity (supplied by Umeme/UEDCL) is widely perceived as unaffordable in proportion to what it delivers. A male LC1 chairperson from Rakai District described electricity cost as the single most pressing issue: "The units we buy from Umeme are very few compared to the money we pay. Most of our people are low earners, so they can't afford to pay for power every month." A female interviewee from Kakuto sub-county, Kyotera District and a second female interviewee from the same sub-county made almost identical observations, with the former noting that "you can find that you buy like 20,000, then you find they have given you like 10 units or even less." A further female interviewee from Kakuto sub-county confirmed this dynamic from her own household experience, stating simply: "It is now costly. We pay a lot, then we get few units."

Power outages are a second near-universal grievance. A male LC3 chairperson from Kakuto sub-county described the problem in structural terms – "the unstable supply" affecting "offices, stationeries" and daily commerce – while a female teacher interviewed in the same area offered a more personal account: "electricity is on and off many times. It is on and off." Two female interviewees from Kakuto sub-county both noted that outages consistently accompany rainfall, leaving households in darkness for days at a time.

Geographic exclusion forms a third tier of the access problem. The male LC3 chairperson from Kakuto sub-county observed that in some communities "power is not there... the connection issue is also becoming a problem," and that transmission infrastructure does not reach all villages. A male interviewee from Bigada Parish, Kakuto sub-county, gave the starkest account of exclusion:

grid lines pass through his parish to serve only the parish church and residents were told by the incoming distributor that their original connection agreement with Umeme was void: "the power is on the line but not connected to people's homes." He described households within his village as unable to afford so much as a single solar panel, with families walking long distances to charge mobile phones. A male LC1 chairperson from Sanyonyi Village, Kyotera District, reinforced the information dimension of exclusion, noting that many people saw renewable energy as "an expensive venture, yet they can have smaller systems that can at least give them light."

The practical consequence of these overlapping access failures is that the majority of households interviewed rely on biomass for cooking, with grid electricity used only for lighting and charging. "We don't cook using energy, it is now costly," said one female interviewee from Kakuto sub-county. A female teacher interviewed in the same area described firewood becoming difficult to source as forest cover declines: "we are struggling to collect the firewood because many people have cut down the forests."

Solar Energy: Adoption, Benefits And Barriers

Solar photovoltaic systems - mostly small, household systems - emerged as the dominant renewable technology with which interviewees have direct experience.

Among those who have adopted solar, the defining perceived advantage is the shift from recurring expenditure to a one-time investment. The male LC3 chairperson from Kakuto sub-county articulated this most clearly: "you pay once and utilize for some time unless it has got some damages... there are no issues of constant recharging." A female community leader from Rakai District elaborated on the household financial logic: "with solar, you save a lot... money I save can be used onto other expenditures in the households like food." The male LC1 chairperson from Rakai District confirmed: "Once you install it, you don't have to pay daily or monthly bills."

Reliability relative to the grid was identified as a second major benefit. Even interviewees without solar, such as a female interviewee from Kakuto sub-county, understood this intuitively: "it is very reliable. It doesn't go off like Umeme."

The male LC3 chairperson from Kakuto sub-county described how the hotel he manages maintains consistent lighting and attracts guests during rain because "even if there is no day you can find that you are lacking light." The supplementary function of solar - filling in grid outages rather than replacing the grid entirely - characterises most adoption patterns in the interviews.

Several interviewees noted a fall in the economic barriers to solar ownership. The female teacher from Kyotera District (interviewed twice) observed: "Now purchasing a solar panel is not a luxury as people could think before." The female community leader from Rakai District reported that "every household has got a solar panel, however small it is" in her area. For those still without solar, the barrier is primarily financial rather than attitudinal. One female interviewee from Kakuto sub-county described the rationality plainly: "you rather buy a candle... candles save," reflecting short-term cash-flow constraints over longer-term cost calculation.

Product quality and technical knowledge gaps were the main barriers cited by interviewees who had not yet adopted solar. The female teacher from Kyotera District expressed concern about counterfeit products: "some are duplicated, they don't last long." The male interviewee from Bigada Parish, Kakuto sub-county, raised the challenge of maintenance illiteracy in communities with low formal education: "you can give me a solar, in one month it can be destroyed because of the poor usage because I don't know how to handle it." The female community leader from Rakai District proposed a practical supply-side response, recommending that vocational training hubs incorporate solar installation courses: "those renewable energies, they would train them how to make biogas, they would train them how to light from biogas."

These concerns align with reports by solar industry actors who have commented on the proliferation of sub-standard solar products, which has undermined public confidence in the energy transition. In response to widespread concerns about the quality of solar products, the Ugandan government has introduced legislation that imposes fines on solar dealers whose installations do not meet the requisite standards.

The male LC3 chairperson from Kakuto sub-county raised a technology limitation that recurred across interviews: small, affordable solar systems cannot run high-powered appliances such as refrigerators, milling machines or large televisions. He framed this as a meaningful constraint: "those who afford are somehow at a higher cost which people in the rural areas cannot afford." The female teacher from Kyotera District posed the same question more directly: "if someone is milling, I don't think someone can mill on a solar. Is it possible?" This capacity gap shapes how interviewees conceptualise solar as a supplement to, rather than replacement for, grid electricity.

Health, Environment And Safety Impacts

Across interviews, a clear and consistent contrast was drawn between the health and environmental costs of traditional and fossil fuel energy sources and the relative cleanliness of solar. The most frequently cited harm from pre-solar energy sources was indoor air pollution from paraffin lamps, candles and charcoal stoves. The female community leader from Rakai District noted that "paraffin used to cause cough" and eye disease, while a female interviewee from Kakuto sub-county recalled that when using a kerosene stove "the food was smelling paraffin-like" and that the smoke caused suffocation, requiring the stove to be placed away from the house. The male interviewee from Bigada Parish, Kakuto sub-county, acknowledged that "there are some diseases which can break out when using that fossil energy" through charcoal stove use indoors, although he noted the challenge of changing these behaviours without formal training.

The fire risk associated with candles and paraffin lamps, especially for children, was cited by multiple interviewees as having been substantially reduced by solar adoption. The female community leader from Rakai District described how previously "people used to burn themselves using paraffin" and houses caught fire from unattended candles. The female teacher from Kyotera District similarly observed: "previously people were using these candles to light and there were many accidents. Perhaps someone forgets it, burning - can burn the house, which is not the case with solar." A male interviewee from Kakuto sub-county noted the same improvement: "In the past, we used fuel for lighting and children would end up burning themselves. But since we bought the solar system, at least the risks have reduced."

On the environment, the female teacher from Kyotera District offered the most developed account, linking energy source directly to deforestation: "if someone is no longer using that power maybe for cooking, can see how many plants can be saved. Because cutting down of trees is on high rate as people try to get firewood and charcoal." The male interviewee from Bigada Parish connected the same dynamic to reduced rainfall: "using this fossil energy, I think it can avoid the deforestation practice. Because when you cut down the more trees, the more reducing on the rainfall received."

Security improvements from solar lighting were cited by nearly every interviewee and represent one of the most tangible community-level benefits observed. The female community leader from Rakai District described solar security lights creating a chain of visibility along roads: "if I have one, my neighbor has, that means the whole stretch will be lightened up. So someone wouldn't be moving in darkness."

The male LC1 chairperson from Rakai District noted that "many households now have security lights powered by solar... this has reduced the crime in our area." This finding is echoed almost identically by the male LC3 chairperson from Kakuto sub-county, the male interviewee from Bigada Parish, the female interviewees from Kakuto sub-county and the male LC1 chairperson from Kasensero.

The male interviewee from Bigada Parish raised an additional, less commonly noted safety concern specific to his rural context. Without light, households in heavily forested areas cannot detect dangerous wildlife, particularly snakes displaced by eucalyptus monoculture plantations: "no one can come across the house where there is light... Whenever we get that light, we can improve." He also raised the gendered safety dimension of energy poverty, describing young girls being sent long distances to charge phones, with associated risks of sexual exploitation: "on the way they meet those big boys and whatever, which can even defile them, which leads to school dropouts."

Impacts Of Oil And Gas Infrastructure (EACOP Pipeline)

A substantial portion of interviews – particularly those conducted in Kakuto sub-county and Kyotera District, through which the East African Crude Oil Pipeline (EACOP) passes – addressed the harms caused by fossil fuel infrastructure. Land displacement and inadequate compensation were the dominant grievance. The male LC3 chairperson from Kakuto sub-county described a pattern of compulsory acquisition: "people lost their valuable land to the project. Others had developments like houses that were affected by the pipeline. Others had plantations, coffee, banana plantation, that were affected by the right of way." He noted that financial support was provided but "we cannot underestimate the value of their properties they lost to the project."

The male interviewee from Bigada Parish, Kakuto sub-county, gave the most detailed and distressed account of displacement impacts. He described households with eleven to twelve members being compensated with three-room structures, violating cultural norms: "In our culture we are in Buganda, this is central region. If you have a son, the son gets married to a girl, that girl is not allowed to sleep in the same house with the father of the son. So now it's re-abusing our culture." He further described crop destruction without replanting, loss of access to wells, informal and precarious employment practices – "employing anyone without giving him or her any appointment letter, they have dismissed many minus any genuine reason" – and security curfews restricting community movement.

A female interviewee from Kakuto sub-county described the pipeline displacing people from land without adequate resettlement funds: "they were not given enough money to buy land elsewhere. Even the environment has been affected because some trees were cut down."

Danger to physical safety and road damage from heavy haulage vehicles was cited by multiple interviewees. A fatal road accident directly attributable to pipeline construction traffic was reported by the male LC3 chairperson from Kakuto sub-county: "about five months ago, a truck carrying those oil pipes knocked our colleague on the way and somebody abruptly lost life and we miss our colleague." The male LC3 chairperson from Kakuto sub-county observed that "access roads have been heavily affected by the heavy trucks, especially in the villages when you move there during the rainy season you find it very hard, they are non-existent they are inaccessible now." The male LC1 chairperson from Kasensero noted risks of "air pollution and the risk of fire in case of any accidents." The female interviewee from Kakuto sub-county (Betty) mentioned that thieves used the pipeline corridor as cover and reported leakages: "they found them when they are broken off, broken, leaking." The male interviewee from Kakuto sub-county (Mukalazi) explicitly connected displacement to declining quality of life: "if I compare the life of those displaced by fossil fuel productions, their life is totally deteriorating compared to those close to them."

Education, Work And Livelihoods

The educational benefits of solar lighting – enabling children to study at night – are cited by virtually every interviewee and are among the most consistently and strongly expressed positive impacts of renewable energy adoption. The female community leader from Rakai District described the transformation vividly: "initially children wouldn't read at night because of lack of light. But now they even read. They do their homework, they read. Even the performance – academic performance of the children of today against the former – you find now it is better." The male LC1 chairperson from Rakai District confirmed: "My children can also study at night without any problem." The male interviewee from Bigada Parish, Kakuto sub-county, connected the same benefit to the aspiration: "our students can get a chance of revising books on using those solar lights."

In rural and peri-urban settings, solar also enables small income-generating activities. The male LC3 chairperson from Kakuto sub-county described how solar provision at his hotel supports business continuity: "it keeps business moving at affordable costs... in rainy seasons we always get visitors because they know even if power is off we always have light."

The female interviewee from Kakuto sub-county (Jane Nassuna) noted that solar creates opportunities for mobile phone charging businesses. Health facilities were cited by multiple interviewees as beneficiaries: the male LC3 chairperson from Kakuto sub-county noted that "health centers deep in the villages also use solar systems to give light in the facilities," and the male interviewee from Kasensero observed that "small clinics are using solar to provide basic services even at night."

The Role Of Communities And Leaders In The Energy Transition

On community ownership and management, interviewees broadly agreed that training and engagement is the prerequisite for sustainable adoption. The female community leader from Rakai District articulated this in terms of mindset: "mindset change is very key and attitude towards these new innovations is very paramount if we are to transform our communities." The male LC3 chairperson from Kakuto sub-county argued for a training-first approach: "people in the villages should be encouraged, getting trained in how to use and install these renewable sources." The male interviewee from Bigada Parish was more candid about the baseline: "I think no individual can afford one, even a solar for two, I think him or her can't in my village. Keeping on raising the voice from our leaders or non-government organizations... at least you can come out and assist so that we can get that."

On the role of political leaders, the strongest and most frequently cited demand is for community sensitisation and law enforcement. The female community leader from Rakai District called specifically for "enforcing the laws... regarding energy renewable and the other, the laws regarding environment, environmental protection," and for "separating the political interest from development programs." The male LC3 chairperson from Kakuto sub-county identified lobbying and advocacy as the key political function: leaders "should work hand in hand with the government to show their community's interest in using the renewable sources."



Aspirations For Uganda And Africa's Energy Future

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Without exception, interviewees expressed strong support for a renewable energy-powered future, though most grounded their aspirations in practical rather than ideological terms. The female community leader from Rakai District summarised the economic logic: "renewable energy can even be generated by ourselves from our local materials... there you earn and spend, but here you generate and save." The male LC3 chairperson from Kakuto sub-county hoped to see "the whole country, the whole area, covered by the renewable power energy source." The male interviewee from Bigada Parish connected Uganda's energy future to wildlife conservation, biodiversity and tourism: "the lions would not run away, the zebras and whatever, which improves on the income of the foreign exchange to Africa which develops our countries" - placing the energy transition within a broader vision of environmental restoration.

The female teacher from Kyotera District articulated a desire for Uganda's natural resource wealth to benefit Ugandans first: "I would wish that if anything good has been found in Uganda - let Ugandans benefit first before we relate with others." The male interviewee from Kakuto sub-county (Mukalazi) linked continental renewable energy adoption to improved information access: "communities will be better informed because they'll be able to watch television and access information."

The female community leader from Rakai District offered a concise summary of the continental aspiration: "an environmentally protected and compliant Uganda country and its citizenry - where everyone is environmentally responsible for whatever is happening around them."

Conclusion

Uganda's energy story is one of genuine, extraordinary potential – and of equally real risk that this potential will be squandered. The country possesses world-class solar resources, a grid that is already almost entirely renewable, significant geothermal endowments and mineral deposits that place it at the centre of the global clean energy supply chain. Its youthful population, growing urban economy and regional connectivity through the Eastern Africa Power Pool give it structural advantages that few low-income countries can claim. The analysis in this report suggests that a credible pathway to green industrialisation exists – one that would generate employment, reduce energy costs for households and businesses, strengthen Uganda's position in emerging global value chains and deliver a more equitable distribution of the country's natural resource wealth than its extractive history has so far produced.

But that pathway is narrower and more contested than Uganda's official planning documents acknowledge. The financing gap is not a minor technical problem to be solved at the margins of the existing system: at an estimated US\$1.4 billion per year in the energy sector alone and with the total cost of Uganda's NDC commitments exceeding half of current GDP, the scale of external capital required is of a different order of magnitude to anything Uganda has previously mobilised for a domestic development priority. The cost of capital facing Ugandan projects is structurally punishing – with equity returns demanded at nearly 40 per cent for solar projects according to the OECD – and the institutional infrastructure needed to attract, structure and deploy that capital at scale does not yet exist. The Mineral Development Programme has been described by Uganda's own Ministry of Finance as under-prioritised and under-resourced. The regulatory framework for green industrial zones has not been designed. . The local financial system lacks the capacity to assess and price green project risk. These are not temporary deficiencies: they are the accumulated result of decades of underinvestment in public institutional capacity and they will not be resolved without deliberate, sustained and adequately resourced reform.

The voices gathered in this report's community interviews illustrate, with striking clarity, the human cost of the status quo. Households in Kakuto, Kasensero and Kyotera describe electricity that is unaffordable, unreliable and geographically inaccessible. They describe firewood becoming scarce as forests disappear.

They describe communities displaced by the EACOP pipeline with inadequate compensation and no pathway back to the land and livelihoods they have lost. They describe young girls walking kilometres to charge phones, exposed to exploitation along the way. They describe borrowed candles and improvised lamps and the constant arithmetic of energy poverty – the calculation of whether 1,000 shillings buys more warmth or more light. What is striking about these testimonies is not their despair but their clarity: interviewees know what they want, understand the economics of solar adoption and have a sophisticated grasp of the policy failures that stand between them and the energy access they need. The gap between these communities and Uganda's green industrial future is not a gap in aspiration. It is a gap in governance, finance and political will.

The EACOP contradiction runs through this report and cannot be wished away. The Ugandan government's position – that oil revenues will finance the transition – has a surface logic, but it is built on increasingly fragile foundations. Revenue projections are contingent on market conditions that are being disrupted by geopolitical events and the accelerating destruction of oil demand through electrification. The pipeline has failed to attract the private financing its consortium anticipated, leaving the government exposed to a larger share of the liabilities than originally projected. The documented human rights abuses associated with land acquisition, the suppression of environmental defenders and the pipeline's projected lifetime emissions of 379 million tonnes of CO₂-equivalent are generating growing legal exposure in the wake of the International Court of Justice's 2025 advisory opinion on climate obligations. And while EACOP consumes political bandwidth, capital and institutional attention, the window for establishing Uganda as a credible, low-carbon mineral supplier to Western markets – a window defined by the investment timelines of the European battery manufacturing sector – is not indefinitely open. Uganda cannot be both a serious fossil fuel producer and a serious green industrialisation story: the international investment community, civil society and an increasingly sophisticated body of domestic scholarship are making that incompatibility harder to sustain.

The gender dimension of Uganda's energy transition demands explicit acknowledgment that it has not always received. The burdens of energy poverty fall disproportionately on women and girls: the hours spent collecting firewood, the health costs of indoor air pollution, the safety risks of inadequate lighting, the exclusion from compensation processes that favour male landholders and the confinement to informal labour in construction zones while formal employment in the energy sector remains male-dominated. Any green industrialisation strategy that does not deliberately address these structural inequities will replicate them at larger scale. The mining boom in Karamoja, the EACOP displacement in the Albertine region and the agro-industrial expansion across the country all carry

documented histories of gendered harm. The clean energy and green industrial transitions will not be different by default: they will only be different by design.

None of this should obscure what remains genuinely possible. Uganda has already demonstrated, through the GETFiT programme, that blended finance instruments can mobilise private capital for renewable energy at meaningful scale. It has demonstrated, through the Kakira Sugar Works cogeneration plant, that biomass-anchored industrial energy systems can feed the national grid. It has demonstrated, through the Mineral Production Sharing Agreement for Kilembe, that a new generation of mineral governance instruments can impose more demanding local value addition and environmental standards than the concession model that preceded it. It has demonstrated, through the community solar adoption described in these interviews, that Ugandans are ready to embrace renewable energy given the right conditions of affordability and quality assurance. The building blocks of a green industrial future are present. What is required now is the political will to assemble them into a coherent national programme, the institutional capacity to implement that programme with discipline and accountability and the international partnerships to finance it at the scale the challenge demands.

The recommendations that follow are offered in that spirit: not as a checklist of desirable outcomes, but as a set of concrete, interconnected actions that together constitute the minimum necessary to translate Uganda's green industrial potential into lived reality for the communities whose voices animate this report.

Recommendations

For Ugandan Policymakers And Parliamentarians

Pass a Green Industrial Zones Act that creates dedicated, mission-oriented institutions for each zone. The three green industrial zones identified in this report – the Albertine Graben, the Kampala-Busoga corridor and Northern Uganda – each require a coordinating body with a statutory mandate, multi-year budget and technical staff capable of aligning energy, mining, land and investment policy at zone level. The institutional fragmentation between the Ministry of Energy, the Directorate of Geological Survey and Mines, the Uganda Investment Authority and district governments is currently the single most tractable binding constraint on green industrialisation. Uganda's precedent from the oil sector, where the Petroleum Authority of Uganda provides a dedicated, sector-specific regulator with real enforcement capacity, offers a template. A Green Industrial Zones Act could establish equivalent bodies for the clean energy and strategic minerals sectors, with explicit mandates to de-risk private investment, enforce domestic value addition requirements and report publicly on progress. Parliament should also require that zone-level environmental and social impact assessments are conducted with mandatory community consultation before any zone-level investment licence is issued.

Establish a Uganda Green Finance Facility, capitalised through oil revenues and multilateral concessional lending, to de-risk private clean energy investment. Uganda's energy financing shortfall of US\$1.4 billion per year cannot be bridged through project-by-project concessional loans. The government should establish a dedicated green finance facility – modelled on the GETFiT programme's blended finance architecture but operating at far greater scale – that pools first-loss guarantees, viability gap funding and concessional debt into a single vehicle accessible to private developers of renewable energy and green industrial projects. A proportion of oil revenues from the Tilenga and Kingfisher fields should be legally ringfenced for capitalisation of this facility through a sovereign wealth-style fund, ensuring that fossil fuel extraction directly finances the transition rather than simply being invoked rhetorically to justify it. Parliament should legislate the ringfencing mechanism and establish an independent oversight board with civil society representation to prevent the facility's resources from being diverted.

Develop and pass a comprehensive Just Transition Act that formally addresses the EACOP contradiction, commits to a managed fossil fuel phase-down timeline and enshrines protections for workers and communities. Uganda cannot credibly pursue green industrialisation while simultaneously expanding fossil fuel infrastructure

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Develop and pass a comprehensive Just Transition Act that formally addresses the EACOP contradiction, commits to a managed fossil fuel phase-down timeline and enshrines protections for workers and communities. Uganda cannot credibly pursue green industrialisation while simultaneously expanding fossil fuel infrastructure without a legal framework that defines how and when the transition will occur. A Just Transition Act – informed by the community voices captured in this report and drawing on the academic literature on gendered extractivism in Uganda – should set binding commitments for the phase-down of fossil fuel dependence, establish retraining funds for workers in the oil sector and adjacent industries, require gender-disaggregated impact assessments for all energy and extractive projects and create enforceable compensation standards for communities affected by infrastructure displacement that go beyond the inadequate provisions documented in this report. Parliament's Climate Change Committee, which has already flagged implementation gaps in existing climate legislation, should lead the drafting process.

For Ugandan Civil Society

Build a unified just transition coalition that connects energy access advocates, EACOP-affected communities, environmental defenders and green industrialisation campaigners. Civil society in Uganda working on energy and climate issues is currently fragmented across issue silos: organisations opposing EACOP, groups promoting solar access, researchers documenting mineral governance, gender advocates and community-based organisations represent distinct networks that rarely speak with a coordinated voice. A unified just transition coalition – modelled on South Africa's National Planning Commission engagement processes – would be better positioned to influence the legislative agenda described above, to hold the proposed Green Finance Facility accountable and to ensure that community voices from Kakuto, Kasensero, Kyotera and other affected areas are systematically incorporated into policy design rather than confined to research reports. The community interviewees in this report repeatedly called for leaders to "enforce the laws" and "separate political interest from development programs" – a coalition of this kind could provide the organised civic pressure necessary to make those demands effective.

Develop and disseminate a community-owned monitoring framework for tracking just transition commitments at the local level, with particular attention to gender equity. The community voices in this report expose a systematic gap between national-level commitments to energy access and the lived reality of rural households – particularly women and girls, who bear the largest burdens of energy poverty, biomass collection and fossil fuel infrastructure displacement. Ugandan civil society organisations, including Environment Governance Institute, AFIEGO and women-led organisations such as WoGEM (Women for Green Economy Movement Uganda),

should collaborate to develop a simple, locally owned monitoring framework that community members can use to track whether electricity connections are being delivered, whether compensation for EACOP displacement meets legal standards, whether renewable energy projects are creating local employment for women and whether clean cooking access is improving in line with the National Integrated Clean Cooking Strategy targets. This framework should feed directly into Uganda's EITI reporting process and into the advocacy work of any unified just transition coalition.

Commission and publish Uganda-specific research on the just transition's distributional impacts, filling the gaps identified in the existing literature. The just transition literature on Uganda – as surveyed in this report – is weakest on four dimensions: the labour market implications of a managed fossil fuel phase-down; the urban energy poverty dimension of the transition; the specific experience of women in communities affected by extractive projects; and the economic feasibility of domestic value addition in strategic minerals. Ugandan civil society organisations and research institutions, including Makerere University, should prioritise these gaps and publish findings in accessible formats that can inform both parliamentary debate and the international investment community. In particular, a detailed community-based study of the gendered impacts of the EACOP displacement – building on the Cambridge/Leverhulme research cited in this report but with a Uganda-specific policy focus – would significantly strengthen the evidence base available to policymakers.

For The International Investment Community

Adopt Uganda-specific cost-of-capital reduction strategies rather than applying generic Africa-wide risk premiums and publicly disclose the methodologies used. The Clean Air Task Force's analysis demonstrates that Uganda, like other East African economies, is penalised by generalised regional risk premiums that significantly overstate the actual default risk of well-structured renewable energy projects. International development finance institutions – including the African Development Bank, British International Investment, the IFC and bilateral DFIs – should commit to publishing Uganda-specific weighted average cost of capital assumptions for clean energy projects and to transparently explaining how country-specific risk factors are assessed. They should also significantly expand first-loss guarantee facilities and political risk insurance products tailored to the Ugandan market, building on the lessons of GETFiT and the Climate Investment Funds' \$50 million SREP programme. The goal should be to bring the effective cost of capital for utility-scale solar, geothermal and green industrial projects in Uganda closer to the 8–10% range that makes projects bankable without requiring perpetual concessional subsidy.

Condition investments in Uganda's strategic minerals sector on demonstrable green industrial standards, including domestic value addition, low-carbon processing and community benefit-sharing. International investors in Ugandan graphite, rare earths, copper and cobalt – including Ionic Rare Earths (Makuutu), Blencowe Resources (Orom-Cross) and the Sarrai Group (Kilembe) – operate in a market where Western offtake partners and end-users increasingly require traceable, low-carbon supply chains. The international investment community should use its leverage at the point of project financing to require, as conditions of investment, that processing is powered by renewable energy, that community benefit-sharing agreements meet IFC Performance Standard 5 requirements, that gender-disaggregated employment and compensation data are publicly reported and that a minimum share of project revenues is committed to local skills development. This is not merely an ethical imperative: it is commercially rational, given the ESG due diligence requirements that European battery manufacturers and the SAFELOOP consortium are already applying to potential suppliers like Orom-Cross.

Provide technical assistance and patient capital specifically for Uganda's public institutional capacity, treating this as a precondition for commercial investment rather than an afterthought. The World Bank, IEA and OECD analyses cited in this report all identify weak institutional capacity as the structural root cause of Uganda's financing gap – yet the majority of international development finance continues to flow to project finance rather than to the institutional infrastructure that makes project pipelines possible. International investors and development partners should commit a dedicated stream of technical assistance and institutional capacity-building support to: the Electricity Regulatory Authority (ERA), to improve its ability to design bankable power purchase agreements and tariff structures; the Directorate of Geological Survey and Mines, to accelerate the geological data collection needed to attract mineral investment; local commercial banks and Uganda's pension funds, to develop the risk assessment capabilities needed to deploy domestic capital into green projects; and any Green Industrial Zone coordination bodies established under the legislation recommended above. This institutional investment should be treated as the first tranche of any country partnership, not as a discretionary add-on.

Refuse to finance EACOP or associated oil infrastructure and redirect that capital explicitly to Uganda's clean energy and green industrialisation sectors, with a public commitment to the reallocation. Forty-three banks and thirty insurance companies have already withdrawn from EACOP on the grounds of climate risk, human rights exposure and financial viability. The international investment community should formalise this position and go further: those institutions that have declined to finance EACOP should publicly commit that the capital they would otherwise have deployed will be redirected to Uganda's renewable energy and green industrialisation sectors through the kinds of instruments described

in recommendations 7–9 above. This reallocation would transform a reputational decision into a positive developmental commitment, directly addressing the "opportunity cost" argument made in this report – that EACOP diverts political attention and capital from the clean energy investments Uganda urgently needs. It would also provide the Ugandan government with a concrete alternative offer that strengthens the political case for a managed transition away from fossil fuel dependence.

