WATER and ENERGY for FOOD

Energy Service Companies (ESCOs) for Energy Efficiency in Uganda

MARKET GUIDE

NOVEMBER 2022

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Acknowledgements and disclaimer

The goal of this market guide is to serve as a reference document for early exploration of the market for energy service companies in Uganda (ESCOs) with a focus on energy and cost savings for agri-food processing companies.

The guide was prepared by a team from Open Capital comprising of Neil Wood, Philippa Itabaza, Jonathan Maraka, Patrick Kikomeko, and Perez Magoola with support from the GIZ Water and Energy for Food (WE4F) team. The team extends its appreciation to all private and public sector organizations consulted especially the Ministry of Energy and Mineral Development (MEMD) and GIZ Uganda.

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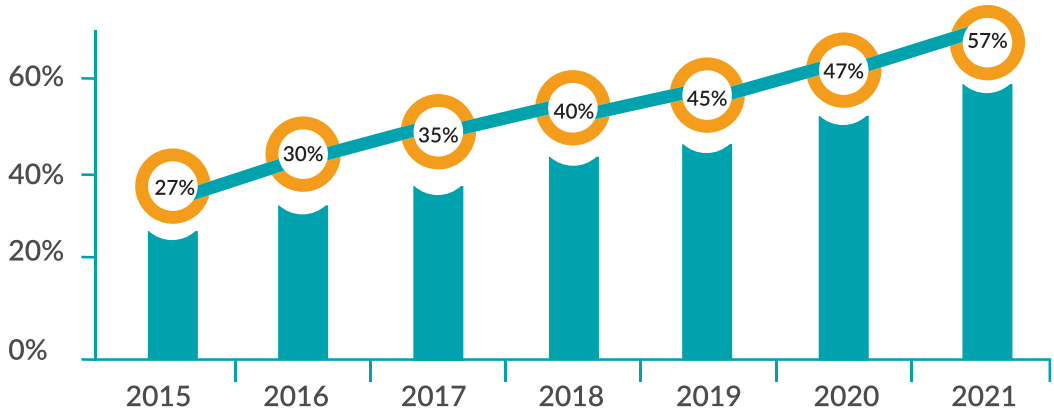
Executive Summary

Despite significant investment to boost energy access, the energy costs in Uganda remain high, creating an opportunity for ESCOs

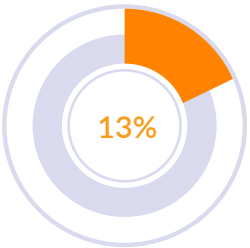
Sources: 1 MEMD, National Electricity Survey for ERT III 2 AfDB, Uganda Launches Last-mile Connectivity, 2021 [Link] 3 MoFPED, The impact of COVID-19 on Uganda's Energy Sector, 2021 [Link] 4 ERA, Uganda's Electricity Supply, 2021 [Link] 5 ERA, Tariff Determination in Uganda, 2006 [Link] 6 ERA, Tariff Adjustment Methodology, 2021 [Link]

Energy access is currently at 57%, having grown significantly over the last few years due to government investment

National access to electricity in Uganda[1] - % connected

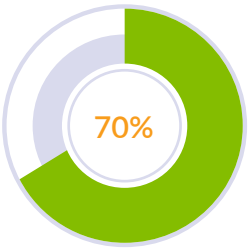


Electricity supply and generation in Uganda



Electricity generation has been growing at 13% p.a. with significant investment in hydropower stations[1]

Uganda generates ~ 1,350 MW of electricity, creating a surplus, as demand is only 600 MW[3]



% of Uganda's renewable energy potential is from hydroelectric power and biomass sources[4]

In addition to the existing technologies, GoU is exploring the development of other renewable energy technologies such as geothermal and wind energy

UG implemented cost reflective tariffs that have increased due to investment in generation assets & macro-economic factors

- Recent investments in generation assets have led to higher tariffs for all consumer segments
  - » Cost reflective tariffs are set for the various end-user customer groups such as domestic, commercial, medium-scale industries and large-scale industries[5]
  - » Tariffs account for generation, transmission, and distribution costs[5]
- Currency exchange rate fluctuations and inflation have had direct impact on electricity tariffs
  - » Tariff is meant to recover costs of investment as well as costs of operation and maintenance (O&M)
  - » A significant share of the costs was financed in USD, requiring USD payments to service loans and to recover invested equity to foreign financiers
- As ERA adjusts tariffs each quarter to reflect fuel prices, inflation reflects in a direct increase in tariffs[6]

As a result, companies looking to manage energy costs provide potential market opportunity for ESCOs

And while the market is nascent, commercial & medium industrial consumers present the highest opportunity for ESCO uptake

"ESCOs provide performance guarantees though Energy Performance Contracts (EPCs), which provide various energy services that guarantee energy or cost savings and financing arrangements. Renumeration depends on the achievement of guaranteed energy or cost savings" [2] OCA consultations

Commercial & medium industrial consumers represent the highest opportunity to uptake ESCO services

Segments	Commercial	Medium industrial
Characteristic	3-phase low voltage load ≤ 100A supplied at 415V	Low voltage supplied at 415V with maximum demand of up to 500kVA
Potential demand	**Highest potential given high energy cost and type of energy needs**	

ESCOs offer a range of services that can help agribusinesses reduce energy costs and enhance power reliability including:

- Optimizing energy usage: ESCOs can support agribusinesses to improve their industrial processes
- Installing energy efficient technology: ESCOs can support agribusinesses to identify and install energy efficient equipment
- Installing renewable energy sources: ESCOs can support agribusinesses assess, identify and install a suitable renewable energy source

Currently there are no companies in Uganda that predominantly operate an EPC-ESCO model[1]

- Remuneration of most energy companies in UG isn't based on the energy savings for the client. Typically, these companies operate either **lease to own, direct purchase, or tripartite agreement models**

Model	Description
Lease to Own model[2]	Energy company arranges financing, designs, installs, operates, and maintains an energy efficiency facility
Direct purchase[2]	The owner pays for the energy efficiency service upfront, financed using their own capital or external financing
Tripartite agreement[2]	The energy company arranges financing through a third party, designs, installs, operates and maintains a captive power plant on either the client's premises or nearby premises

Where agribusinesses in commercial & medium industrial segments are more likely to seek a wider range of ESCO services

Sources: GET. Invest, Uganda: Captive Power, Developer Guide, 2019 [Link]

Energy segment	Sector	Energy consuming activity	Likelihood to take-up ESCO service		
			Conduct Energy audit	Install energy efficient technology	Install renewable energy source
Commercial	**Dairy sector**	Cold storage	•	•	•
	Fish processing facilities	Cold storage	•	•	•
	Coffee factories	Drying and milling	•	•	•
Medium industrial	**Flower farms**	Heating and cooling	•	•	•
	Tea factories	Heating	•	•	•
	Abattoirs	Heating	•	•	•

Key: Most likely - • Less Likely - •

Gov't and dev partners can support the growth and scalability of ESCOs by strengthening the enabling environment

Gov't & dev partners can strengthen the enabling environment

Economic & financial

Develop financing support structures or funding mechanisms such as concessional funds and loan guarantee programs & TA to banks to increase access to finance

Social

Promote awareness of the energy efficiency benefits and services such as conducting training exercises for energy users regarding energy efficiency

Regulatory

Develop more energy efficiency programs and institutional laws such as creation of energy agencies to coordinate & set up obligations for customers and utilities

Technical

Build energy efficiency capacity and human resources through capacity building, networking and information sharing opportunities to ESCOs

Sources: GET. Invest, Uganda: Captive Power, Developer Guide, 2019 [Link]

GoU through MEMD, is looking to set up a super ESCO

High level structure of Super ESCO

The super ESCO is expected to have the following functions:

- **Function as a dev't pillar for private ESCOs:** provide technical training, share best practices, and establish contracting standards or templates
- **Create a pipeline for large scale projects:** leverage the public sector to conceptualize projects for energy efficiency
- **Create a regulatory environment for ESCOs:** provide guidelines & standards on how ESCOs should be run in UG Finance potential large scale projects: tap into public funds to provide start up capital for energy efficiency projects

Registration processes & tax exemptions exist to enable ESCO setup; new entrants can leverage partnerships to spur growth

ESCOs seeking to set up operations in Uganda are typically required to go through 5 key stages to formally establish as a business

Incorporate company	Register for a TIN	Attain Investment license	Get secondary license	Prepare draft customer contracts
• Register your company with the Uganda Registration Services Bureau (URSB)	• Register for a Tax Identification number (TIN) with the Uganda Revenue Authority	• Acquire an investment license from the Uganda Investment Authority (UIA) (foreign investors only)	• Companies operating in some sectors such as energy, health and education may require additional secondary licenses	• Draft a customer contract to facilitate customer discussions / negotiations to implement energy efficiency projects

Tax exemptions

Various tax exemptions and incentives are in place to catalyze the development of ESCOs in Uganda

- Income tax allowances
- Value Added Tax (VAT) exemptions
- Custom Duty exemptions

Other upcoming policies such as the Energy Conservation Bill, the Electricity Amendment Bill and the Net Metering code are expected to provide additional incentives for ESCOs

Considerations to setting up an ESCO

New entrants into the ESCO market could form partnerships to leverage existing skills, knowledge and networks; including:

- **Energy auditors:** provide the expertise and authorization to conduct energy audits
- **Financiers:** provide financing for energy efficiency projects
- **Equipment suppliers:** provide equipment required to execute an energy efficiency project
- **Installation companies:** provide the labour, and expertise to implement an energy efficiency project

ESCOs require financing at three stages – instruments typically include debt, equity, grants or mezzanine instruments

Sources: 1 European Commission, Financing Energy Efficiency, 2010 [Link] 2 European Commission, ESCO Financing Options [Link] 3 OCA consultations

1. Technology/venture development[2,3]	2. Construction[2,3]	3. Commercial operation[2,3]
Conducting prefeasibility and feasibility studies, project analysis, e.g., commercial & technical viability assessments, and energy audits	Construction and commissioning of projects	Operation and maintenance of projects
Financing needs: Largely operational expenses to assess viability	**Financing needs:** High CAPEX requirements to purchase equipment, & materials, with some operating expenses to acquire qualified staff	**Financing needs:** Mostly O&M expenses to ensure project meets the ESCO's performance obligations

Traditional financing instruments[1,2,3]

Ugandan ESCOs mostly use **traditional financing instruments including debt, equity, grants and mezzanine finance** all leveraged differently at various stages of project development

- Debt is the most common type of ESCO financing, with products varying depending on the structure of the ESCO
- Equity is leveraged by large ESCOs looking to support growth and those seeking to develop projects quickly
- Grant funding is gaining traction with most of it being leveraged to support feasibility for ESCOs

Other Instruments[1,2,3]

Non-traditional financing instruments being used in more developed countries include **government grants, bonds, carbon finance, vendor financing, pooled procurement and risk sharing mechanisms such as guarantee schemes**

A comprehensive list of local & international financing options is detailed in chapter 4 of this market guide (particularly pages 59 and 64 – 66 respectively)

Scaling financing to ESCOs requires all stakeholders to consider new approaches in the short, medium, and long-term

Notes: 1. UNREEEA - Uganda National Renewable Energy and Energy Efficiency Alliance

	Short-term	Medium and long-term
ESCOs	• Strengthen internal capacity to make ESCOs more investable. • Improve market awareness of ESCOs models and service	• Boost lobbying efforts for favorable policies for ESCOs • Explore innovative financing structures that help increase participation from a range of financiers
Banks & funders	• Banks should partner with clean energy funds to increase debt access for ESCOs • Banks and funders should explore working with TA providers to boost staff	• Banks should develop tailored lending products for energy efficiency projects • Banks and funders should seek out de-risking facilities with development
Gov't	• Partner with development agencies to conduct studies to better understand the ESCO financing • Implement tax credits and tax incentives for energy users in commercial and industrial sectors	• Identify opportunities for ESCO services in gov't bodies • Develop grant program to subsidize initial costs of project development • Strengthen the enabling environment through passing laws and regulations
Dev't partners	• Designing guarantee programs and other de-risking facilities to support on-lending to ESCOs • Funding TA support to key actors to address key barriers.	• Fund advocacy programs to support lobbying of favorable laws and legislation to create a market for ESCO services • Develop bundling strategies that can help overcome barriers such as high cost of equipment

Context

WE4F is undertaking studies to promote innovative solutions in the water-energy-food nexus to transform the agri-food sector

The Government of Uganda (GoU)

The GoU is actively promoting an Energy Efficiency Programme across all sectors of the economy

- The Draft National Energy Policy (2019) will put in place an enabling framework to promote energy efficiency across all sectors including agriculture
- Some of the proposed strategies include:
- Promoting energy efficient agricultural methods, practices and technologies to minimize energy use
- Promoting establishment of Energy Service Companies

Water and Energy for Food (WE4F)

WE4F aims to increase food production along the value chain through sustainable and efficient usage of water and energy

- WE4F seeks to improve energy and water efficiency through forming partnerships with private sector actors, offering technical assistance, financial grants, investment facilitation, capacity building and policy advocacy
- Through this support, WE4F seeks to support and scale innovative solutions in the water-energy-food nexus

Therefore, GIZ (supported by Open Capital) embarks on a study under the WE4F project to investigate how ESCOs, specifically working on energy efficiency, can be set up in Uganda.

- The study will include a special focus on agri-food processing companies, where significant energy and costs savings can be achieved

This market guide comprises 4 sections, that assess opportunities for ESCOs in UG; and provide a guide to promote uptake

Objective of the Market Guide

- Provide private sector actors with insights into the electricity sector and institutional frameworks relevant for ESCOs in Uganda
- Explore the market potential and analyze market dynamics and opportunities for ESCOs in Uganda
- Highlight the procedures to be followed in setting up ESCOs, such as licensing and necessary permits
- Define financing models & arrangements available for ESCOs in Uganda

Methodology

- Conduct secondary research
- Hold consultations with key stakeholders
- Analyze the market landscape of ESCOs in Uganda to analyze models being implemented and potential opportunities that can be leveraged
- Consolidate and synthesize learnings gained to develop a 40-60 page guide slide and conduct validation workshop to present findings, incorporate feedback and finalize the market guide report

The Market Guide provides a comprehensive overview of the ESCO market in UG with 4 sections

Electricity sector profile analysis
Overview of the electricity sector in Uganda, analysis of the relevant electricity costs, and an assessment of energy consumption in Uganda

Market potential and opportunities for ESCOs in Uganda
Assessment of the Uganda ESCO market, its competitive landscape and current stage of development coupled with business case studies

ESCOs set up and relevant business cases in Uganda
Overview of the guidelines and requirements for setting up an ESCO in Uganda

Access to finance for ESCOs in Uganda
Review of the possible financing options available for ESCOs in Uganda

The market guide defines ESCOs in the context of Uganda and answers key research questions

Definition of ESCOs

ESCOs are companies offering energy services or technologies to energy users to replace or improve existing energy facilities to save energy. The companies usually have three main characteristics.

- Guarantee energy savings and/or provision of the same level of energy service at a lower cost
- Remuneration of ESCOs is directly tied to the energy savings achieved
- Different business models apply, whereby some ESCO models provide finance, or assist in arranging financing for the operation of an energy system by providing a savings guarantee

Key research questions

What is the current landscape of ESCOs operating in Uganda?

- What is the competitive landscape, and current development stage of the ESCO market?
- What models of ESCOs are currently being implemented in Uganda?
- What business models can ESCOs in Uganda adopt in the agri-food sector to make an investment in energy efficiency viable?

What is required to set up an ESCO to support the Ugandan agricultural sector?

- What guidelines on licensing & regulations should be considered when setting up an ESCO for the agricultural sector?
- What are the applicable laws for investor protection and the incentives for investors in setting up?
- What learnings from global ESCO trends can be applied in Uganda's unique context?

What are the available financing options for ESCOs in Uganda?

- What financing models are applicable for ESCOs in Uganda?
- What financing options are available to ESCOs in Uganda?
- What are the potential risks of each of the different financing options (local/regional/internal) and instruments?

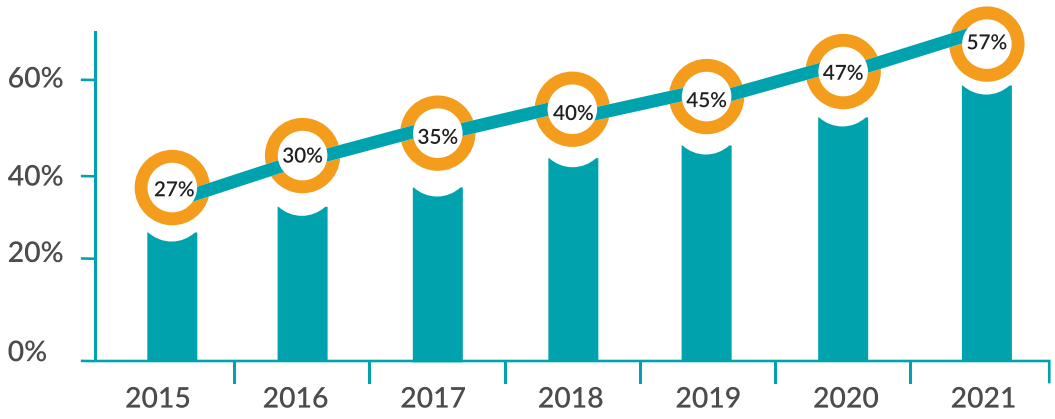
01 Electricity sector profile analysis

National electricity access rates have grown rapidly to 57% in 2021 mostly due to investment in hydropower stations

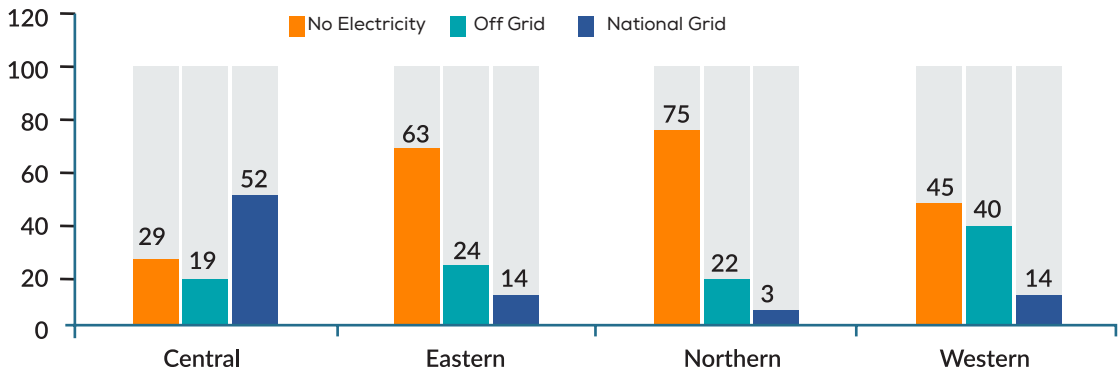
Sources: 1 MEMD, National Electricity Survey for ERT III ; 2 AfDB, Uganda Launches Last-mile Connectivity, 2021 [Link] ; 3 MoFPED, The impact of COVID-19 on Uganda's Energy Sector, 2021 [Link] ; 4 ERA, Uganda's Electricity Supply, 2021 [Link] ; 5 Africa Barometer, 2021 [Link]

While there has been rapid growth in Uganda's overall energy access, there is an imbalance in energy access across regions

National access to electricity in Uganda[1] - % connected



Access to electricity by region[2] - % connection by source



Electricity supply has largely grown due to government investment in hydropower stations

- National electricity access rate was 57% in 2021; 19% of access driven by on-grid demand[3]
  - » 78% of electricity demand is driven by C&I businesses; residential households account for only 22% of total demand[4]
- Electricity generation in Uganda has been growing at 13% per annum with significant investment in hydropower stations[1]
  - » **Hydropower:** Installed capacity of both large and small hydropower plants is 1073 MW with 63 MW coming online in 2021
  - » **Solar energy:** Installed capacity of solar energy both on and off-grid solar plants is currently 61 MW with 30% of it having come online in 2018
  - » **Biomass:** Capacity of both biomass and cogeneration is ~ 111 MW

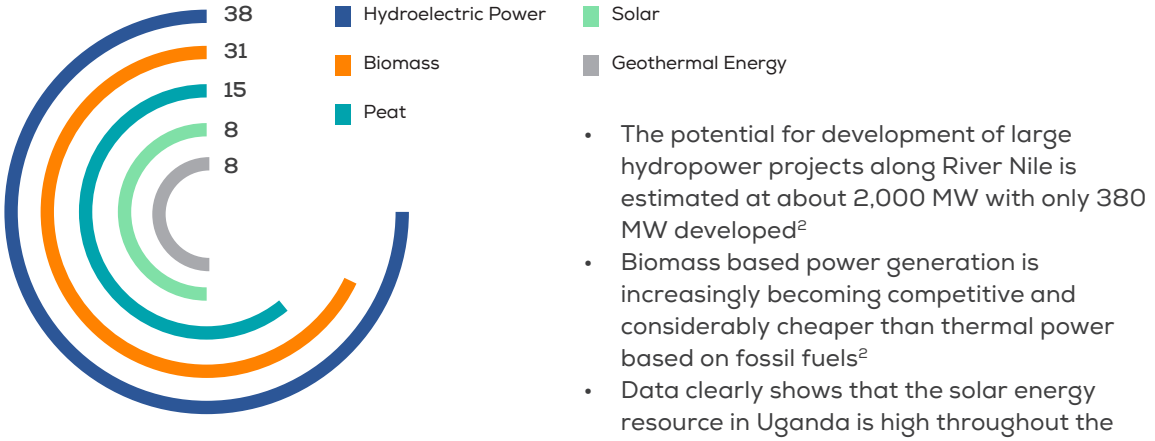
Today Uganda generates a surplus of electricity of over 1,350 MW yet demand is only 600 MW[5]

While hydropower is UG's largest renewable energy source, government is exploring developing others such as biomass

Sources: 1 GIZ, Uganda Sector Brief, 2022 [Link] ; 2 ERA, Renewable Energy Opportunities, 2018 [Link] ; 3 GTZ, Eastern African Resource Base, 2007

~70% of Uganda's renewable energy potential is from hydroelectric power and biomass sources

Total potential of renewable energy resources in Uganda [1]
% breakdown of generation source



- The potential for development of large hydropower projects along River Nile is estimated at about 2,000 MW with only 380 MW developed[2]
- Biomass based power generation is increasingly becoming competitive and considerably cheaper than thermal power based on fossil fuels[2]
- Data clearly shows that the solar energy resource in Uganda is high throughout the year, but solar energy is not generated in sufficient capacity to connect to the grid[2]

In addition to hydropower and biomass, Uganda is also rich in other renewable energy sources

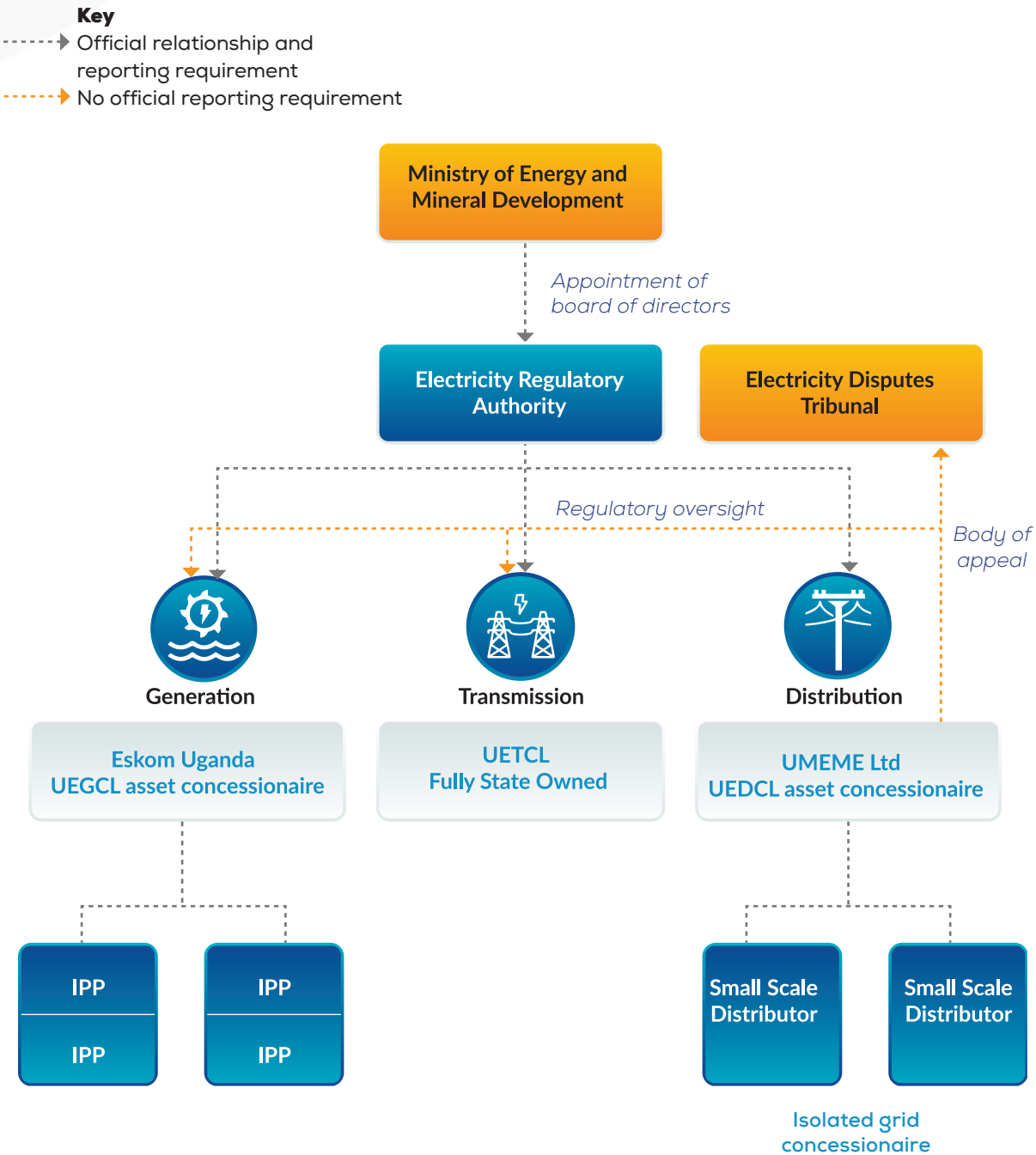
Source	Potential[3]
1. **Hydropower**	2,000 MW of hydroelectric power
2. **Solar energy**	5.1 kWh/m2/day of solar energy on average
3. **Geothermal**	450 MW of geothermal energy
4. **Peat**	250 million tons of peat (800 MW)
5. **Biomass**	50 million tons of sustainable annual output; 1,650 MW in co-generation
6. **Wind**	3.7 m/s on average

In addition to the existing technologies, the government is also exploring the development other renewable energy technologies such as geothermal and wind energy

> Electricity generation in Uganda has been growing at 13% per annum with significant investment in hydropower stations

MEMD & ERA provide operational and regulatory oversight to bodies across generation, transmission & distribution(1/2)

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link] ; 2 UOMA, Off-grid Energy Market Map, 2021 [Link] ; 3 Various company websites



MEMD & ERA provide operational and regulatory oversight to bodies across generation, transmission & distribution (2/2)

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link] ; 2 UOMA, Off-grid Energy Market Map, 2021 [Link] ; 3 Various agency websites

	Generation	Transmission	Distribution
Key players [1,2,3]	**UEGCL:** Generates electric power for use in Uganda and for sale to neighboring countries	**UETCL:** Owns, develops and operates the bulk power network above 33kv in Uganda	**UEDCL:** Distributes electric power to domestic and commercial end-users in Uganda, at and below 33 kv
	Eskom: UECGL's asset concessionaire operating Nalubaale and Kiira Power hydropower complexes		**UMEME:** UEDCL's asset concessionaire and Uganda's largest electricity distributor
	IPPs: Independent Power Producers operating electricity generating assets		**Small scale distributors:** Small scale electricity distributors often servicing remote regions
Regulatory bodies [1,2,3]	**Ministry of Energy and Mineral Development (MEMD):** Has the overarching mandate to promote development of sustainable use of energy and mineral resources		
	Electricity Regulatory Authority (ERA): Regulates the electricity supply industry and issues licenses for generation, transmission, distribution or sales of electricity, as well as ownership or operation of transmission systems		
	Electricity Distributes Tribunal (EDT): Tribunal is mandated to handle (hear, mediate, arbitrate and adjudicate) electricity disputes save for criminal matters between different parties which may include consumers and the public bodies responsible for the generation, transmission and distribution of electricity in Uganda		

The current governing structure has evolved from having one parastatal to having three, all reporting to ERA

Sources: 1 GoU, Electricity Act, 1999 [Link] ; 2 World Bank, Lessons from Electricity Reform in Uganda, 2018 [Link] ; 3 OCA consultations ; 4 Daily Monitor, REA disbanded, 2022 [Link]

Initial electricity sector reforms began in the 1990s and culminated with signing of concessions in 2006

The 1999 Electricity Act, provided the legal framework necessary to initiate sector reforms[1]

- The Act liberalized the power sector, established the Electricity Regulatory Authority (ERA) and the Rural Electrification Fund (REF)
- The Act also provided for the establishment of the successor companies of the Uganda Electricity Board (UEB) i.e., Uganda Electricity Generation Company Ltd (UEGCL), Uganda Electricity Transmission Company Ltd (UETCL) and, Uganda Electricity Distribution Company Ltd (UETCL)

Most of the initial reforms were completed by 2006 including:[2]

- Instituting the Rural Electricity Board (REB) to oversee rural electrification
- Creation of the Rural Electrification Authority (REA) to operationalize REA's mandate and support its day-to-day activities
- Signing of 20 years concessions to Eskom to run Nalubaale and Kiira hydropower plants and to UMEME to operate UEDCL's distribution network

> A financial analysis on the impact of the merger is being conducted with sponsorship from the World Bank

A new wave of power sector reforms have been kicked off by GoU driven by a need to drive efficiencies in the sector

The Rural Electrification Agency (REA) has been reabsorbed into MEMD[3,4]

- Ministry of Finance, Planning and Economic Development (MoFPED) through the guidance of the Cabinet got approval to reallocate REA's appropriated funds to the Ministry of Energy and Mineral Development (MEMD)
- REA has temporarily become the Renewable Energy Program (REP), within the Ministry of Energy until Oct 2022 when it will be fully transformed into a Department

UEGCL, UETCL and UEDCL are being merged into one company – The Uganda National Electricity Company (UECL)[3]

- The different companies are expected to operate as distinct departments in UECL
- A financial analysis on the impact of the merger is being conducted with sponsorship from the World Bank
- Merger process is expected to take up to two years and is being spearheaded by the Ministry of Public Service

The government has introduced several policies advancing the use of renewables and recognizing the role of energy efficiency

Sources: 1 GoU, Electricity Act, 1999 ; 2 GoU, Vision 2040, 2020 [Link] ; 3 REA, Electricity Connections Policy, 2018 [Link] ; 4 SE4ALL, Uganda [Link] ; 5 GoU, National Energy Policy, 2019 [Link] ; 6 GoU, NDP III, 2020 [Link] ; 7 DFID, Energy Compact, 2016 [Link]

Uganda has several policies that recognize the role of renewables in achieving universal access		More recently, the government is increasingly recognizing the role of energy efficiency in energy policy	
Electricity Act[1] 1999 – to date	Act to regulate the generation, transmission, distribution, sale, export, import and distribution of electrical energy including energy from renewable sources[1]	**National Energy Policy[5] 2019 - 2029**	Primary guiding document for Uganda's electricity sector and seeks to develop and enforce regulations, standards and codes that mandate energy efficiency practices across all sectors of the economy
Vision 2040[2], 2020 - 2040	Targets middle-income status by leveraging energy, primarily electricity access, as a key driver for socio-economic growth. Vision sets out pursue renewable energy sources to compliment existing sources of energy	**NDP III6 2021 – 2025**	Targets to bring the cost of electricity down to 5 cents per unit through several avenues including improving energy efficiency on both the demand and supply side
Electricity Connection Policy[3] 2018 - 2027	Aims to achieve a 60% access to electricity for Uganda by 2027 and seeks to promote the use of renewable for communities where the national grid is not available	**Energy Africa Compact[7] 2014 – to date**	Framework seeks to fast-track expansion of household solar market in Africa towards achieving universal energy access by 2030. The policy seeks provide clarity on fiscal policy including tax exemptions on energy efficiency appliances
Uganda's SE4ALL Action Agenda[4] 2015 – to date	Sets the goal of having 99% with access by 2030, while achieving more than 90% of renewable electricity production	**Although energy efficiency is continually featuring in several policies, it is yet to be mainstreamed in upcoming polices and strategies e.g., the draft National Electrification Policy**	

There is a strong business case for ESCOs given high energy costs due to infrastructure investment and macro-economic factors

Sources: 1 ERA, Tariff Determination in Uganda, 2006 [Link] ; 2 ERA, Tariff Adjustment Methodology, 2021 [Link] ; 3 The East African, Uganda seeks Additional USD 212 M, 2018 [Link] ; 4 Reuters, Uganda's Karuma dam costs escalate to USD 2.2 B [Link] 5 ERA, FAQs [Link]

Since 2012, Uganda has implemented cost reflective tariffs that have increased due to recent investment in generation assets

- Cost reflective tariffs are set for the various end-user customer groups such as domestic, commercial, medium-scale industries and large-scale industries[1]
  - » Costs vary between customer groups and typically highest for households and lowest for industrial users
- ERA approves tariffs on a quarterly basis to ensure that adjustments are made for macro-economic factors such as inflation, exchange rates and the price of fuel[2]

Since the tariff takes into account generation, transmission, and distribution costs, recent investments in generation assets have driven tariffs up

- Government is heavily leveraged through borrowing to construct electricity generation assets especially in hydropower projects such as the Isimba and Karuma hydropower plants[3]
- There have been several costs overruns on recent projects e.g., the Karuma hydropower project cost more than doubled to USD 2.2 B[4]

2.2 BILLION

the Karuma hydropower project costs more than doubled to USD 2.2 B

In addition to generation investments, macro-economic factors have increased energy costs creating opportunity for ESCOs

Foreign exchange and inflation have affected energy costs and companies require energy solutions to minimize energy bills

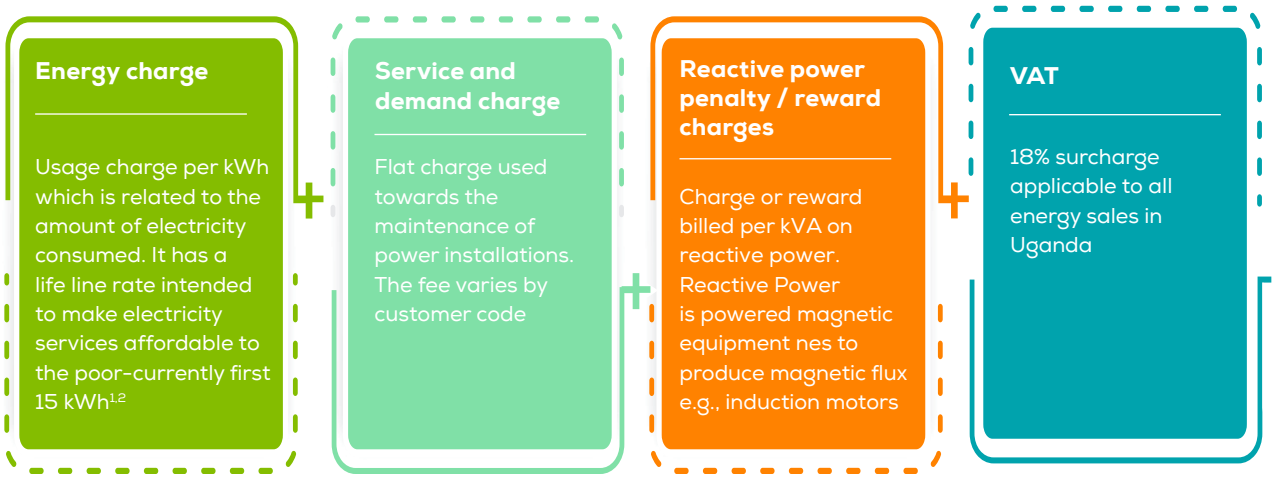
- Fluctuations in foreign exchange rates have a direct impact on the tariffs[5]
  - » The electricity tariff is meant to recover costs of investment as well as costs of operation and maintenance (O&M). Most of the investment costs and a portion of the O&M costs of electricity service are made in USD. Most loan repayments and recovery of invested equity are made in USD to foreign financiers
- Besides foreign exchange rate fluctuations, inflation is the second driver of high tariffs with Uganda experiencing on of the highest inflation in the region
  - » Given ERA on a quarterly adjusts tariffs to reflect exchange rates and price of fuel any increase in inflation leads to an upward movement in tariffs[2]

Since ESCO renumeration is pegged to energy savings, there is strong potential to introduce business model to companies

UG's tariff structure has 4 components – reactive power penalties drive up cost of energy for commercial & industrial customers

Sources: 1 ERA, Tariff Determination in Uganda, 2006 [Link] ; 2 UMEME, Customer Information Handbook., 2021 [Link] ; 3 OCA consultations ; 4 ERA, Quarterly Bulk Supply Tariff [Link]

Retail electricity tariffs in Uganda are made up of different cost components. End-users are classified as domestic, commercial or industrial, with sub-categorization for industrial customers into medium, large and extra-large. Cost components include; a) an energy charge, b) a service (fixed) and demand charge, c) a reactive power penalty or reward charge d) Value Added Tax (VAT)[1]



All tariff categories pay an energy charge per kWh of consumption, and all are subject to a monthly fixed service charge. Industrial users also pay a monthly demand charge, and a monthly reactive power penalty or reward charge may apply.

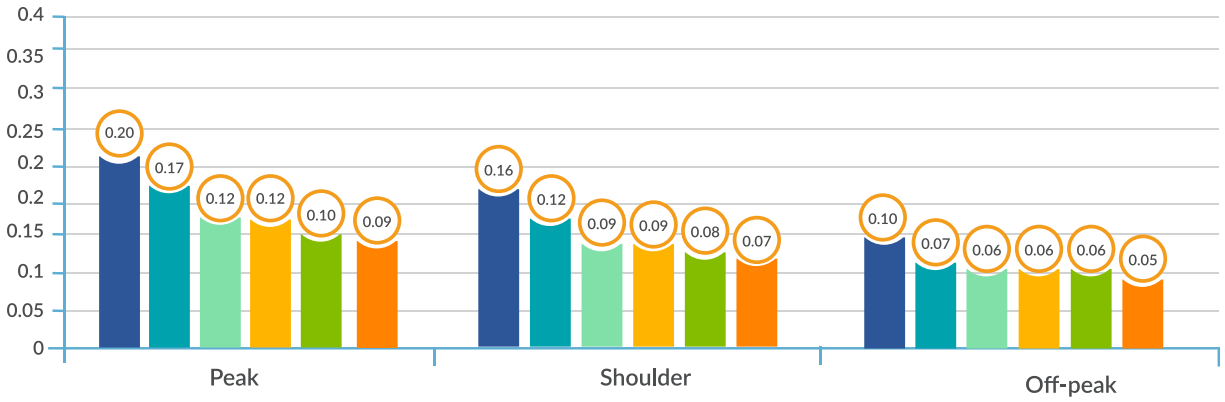
The tariff breakdown is applicable to UMEME which is responsible for ~90% of electricity sales in Uganda[3]. Other IPPS such as WENRECO have a bulk power supply tariff(BST) in place that is revised on a quarterly basis[4]

Tariffs vary by customer group typically reducing for customers with high energy demand and are influenced by time of use

Sources: 1 UMEME, Q2 2022 Tariffs [Link] ; 2 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link] Note: Conversion to USD leveraged Bank of Uganda July interest rates [Link]

Since 2012, Uganda has implemented cost reflective tariffs that have increased due to recent investment in generation assets

Electricity tariffs by consumer category and time of use[1,2] USD per kWh



Load Pattern	Time
Peak	18:00-24:00Hrs
Shoulder	6:00-18:00Hrs
Off-peak	24:00-6:00Hrs

- Commercial (Code 10.2)
- Large Industrial (Code 30) - Block 1
- Extra Large Industrial (Code 40) - Block 1
- Medium Industrial (Code 20)
- Large Industrial (Code 30) - Block 2
- Extra Large Industrial (Code 40) - Block 2

- **Marginal costs of generation, transmission and high voltage distribution vary by time of day. Costs are higher in hours when load growth is likely to require additional capacity, or when high-cost generators must be dispatched to meet load**
- **Time of use (TOU) charging improves the efficiency of price signals because the charges vary for consumption in predefined period within the billing period**

02 Opportunities for ESCOs in UG

ESCOs provide technology and finance services to replace existing energy facilities through four steps that lead to energy savings

Source: 1 EACREEE, Energy service business models to foster energy efficiency in East and Southern Africa, 2022 [Link] ; 2 iisd, Energy Service Companies (Escos) In Developing Countries, 2022 [Link]

Energy Service Companies (ESCOs) are businesses that provide technology & finance services to replace or improve existing energy facilities targeted at achieving energy savings.[1,2] Primarily under two operational models:

- **Consultancy/technically based ESCOs:** Consulting firms that have a general expertise in engineering or energy efficiency
- **Vendor/technology-based ESCOs:** Energy technology suppliers, sometimes with a connection to a particular energy-efficiency equipment manufacturer

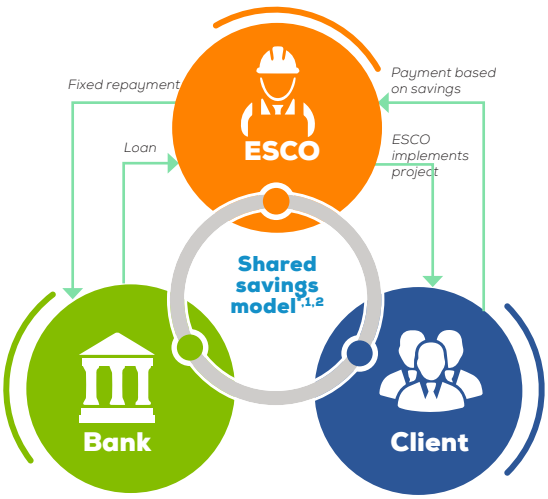
ESCO services can be divided into four main categories:[1]

1. Energy audit	2. Finance	3. Procurement	4. Monitoring
• ESCO conducts energy analysis and investment grade audits to identify possible energy savings and efficiency improvements • ESCO then performs a comprehensive engineering project design and specifications based on the findings from the audit	• ESCO arranges project financing to implement all necessary energy upgrades based on the energy audit • The client can provide a bank guarantee as the ESCO guarantees certain energy reductions, and receives a share of the savings to recover its investment	• ESCO procures equipment, constructs or installs, and finally commissions the complete facility • ESCO can supply the energy equipment itself • ESCO can also supply energy and other services such as cooling, lighting and space heating	• ESCO can provide operations and maintenance services • ESCO can also measure and verify energy cost savings to ensure payment • There are some innovative models where ESCOs can manage a property or the installed facility

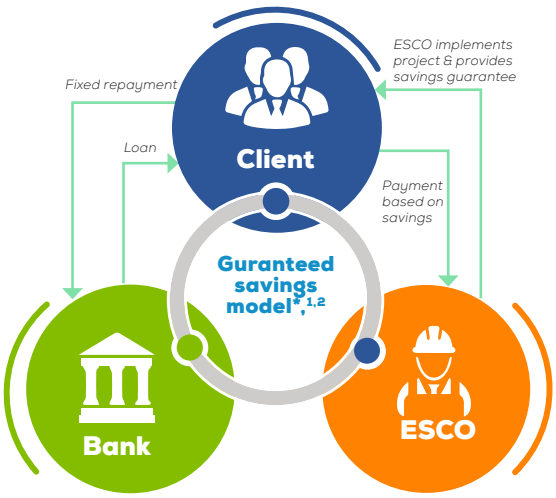
ESCOs typically operate on two types of Energy Performance Contracts, where guaranteed savings are more widely adopted

*Note: * The shared models can also involve insurance providers taking on the technical risk and the credit risk*
Source:s 1 EACREEE, Energy service business models to foster energy efficiency in East and Southern Africa, 2022.[Link] ; 2 iisd, Energy Service Companies (Escos) In Developing Countries, 2022 [Link] ; 3 OCA Consultations

ESCOs provide performance guarantees though **Energy Performance Contracts (EPCs),** which provide various energy services that guarantee energy or cost savings and financing arrangements. Renumeration depends on the achievement of guaranteed energy or cost savings, and is typically performed under a **shared savings**, or **guaranteed savings**[1] model



- The client and ESCO share the cost savings based on a pre-determined percentage for the contract period, after which the client retains any further savings
- The ESCO typically finances the project, hence assuming both the credit and the performance risk



- ESCO guarantees a certain level of energy savings, and the customer makes the upfront investment; if the savings fall short of the investment, the ESCO compensates the client
- The ESCO provides design, procurement and construction services and receives a service fee in exchange.

Shared savings have increasingly declined in advanced markets due to disputes resulting from unspecified energy-savings cash flows & share ratios. Hence, developing countries (e.g., Kenya) mostly adopt guaranteed savings EPCs[2,3]

By providing reliable power & low-cost solutions, ESCOs have the potential to generate energy savings of USD 160M by 2030 in UG

Source: 1 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link] ; 2 UMEME, Q2 2022 Tariffs [Link] ; 3 OCA consultations

ESCOs can support companies manage unreliable power supply, reduce energy costs while reducing CO2 emissions

Unreliable power supply
Consumers continue to face power outages (unscheduled electricity interruptions) which affect productivity. ESCOs can provide energy efficient solutions that improve power reliability and quality[3]

High electricity costs
The GoU heavily invested in building the country's generation capacity to meet the growing power demand. This came at a hefty cost that was transferred to the energy end users through higher tariffs[3]

Environmental gains
Industries using diesel generators (DG) as a main source of electricity or as a backup, are switching to captive solar PV to reduce costs as well as their CO2 emissions[3]

Studies suggest ESCOs can support companies achieve energy savings worth USD 160M through efficient technologies[1]

Sectors	Achievable economic savings (GWh)	Tariff (USD/kWh)	Energy savings (USD)
Residential	327	0.180	59M
Commercial	209	0.169	35M
Industry	516	0.127	66M
Total	**1,052**		**160M**

- An energy efficiency study by the MEMD in UG found that achievable economic savings of 1,052 kWh could be achieved if cost effective energy efficiency measures were adopted through ESCO services
- As a function of the average electricity tariffs across the three customer categories, the resulting annual energy savings in UG by 2030, has potential to exceed USD 160M

160 MILLION

Uganda has potential to exceed USD 160M by 2030 throught the annual energy savings.

Uganda's market has 4 segments with commercial and medium industrial energy segments presenting the highest ESCO potential

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link] ; 2 OCA consultations

Segments	Residential	Commercial	Medium industrial	Large industrial
Characteristics	• Low voltage single phase supplied at 240V	• 3-phase low voltage load ≤100A supplied at 415V	• Low voltage supplied at 415V; max demand of up to 500kVA	• High voltage 11kV or 33kV; max demand >500kVA but ≤ 1,500kVA)
Example customers	• Households	• Smaller hotels • Petrol stations, • Telecom towers, • Health centres, etc.	• Medium to large scale agri-processors (flower farms, tea factories, coffee factories, rice and maize millers) • Medium to large scale food and beverage processors (dairy, poultry, piggery, fruit and juice) • Medium to large scale shopping malls, and hotels	
Average Tariff	0.18	0.169	0.155	0.099
Potential demand	Unexplored even in advanced markets	**Highest potential for UG ESCOs given high energy cost and type of energy needs**		Lower potential due to low tariff costs

The market segments with the highest potential either have high energy costs, unreliable power, or lack access to the grid

- High potential exists for ESCOs to provide energy saving services to commercial and medium industrial segments. These segments have higher average energy costs (USD 0.155 and USD 0.169/kWh respectively) coupled with high usage unlike residential segment
- While large industrial energy consumers have high usage, the tariffs remain low; hence, the incentive to reduce consumption through energy efficient equipment is outweighed by a low return on investment
- Similarly, ESCO services have been relatively unexplored for the residential segment in both developed and developing countries

Therefore, ESCOs can support agribusinesses optimize usage, install energy efficient technology and renewable energy sources

Source: 1. Energy Savings Ideas For Agricultural Businesses, Business Queensland 2022 [Link] 2 OCA Consultations

ESCOs offer a range of services that can help agribusinesses reduce energy costs and enhance power reliability. These services grouped as follows:

Optimizing energy usage

- ESCOs can conduct energy audits to support agribusinesses understand their consumption & affiliated costs, providing key information such as annual energy usage, max. demand during specific periods, peak consumption periods, seasonality of energy usage, etc. [1]
- Consequently, ESCOs can help agribusinesses improve their industrial processes to optimize energy consumption e.g., optimal time for production to avoid peak demand tariffs [1]

Installing energy efficient technology[1]

- ESCOs can support agribusinesses to identify and install energy efficient equipment such as; efficient irrigation pumps, variable speed drives, efficient cooling systems etc. [1]
- ESCOs can install monitoring equipment such as smart meters to support agribusinesses monitor and manage their power usage [1]
- ESCOs can also install cogeneration systems, i.e., combined heat and power (CHP) systems that recover wasted heat from industrial processes for productive use [1]

Installing renewable energy sources[1]

- ESCOs can support agribusinesses assess, identify and install a suitable renewable energy source such as solar, bioenergy, and wind [1]
- These sources can be mini grids that serve a community, cooperative of farmers or a decentralized off-grid/ stand alone system serving one energy user [2]
- Such renewable energy sources could help agribusinesses reduce energy costs, and even provide access to more reliable power instances[2]

In fact, commercial and medium industrial agri-businesses are more likely to take up a wider range of ESCO services

Energy segment	Sector	Number of facilities	Energy consuming activity	Likelihood to take-up ESCO service		
				Conduct Energy audit	Install energy efficient technology	Install renewable energy source
Commercial	Dairy sector	Only 6–8 large scale milk processors and at east 60 small-scale milk collection centres in Western UG	Cold storage	•	•	•
	Fish processing facilities	At least 32 fish processors, some may not be very large	Cold storage	•	•	•
	Coffee factores	60 or more coffee factories, but only few large scale	Drying and milling	•	•	•
Medium industrial	Flower farms	12 flower exporters (~6 exporters medium industrial customers)	Heating and cooling	•	•	•

Key: Most likely - • Less Likely - •

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [LINK]

...while large industrial are less likely to explore renewable & energy efficient sources given lower tariffs from the main grid

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]

Energy segment	Sector	Number of facilities	Energy consuming activity	Likelihood to take-up ESCO service		
				Conduct Energy audit	Install energy efficient technology	Install renewable energy source
Medium industrial	Tea factories	At least 22 tea companies	Heating	•	•	•
	Abattoirs	At least 4 large abattoirs, 3 in Kampala and 1 in Soroti	Meat cutting and cooling	•	•	•
Large industrial	Sugar factories	6 existing major producers, more under development	Heating, milling	•	•	•
	Forestry operations	Only 4 large-scale forestry and processing companies	Heating, milling	•	•	•

Key: Most likely - • Less Likely - •

To enable a scalable approach in Uganda, ESCOs will need to overcome regulatory, technical and financial challenges

Source: 1 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link] ; 2 iisd, Energy Service Companies (Escos) In Developing Countries, 2022 [Link] ; 3 OCA consultations

Lack of an enabling environment

- Energy efficiency policies and regulations to enforce and prioritize energy efficiency requirements are yet to be put in place. In absence of government policy as a driver, ESCOs will face challenges developing a critical mass in Uganda[1 2 3]
- Only recently has the government began to commit funds to energy efficiency and engage in ESCO demonstration projects.[1 3] Catalyzing these efforts would significantly enable the environment to support ESCO uptake

Low awareness of energy efficiency

- Potential ESCO clients, financial institutions, equipment suppliers, and the government have limited knowledge on the energy efficiency opportunities and ESCO operations (various types of contracting, and financing modalities)[1 3]
- Whereas there has been some progress in capacity building in the energy efficiency space, there is still opportunity to build market expertise on energy efficiency opportunities and conduct benefits assessments[1 3]

Lack of access to affordable capital

- Commercial banks are yet to develop experience with financing energy efficiency projects & establish the profitability of energy efficiency loans; hence, increasing the risk of lending which drives up interest rates[1 2 3]
- ESCOs also have limited financial expertise, understanding of financing requirements, credit history, making it difficult to access financing[2]
- Potential clients have limited financial capital, which deem projects as less credit worthy[2 3]

Increased focus on energy efficiency programs has enabled early adoption of some components of the ESCO model

Several energy efficiency efforts since the early 2000's have achieved some success in UG and in turn have led to creation of companies that perform energy audits or energy efficiency upgrades. Examples of such programs include:

Source 1 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link]

GIZ PREEEP and MEMD energy audit program[1]	• GIZ PREEEP and MEMD commissioned energy audits of 26 high energy consuming industries from September 2014 to March 2015 to (i) establish an energy consumption baseline in different industrial subsectors, and (ii) sensitize industry managers on energy management. It was found that there is "low intake of energy audits and energy management in industries., and that the number of energy efficiency measures implemented following the audits in the private sector was limited. • In 2015, GIZ PREEEP and MEMD also carried out theoretical and practical energy management trainings for local energy auditors and developed a process to certify the energy auditors that completed the course
PSFU and World Bank power factor correction program[1]	• In 2011, the Private Sector Foundation Uganda (PSFU) implemented a program to incentivize industry to correct power factors under the World Bank ERT II project. The program included free audits and offered 59% investment cost sharing to correct power factor. CREEC was in charge of verifying estimated energy savings • As of 2014, 21 manufacturing companies had benefited from the program, with a total saving of 8.04 megavolts ampere (MVA) of demand, equivalent to 8.4 MW of electricity. In industries where the correction equipment has been installed, the power factor increased from an average of 0.68 to 0.95; a 40% improvement

Despite the progress made thus far, the UG ESCO market is still nascent as EPC-type ESCO models are yet to be fully implemented on the market

...resulting in the emergence of energy efficiency companies on the UG market that leverage non-EPC business models

Note: The regulatory landscape of Power Purchase Agreements (PPAs) in Uganda is unclear; hence, some developers are leveraging tripartite agreements as a workaround Source: 1 OCA consultations*

Currently there are no companies in UG that predominantly operate an EPC-ESCO model in the market [1]

- The remuneration of most energy companies in UG isn't based on the energy savings for the client. These companies often steer away from bearing the financial risk associated with the conventional EPC ESCO model[1]
- Hence, these companies either operate a lease to own model, direct purchase model, or tripartite agreement model[1]

Lease to own model [1]

- Energy company arranges financing, designs, installs, operates, and maintains an energy efficiency facility for a client under a lease agreement
- Client pays off the facility value through fixed monthly payments and ownership is transferred to them at the end of the contract
- This model accounts for 61% of Solar PV installations in UG
- Companies such as Solar Pipo and Solar Now offer a lease to own model

Direct Purchase [1]

- The owner pays for the energy efficiency service upfront, financed using their own capital or loans.
- Once purchased, the owner can either take on operations and maintenance or enter into an O&M contract with the energy company
- In UG, this model is usually facilitated with grants/subsidies/ commercial bank financing which has come predominantly through the SUNREF green credit line participating bank Diamond Trust Bank

Tripartite Agreement [*,1]

- The ESCO arranges financing through a 3rd party, designs, installs, operates & maintains a captive power plant on either the client's premises or nearby
- The client makes monthly payments based on the energy consumed over a long term contract
- After paying for the contract period, the client has the option to transfer the asset to themselves or replace it
- Model leveraged by an eco-friendly resort in Uganda to install a solar power plant and reduce energy costs

40%

The power factor increased from an average of 0.68 to 0.95, in industries where the correction equipment has been installed, a 40% improvement

61%

Lease to own model accounts for 61% of Solar PV installations in Uganda

Case study | **Solar Pipo uses a lease to own model; but opportunity exists to consider guarantee provisions to limit exposure**

Source: 1 GOParity website [Link]

Key actors

Energy Provider
SolarPipo Group is a Dutch company with 8 years experience in supplying and installing solar systems for cooling, water pumps and other productive uses of dairy cooperatives in Uganda[1]

Energy User
Founded in 2014, Bweramule Cooperative is made up of 163 member farmers and over 380 non members farmers in the community who contribute milk to the milk collection center of the cooperative [1]

Investor
Founded in 2017, in Portugal, GoParity is an impact investment platform that connects companies looking to finance their sustainable projects, with individuals and entities who want to invest sustainably [1]

Case description[1]

- **SolarPipo** raised **EUR 57,500** through **GoParity** to replace **Bweramule Cooperative's** diesel generator for a 11.88 kW solar power plant with a battery rack of 67.2 kWh
- The loan will be paid back in **5 years** through monthly payments at an annual interest rate of **7%, after a 3 month grace period** of capital.
- SolarPipo retains ownership of the equipment and performs operations and maintenance during the first 5 years

Results [1]

The switch to solar allows Bweramule Cooperative to:

- Reduce costs throughout the lifetime of the solar power plants (usually 15 to 20 years)
- Eliminate the consumption of 3800 litres of diesel a year that will avoid the emission of 10.2 tons of CO2/year
- Increase their income due to the increased reliability and supply of energy for storage and milk production

Case study | **NUCAFE used a direct purchase model; opportunity exists to consider guarantee provisions to limit exposure**

Source: 1. Village Energy website [Link] ; 2 NUCAFE Commissions First Industrial Solar Power Plant In Uganda". National Union Of Coffee Agribusinesses And Farm Enterprises (NUCAFE), 2022 [Link] ; 3. aBi Website [Link]

Key actors

Energy Provider
Village Energy, a Ugandan distributor of solar solutions that enable productive use of energy (PUE) for businesses, through custom design, financing, installation, remote monitoring, and on-site servicing [1]

Energy User
Founded in 2003, the National Union of Coffee Agribusinesses and Farm Enterprises Ltd (NUCAFE) is a private sector led farmer organization formed to serve and position farmers well in the coffee value chain [2]

Investor
ABI channels development funding to agribusinesses and agriculture in Uganda. It focuses on increasing agricultural production & value addition [3]

Case description[2]

- NUCAFE hired Village Energy and other contractors such as Bitcom Delta, designed, to install, operate and maintain a 172 kWp solar power plant for its factory in Namanve
- aBi and other partners such as the Nordic Dev't Fund financed this project as part of a larger program, to enhance the quality and profitability of coffee by small holder farmers
- NUCAFE will use the first 5 years to payback the loan facility and will then access free electricity for the remaining lifetime of the solar plant

Results [2]

- Since commissioning of the solar power plant, NUCAFE has registered reductions of over 70% in power bills, contributing to equivalent savings for the processing plant.
- The solar power plant is expected to save 241.3 tons of CO2 emissions per annum from the atmosphere and planet earth hence facilitating the export of the first carbon neutral coffee

Other case studies | **Most players in the energy efficiency space leverage a lease to own model to offer energy efficiency services**

Source: All in Trade website [Link] ; 2. OCA Consultations ; 3 Aptech Africa website [Link] 3 Solar Now website [Link]

Company	Profile	Projects developed[3]	Business model[3]
All in Trade	Founded in 2008, **All in Trade Limited** is a private Ugandan company that designs, supplies, installs and maintains renewable energy systems such as solar, and wind in Uganda and other neighbouring East African countries[1]	Developed several C&I projects across healthcare, education and hotels using the direct purchase model. Has also partnered with SolarPipo to implement captive solar installations for dairy cooperatives leveraging a lease to own model	Direct Purchase and Lease to own
	Founded in 2011, **Aptech Africa Ltd.** is an Engineering, Procurement and Construction company with focus on solar energy and water pumping solutions in Africa. It has presence 7 countries across Africa[2]	Has sold solar PV powered water pumps to low income subsistence farmers for irrigation offering a lease to own model	Lease to own
solar now	Established in 2010, **SolarNow** is a for-profit business providing high quality energy solutions initially for rural homes and small businesses but has since evolved into an energy solution provider supporting businesses, farmers, and institutions[3]	Implemented several captive solar installations for large agriculture farms, fuel stations, and office buildings leveraging mainly a lease to own model	Lease to own

Non-EPC ESCO models can be leveraged to scale energy efficiency services as the EPC model is yet to be suited for the UG market

Source: 1. Climate Policy Initiative, Exploring Viable Energy Efficiency Business Models In Indonesia, 2022 [Link] ; 2 iisd, Energy Service Companies (Escos) In Developing Countries, 2022 [Link]

EPC-ESCO's have worked well in some developed countries such as the USA, but haven't necessarily taken off in developing countries such as China, and Indonesia. [1 2] This is a result of the following reasons:

- Disputes arising from energy savings measurement and the resulting monetary savings. This uncertainty deters confidence amongst the associated stakeholders (e.g., funder, client or ESCO) in the viability of the energy efficiency project [1 2]
- Clients in developing countries such as Uganda present risks as they are often less financially viable hence prone to payment defaults [2]
- The lack of a financial guarantee in a non performing situation may lead to ESCOs defaulting on loan repayments [2]

This might be the same case for UG as no energy efficiency project that has implemented EPC-ESCO model has been identified. Therefore, opportunity exists to modify the 3 existing business models in UG to scale energy efficiency services: [1]

Lease to Own model
- Offer a performance guarantee on minimum energy savings or the output of a power facility
- Establish requirements such as refundable deposits to protect the ESCO from late or no payments even if the device delivers as promised
- The deposit ensures that the ESCO can repay the bank loan when the client delays payment

Direct Purchase
- Offer a technical guarantee on minimum energy savings or the output of a power facility
- The guarantee covers situations when the device breaks down, does not deliver as promised, or left unrepaired by the ESCO.
- Align with the client on the required M&V devices to measure the achieved energy savings

Tripartite Agreement
- Offer a performance guarantee on minimum energy savings or the output of a power facility
- Request for refundable deposits to protect the ESCO in case the client defaults or pays late
- Set up M&V devices as part of its installation to accurately measure and verify energy savings hence gain the clients trust

65 kWp

NUCAFE runs a 65 kWp solar captive power plant. The processing facility uses most of its energy on a drier, pneumatic sorter and a hopper

Site visits | **Ag businesses are interested in acquiring solar captive plants or battery back-ups on direct purchase or lease to own**

Organization	Overview	Energy usage and efficiency opportunities
NUCAFE	Farmer owned social enterprise specializing in coffee processing	• NUCAFE runs a 65 kWp solar captive power plant. The processing facility uses most of its energy on a drier, pneumatic sorter and a hopper • The factory is looking to purchase back-up batteries to run their drier and expects to realize energy savings of up to 50%
Wagagai Limited	Producer of flower propagation cuttings in Central Uganda	• Wagagai uses on-grid electricity to run most of their equipment including motors, heat pumps, and boilers • Wagagai is looking to install a battery back-up system to mitigate frequent power outages.
Bwamba Cooperative Union	Cooperative formed by Bundibugyo Cocoa Farmers in Western Uganda	• Bwamba uses on-grid electricity in its warehouses to run weigh scales and control temperatures • The cooperative is interested in purchasing a solar captive plant to reduce energy spend
Koch Producers and Marketing Cooperative	Farmer group with over 180 members in Northern Uganda; focused on cassava value addition	• Koch currently runs a chipper, grinder and sorter using a diesel genset • They are interested in purchasing a solar captive plant to substitute the diesel genset, in turn reducing energy spend in the long-term

Agri-processors need energy efficient solutions to enhance production & achieve cost savings; hence, establishing the feasibility for ESCO set up in the UG market

Gov't and dev partners can develop funding mechanisms and energy efficiency programs to promote the growth of ESCOs

Source: 1 iisd, Energy Service Companies (Escos) In Developing Countries, 2022 [Link] ; 2 OCA Consultations

Economic & Financial

GoU and Dev't Organizations could develop financing support structures or funding mechanisms [1]

- Set up an ESCO dev't fund to offer concessional financing, in the form of low/free interest loans to decrease the amount of equity capital required to start an ESCO (e.g., capacity building and initial energy audit costs)
- Establish loan guarantee funds, backed by public funds (as discussed in the previous section), to reduce risk perception of financial institutions, which could be key to the development of commercial energy-efficiency lending programs.
- Offer tailored capacity building training for bank staff and other stakeholders to understand energy efficiency financing through ESCOs

Regulatory

GoU could develop more energy efficiency programs and institutional laws [1]

- Enable creation of energy agencies/associations to serve as central sources of information and coordination on energy-efficiency policy and ESCOs
- Set energy-efficiency target obligations for energy consumers and utilities such as; building codes, annual percentage reduction in energy consumption, and requirements for utilities to invest a percentage of revenues in energy efficiency on an ongoing basis
- Develop institutional frameworks for ESCO operations specifying requirements for ESCO setup and tax incentives to encourage the growth of ESCOs e.g., income tax rebates on payments made to ESCOs or on energy-efficiency projects, service tax exemptions on energy audit fees, subsidies for energy audits and five year tax holidays for ESCOs

Gov't and dev partners could promote energy efficiency awareness programs to build sector knowledge and expertise

Source: 1 iisd, Energy Service Companies (Escos) In Developing Countries, 2022 [Link] ; 2 OCA Consultations

Social

GoU and Dev't Organizations could promote awareness of the energy efficiency benefits and services[1]

- Conduct information distribution and training exercises for energy users across all sectors regarding energy efficiency, financing and ESCO services to increase the demand for ESCO services. This could be through energy efficiency programs, Demand Side Management (DSM) programs
- Support ESCOs with demonstration and ongoing projects so they can showcase their expertise and gain practical experience. This can be done through public and private sector demonstration programs
- Standardize contracts, or contract provisions, M&V protocols and develop dispute resolution mechanisms to improve client and financial institution understanding of ESCOs and reduce concerns about their reliability

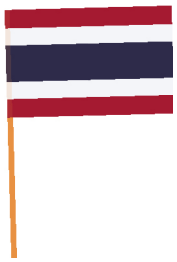
Technical

Build energy efficiency capacity and human resources [1]

- Provide capacity building, networking and information sharing opportunities to ESCOs through training programs, workshops, and manuals, regarding potential funding
  opportunities, appropriate corporate structures, contracting approaches, and new technology applications
- Build human resources to enable ESCOs access building/energy managers and O&M staff with a strong understanding of energy efficiency, auditing and M&V. This can be through energy efficiency programs, creating courses for energy efficiency with certifications, encouraging ESCOs to play an active role in training clients in O&M
- Develop pre-qualification and accreditation organizations and processes for ESCOs to improve client and financial institution trust regarding the reliability of ESCOs

Case studies | **In some developing countries, gov't has taken various measures to catalyze the development of ESCOs**

Source: 1 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link]



Energy Conservation Promotion Fund in Thailand

- The Government of Thailand established the Energy Conservation Promotion Fund in 1992 to foster investment in energy efficiency and renewable energy
- The fund's monies come from a tax on all petroleum sold in the country (US$ 0.001 per litre). The annual funding increased from US$40M in 1992 to US$200M in 2012
- **Successes from the fund include:**
  - The Energy Efficiency Revolving Fund (EERF initially provided credit lines at 0% interest to participating local banks to finance energy efficiency projects at no more than 4%
  - In 2008, an ESCO Fund was created to offer a range of financing and technical assistance to ESCOs.
- From 2003 to 2012, the EERF funded 294 projects resulting in a total of 13.4 PJ of energy savings per year, which represents an annual cost savings of $153M

> The Government of Thailand established the Energy Conservation Promotion Fund in 1992 to foster investment in energy efficiency and renewable energy

Energy Efficiency Program in Tunisia

- In the early 2000's, energy audits were already mandatory for large energy users but were not translating into actual investments
- The Gov't of Tunisia (GoT) and the World Bank designed a GEF-financed program to catalyse energy efficiency investment activities through:
  - providing output-based subsidies;
  - guaranteeing energy efficiency investments to ensure their bankability; and
  - providing technical assistance to improve the understanding of companies, financial institutions, and government agencies, on energy efficiency investments.
- The project supported 116 investment projects by 2012 and led to the creation of another World Bank project that provided dedicated lines of credit to finance industrial energy efficiency and cogeneration projects

In Uganda, the government is actively seeking to set up a super ESCO to enable energy efficiency & accelerate ESCO growth

Source: 1. OCA Consultations ; 2 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]

Super ESCOs are large scale ESCOs established and capitalized by the government to take on larger projects and access competitive terms from financing institutions

KEY

1. Debt/Equity investments or Purchase of energy efficiency solutions
2. Energy efficiency solutions
3. Equity/Debt investment
4. Returns / Repayments
5. Start up Equity and Policy support
6. Returns & dev't impact

GoU through MEMD, is looking to set up a super ESCO to:

- **Function as a dev't pillar for private ESCOs:** provide technical training, share best practices, and establish contracting standards or templates
- **Create a pipeline for large scale projects:** leverage the public sector to conceptualize projects for energy efficiency
- **Create a regulatory environment for ESCOs:** provide guidelines & standards on how ESCOs should be run in UG as the Energy Conservation & Efficiency bill is yet to be signed
- **Finance potential large scale projects:** tap into public funds to provide start up capital for energy efficiency projects

03 Setting up ESCOs in UG

ESCOs seeking to set up operations in UG typically need to go through 5 key stages to formally establish as a business

Sources: Uganda Registration Services Bureau website [Link]

	Incorporate company	Register for a TIN	Attain Investment license	Get secondary license	Prepare draft customer contracts
	• Register your company with the **Uganda Registration Services Bureau (URSB)** to acquire a Certificate of Incorporation • Companies can be registered as local, public and foreign physically as UIA's Investor One Stop Centre (OSC)	• Register for a Tax Identification number (TIN) with the Uganda Revenue Authority • TIN applications can be processed physically at any URA Office as well as the Investor One Stop Centre or online at the **URA website**	• Acquire an investment license (foreign investors only) from the **Uganda Investment Authority (UIA)** • An investment license is mandatory for foreign investors • One should visit UIA's One Stop Centre to apply for the investment license	• Companies operating in some sectors such as energy, health and education may require additional secondary licenses • Companies in the energy sector might require a generation license, distribution license, or an environment license if necessary	• Draft a customer contract to facilitate customer discussions / negotiations to implement energy efficiency projects • These draft contracts will have different terms depending on the ESCO model to be used
Time	1 – 3 days	2 - 5 days	2 - 5 days	N/A	N/A
Costs	UGX 2.087M	Free of charge	Free of charge	N/A	Free of charge

In Uganda, policy mandates that all businesses operating in the market must be legally registered and obtain licenses

*"Uganda citizens are not required to acquire investment license
Sources: "The Investment Process", 2022 [Link] ; 2 "Business Registration Forms". URSB, 2022 [Link]*

To register a company with URSB, one needs to **reserve the name** to be used - this could typically take 2 days and costs UGX 23K. After reserving a name, one then submits different documents depending on the type of company they are looking to set up to incorporate the company. This could typically take 1 – 3 days. Below are the different associated documents and costs for the different types of companies

Type of company	Incorporation documents	Cost
Local limited Company by Shares	• **Company Registration From** • **Memorandum and Articles of Association (MEMARTS)** • **Statement of Nominal Capital** • **Notification of appointment of Director & Secretary of Company**	• Registration fees of nominal capital of UGX 1M to 5M costs UGX 5K • Registration fees of nominal capital exceeding UGX 5M 1% of Share Capital and stamp Duty costs 0.5% of share capital
Local Company Limited by Guarantee	• **Company Registration Form** • MEMARTS for company Ltd by Guarantee **with share capital or with out share capital**	• Registration fees of a company limited by UGX 80K guarantee and UGX 35K stamp duty
Foreign company	• Certified copies of MEMARTS/Charter/ Constitution and Certificate from the country of origin duly witnessed • Registration forms including; **Particulars of Directors and Secretary, Statement of all subsisting charges, List of Names and Address of Persons Resident in UG authorized to accept service on behalf of the company, Address and Principal Office of Company**	• Registration of certified copy of memorandum or equivalent – US $250 • Any other document (forms) – US $55 • Certification per copy – US $10

> To register a company with URSB, one needs to reserve the name to be used - this could typically take 2 days and costs UGX 23K

Given the ESCO model to be set up, additional considerations should be made during the registration process

	Business registration	Secondary licenses	Customer contract terms
Lease to own	• Considered as a lending institution • Should be registered as a "company limited by shares" • Share capital should be **UGX 50M** and above	• ESCO should research and obtain all the necessary licenses required to implement an energy efficiency project (e.g., generation license)	• Down payment • Lease term • Fixed lease payments • Performance guarantee • Performance bonus/ penalty
Direct purchase	• Should be registered as a "company limited by shares" • Share capital should be **UGX 1M** and above	• Depending on the project's dynamics, ESCO may need to guide its client on the necessary licenses required to implement the project	• Down payment • Purchase price • Performance guarantee
Tripartite Agreement	• Should be registered as a "company limited by shares" • Share capital should be **UGX 1M** and above	• ESCO should research and obtain all the necessary licenses required to implement an energy efficiency project (e.g., generation license)	• Lease term • Rent (UGX/kWh) • Performance guarantee • Performance bonus/ penalty • Conditions to lessor/ lessee's obligations

As all other companies, ESCOs would need to pay Corporation Tax, Value Added Tax and Withholding Tax

Notes: A company is tax resident in UG for a year of income if it is incorporated under UG law, the management and control of its affairs are exercised in UG or the majority of its operations are in UG. The information above is at August 2022, as the rates could change over the years
Source: 1. GOGLA, Uganda Solar Energy Association Handbook On Solar Taxation, 2022 [Link] ; 2 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]. 3.URA, Doing Business in Uganda : Taxation, URA, 2022 [Link]

Corporation tax[123]

- The Income Tax Act Cap 340 (ITA) requires all companies (including energy companies) to comply with corporation tax which is at 30%
- Tax residents of UG are taxed on worldwide income while non-tax residents are taxed on income derived from sources within Uganda
- Repatriation of profits by branches of non-residents is taxed at 15%
- Under the ITA, taxable income includes profits, gains, dividends, interest and non-monetary benefits, advantages or facilities obtained through gainful means etc.

Value Added Tax (VAT) [123]

- Under the Value Added Tax Act, VAT is a consumption tax that is charged at a rate of 18%
- VAT is charged on all taxable supply made by a taxable person, every import of goods other than an exempt import and the supply of imported services other than an exempt service, by any person
- Supplies are categorized into standard rated, or exempt/zero rated
- The threshold for VAT registration was increased in 2015 to annual turnover of UGX 150 million (~EUR 35,000)

Withholding tax[123]

- The Income Tax Act requires withholding tax (WHT) to be charged on income at source
- Payments of professional fees, consultancy fees/management fees attract WHT at the rate of 6% (residents) and 15% (non-residents)
- Goods/services supplied to the GoU or public institutions also attract WHT at the rate of 6% (residents) and 15% (non-residents services)
- Imports of goods into UG also attract WHT at the rate of 6% and this is paid by the importer unless exempted from WHT

Upon importing goods, ESCOs are required to pay import duty, infrastructure levy & follow pre-export verification of conformity

Source: 1 GOGLA, Uganda Solar Energy Association Handbook On Solar Taxation, 2022. [Link] ; 2 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]

Import duty is levied on goods imported into UG at specific or ad valorem rates

- East African Community Customs Management Act 2004 (EACCMA) and East African Community Common External Tariff (EAC CET) are the legal frameworks for customs operations within the East African Community (EAC)
- Imports into UG from outside the EAC are valued for tax purposes & typical rates are **25% import duty for finished goods, 18% VAT, 6% withholding tax (0% for plant and machinery),** and a varying environmental levy that is charged on second hand imports
- Additionally, an **infrastructure levy of 1.5% of the imports customs value** is also imposed on all goods from outside the EAC except those exempted under the law
- The levy is intended to mobilize funds for regional infrastructure projects that will assist in improving the infrastructure (e.g. railway development) and reduce the cost of transport in the region

Uganda also has pre-export verification of conformity (PVoC) requirements

- PVoC is an inspection and verification programme on goods conducted by appointed inspection agents in the export country to protect UG consumers against unsafe & substandard products
- The GoU implemented the PVoC guidelines through the **Uganda National Bureau of Standards (UNBS)** which is responsible for the adoption and application of standards for both imported & domestic products in UG
- Electrical products are subject to the PVoC including all solar equipment and any others producing or operated by electricity
- Hence, importers should ensure that consignments have a Certificate of Conformity (CoC) from the authorized PVoC Agent
- In Uganda, authorised PVoC service producers include **Intertek International** and **SGS Uganda Limited**

The owner of a renewable energy facility should obtain energy licenses and related approvals from ERA, MEMD, or UETCL

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]

Currently, there is no particular regulatory framework for energy efficiency services such as installing a renewable energy source (captive power). However, ESCOs or agribusinesses seeking to set up these facilities must still adhere to the Electricity Act, in turn, the existing electricity licensing regulations where applicable. These apply to different sizes and types of captive plants as follows:

Connection	Below 0.5MW	0.5MW-2MW	2MW-10MW
Off-grid	No requirement for license. However, the project should still obtain a licence exemption	Doesn't require a license if it is intended for rural electrification (i.e., mini-grids), which should usually be at least 1 km from the main grid; otherwise requires a generation license with annual fees of USD 3,500	Requires a generation license with annual fees of USD 12,000
Grid connected	Requires a generation license and distribution license with annual fees of USD 2,500 and 1,500, respectively	Requires a generation license and distribution license with annual fees of USD 6,000 and 3,500, respectively	Requires a generation license and distribution license with annual fees of USD 12,000 each

The facility owner is responsible for applying for these licenses; and depends on the type of ESCO model that has been adopted

- For both the Lease to Own and tripartite agreement models, the owner of the facility is the ESCO up to the point when the client fulfils the terms of agreement to acquire ownership. Therefore, the ESCO should apply for the required licenses
- However, under the direct purchase model, the client (e.g., an agri-processor) owns the facility from the onset and should apply for any relevant licenses with support from the ESCO that might be more acquainted with the energy space

Additionally, renewable energy facilities should adhere to environment, public health and water resource regulations

Sources: 1 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]

The National Environment Management Authority (NEMA) requires ESCOs or agribusinesses seeking to set up renewable energy facilities to adhere to the Environmental Impact Assessment Regulation of 1998

The Environment Impact Assessment Regulation requires energy efficiency projects involving set up of a renewable energy generation facility to undergo an Environment Impact Assessment (EIA) process depending on the project characteristics:

- Any greenfield project (e.g. new industrial facility) with a renewable energy generation facility will need to undergo the full EIA process. As well, any large project situated externally to existing premises (e.g. a ground-mounted PV array) or one with noise or effluent impacts (e.g. a biomass combustion plant) is highly likely to be subject to an EIA
- On the other hand, a renewable energy generation plant that is fully contained within an existing industry facility may not be required to perform an EIA
- However, all projects, even those that are likely to be exempt, must submit a Project Brief to NEMA which uses it to decide whether or not a full EIA is needed. If it is not required, the NEMA issues a certificate of approval

Any greenfield project with a renewable energy generation facility will need to undergo the full EIA process.

Apart from the EIA requirements under the National Environment Act, other regulations that may be relevant for energy efficiency projects, especially those involving renewable energy generation facilities, include:

Depending on the size and location of the generation plant, the Public Health (Building) Rules may apply. These require that the developer gives notice and plans are approved by the local authority before construction of or alteration to a building begins

The Directorate of Water Resource Management (DWRM) of the Ministry of Water and Environment may need to be involved under the Water Act of 1997 and Water Resources Regulations of 1998 in case of impact on surface water or water abstraction

Large agri-processors must adhere to current standards; UNBS' MEPS standards are set to increase demand for ESCO services

Source: 1. GET. Invest, Uganda Energy Sector, 2022 [Link] ; 2 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link]

The Uganda National Bureau of Standards (UNBS) is a statutory body under the Ministry of Trade, Industry and Co-operatives established by the UNBS Act in 1989. The UNBS focuses on formulating and promoting national quality standards. It also implements quality control and quality assurance systems for the purpose of consumer protection, public health and safety, industrial and commercial development, and international trade.

UNBS has a set of standards for the energy sector specifically for renewable energy, electric power distribution

- One of the key standards include the Quality of Service Standards in the Electricity Supply Industry which was amended to: [(1)] ensure an improvement in the quality of service standards provided by distribution licensees, and (2) provide for the rights of consumers and obligations of licensees in respect of quality of service among others
- Therefore, these standards require large agri-processors to contribute to the overall improvement of the quality of electricity by using energy efficient technologies such as power banks which can be supplied by ESCOs

UNBS' minimum energy performance standards (MEPS) are set to spur the development of ESCO's in UG

- MEMD and the UNBS issued five MEPS in 2012 for lighting, refrigerators, freezers, motors, and air conditioners. However, the regulation to enforce these standards is included in the draft Energy Efficiency and Conservation Bill that has not been enacted – so they have not been implemented
- Once the MEPS are implemented, the demand for energy efficient equipment is expected to increase; as many large and medium industries in UG currently use old and inefficient equipment – hence ESCOs can identify these opportunities to supply and install energy efficient equipment

Various tax exemptions and incentives are in place to catalyze the development of ESCOs in UG

Source: 1 GOGLA, East Africa Regional Taxation Handbook V2, 2022 [Link] ; 2 GET.Invest, Captive Power: Uganda Developer Guide, 2018 [Link]

Income tax allowances

- An investor who places plant and machinery into service for the first time outside a radius of 50 km from Kampala during a year of income is allowed a deduction for that year for an amount equal to 50% of its cost
- Plant, equipment and machinery used in some industries can also benefit from an accelerated depreciation rate of 20-40%.
- This tax allowance favours and promotes ESCO's providing energy efficient plant and machinery especially to agribusinesses located outside of Kampala

Value Added Tax (VAT) exemptions

- Light emitting diodes; photosensitive semiconductor devices (assembled in modules or made into panels); Solar water heaters, refrigerators, cookers; deep cycle batteries, etc. are VAT exempt in UG
- The supply of any goods and services to the contractors and sub-contractors of renewable energy projects are also VAT exempt even at importation in UG
- These VAT exemptions spur growth of ESCOs in UG as the cost of necessary energy equipment is reduced making it cheaper to provide the associated ESCO services

Custom Duty exemptions

- Specialised equipment for the development and generation of solar and wind energy, including accessories and deep cycle batteries which use and/or store solar power are exempt from customs duty at importation in UG
- Tax regulators are hesitant to offer exemptions to some stand-alone components such as batteries as they are not fully certain of the operators' intended use
- These exemptions reduce the cost that ESCOs' would incur to import equipment required to install alternative renewable energy sources

In addition to the existing regulations, future energy sector regulations and policies are likely to spur growth of ESCOs

Source: 1 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link]; 2. "THE ELECTRICITY (AMENDMENT) ACT, 2022 – CEPIL, 2022 [Link] ; 3. OCA Consultations

The key ongoing policy developments below will in future provide incentives for development of ESCO's in UG

Energy efficiency and conservation bill

- The draft Energy Efficiency and Conservation Bill provides the legal, institutional, and regulatory framework for elaborating and enforcing efficient energy use
- The draft bill will:
- Establish minimum energy performance standards for refrigerators, motors, lighting, and air conditioners
- Require large industries to conduct energy audits, and install management systems
- Hence increase demand for energy efficient services and technology especially from agri-processors

The electricity amendment bill

- The proposal to amend the Electricity Act of 1996 is intended to remove inconsistencies in the law, introduce flexibility in its implementation and to streamline operations of the electricity sector
- One of the key implications of the amendment is to prescribe the circumstances under which a holder of a generation licence may supply electricity to persons other than a bulk supplier
- Therefore, ESCO's or agribusinesses are incentivized to install alternative renewable energy sources as excess power generated could directly be sold to other consumers

Net metering code

- Through ERA, MEMD and REA, the GoU is planning develop a net metering code and the associated regulations based on a pilot to test this initiative
- Currently, there is no specific regulation guiding or governing net metering in UG
- A net metering code would enable ESCO's or agribusinesses seeking to set up renewable energy generation facilities to be credited for electricity they supply to the grid, and this credit is set off against electricity purchased from the utility

Uganda has several investor protections in place for investors seeking to set up ESCOs

Source: 1. GET.Invest, Uganda Energy Sector, 2022 [Link]

The Investment Code Act of 1991 provides procedures, incentives and protections for both local and foreign investors in UG

- The code defines a foreign investors as
  - » a person who is not a citizen of Uganda,
  - » a company in which more than 50% of the shares are held by non-Ugandans and
  - » a partnership in which the majority of partners are not citizens of Uganda.
- The Investment Code also distinguishes between two types of investors:
  - » A larger scale investor, who must apply for an investment license, contribute to the development of Uganda and invest at least USD 500,000 (EUR 430,000) (if a foreign investor) or USD 50,000 (EUR 43,000) (if a local investor) and who in doing so qualifies for investment incentives, such as concessional rates of import duty
  - » A smaller foreign investor who engages "only in trade", does not need to apply for an investment license and must deposit USD 100,000 (EUR 86,000) at the Bank of Uganda, which shall be used for the importation and purchase of goods by the business.
- Foreign investors of both types receive protection in case of compulsory acquisition, with any compensation for such freely transferable out of Uganda
- Under the investment code, there are no foreign exchange controls affecting trade in Uganda. Businesses can bring in capital and repatriate profits without restriction

Investors seeking to invest in energy efficiency projects in UG can leverage the Uganda Investment Authority (UIA) for more information and access to a One Stop Centre (OSC) for business registration, licensing, facilitation and aftercare

To penetrate the UG market, ESCOs could partner with energy audit, financing, equipment supplying or installation companies

Source: 1 USAID, Energy Efficiency Roadmap For Uganda, 2017 [Link]

New entrants into the ESCO market could form partnerships to make use of local skills, knowledge and networks. These could provide opportunities to overcome obstacles or offer more services to clients such as operational and maintenance support. Depending on the ESCO's limitations, it could partner with any of the following actors in UG's energy space

Energy auditors

- Companies that have the expertise and authorization to conduct energy audits on companies in UG
- Can provide insights into company or sector energy costs, load profiles, and interest in energy savings

Financiers

- Financial institutions with prior experience/interest in financing energy efficiency projects in UG'
- In addition to financing, can support ESCO's understand the financial risk of an energy efficiency project

Equipment suppliers

- Suppliers of equipment required to execute an energy efficiency project
- Equipment could include power banks, deep cycle batteries, inverters, cold rooms, compressors, etc.

Installation companies

- Companies that can provide the labour, and expertise to implement an energy efficiency project
- Can also guide the ESCO on the regulatory requirements to execute an energy efficiency project

There are a number of companies in UG providing different services that could be suitable for a potential ESCO partnership

Sources: 1 OCA Consultations

In addition to the energy companies highlighted in chapter 2, below are examples of potential companies to partner with:

Partner	Company	Description
Energy auditors	Energy Monitoring Ltd.	Uganda energy efficiency company that conducts energy audits and supplies energy monitoring equipment for industries such as Coca-Cola in Uganda
	AOT Consulting Ltd.	Ugandan consultancy firm that mainly conducts energy audits across various sectors including; industry, transport and commercial sectors in UG.
Financiers	Equity Bank	Equity bank is a commercial bank in UG that offers a clean energy financing product, the equi-green loan, with support from the UG Energy Credit Capitalization Company
Equipment suppliers	International Energy Technik Ltd	East African based electrical engineering company that sells and installs electrical equipment such as stabilizers and power correction systems
	Davis & Shirtliff	Regional distributor, installer and after sales services provider of water solutions and solar products such as batteries, SHS and refrigerators
	ABB	International company that manufactures, sells, and installs engineering and electrical equipment such as stabilizers, power correction systems, and transformers
Installation companies	Master Power Systems Limited	Engineering and contracting company specialized in designing and executing electrical works mainly in the commercial space in Kenya and Uganda
	Patronics Services Ltd	Engineering and contracting company that designs and executes electrical engineering services in Uganda, Kenya, and Rwanda

04 Financing ESCOs in UG

ESCOs have varying business models resulting in financing arrangements led either by the customer or the ESCO

Sources: 1 OCA consultations ; 2 IEA, ESCO contracts [Link]; 3 Exploring Viable Energy Efficiency Business Models In Indonesia 2022 [Link] 4 Energy Service Companies (Escos) In Developing Countries [Link]

Recall: Currently energy service companies in Uganda are yet to adopt EPC models. The remuneration of most energy service companies in UG isn't based on the energy savings for the client. These companies don't want to bare the financial risk associated with the conventional EPC ESCO model[1]

EPC-ESCO models[2]

ESCO-led financing
Shared savings model: The ESCO provides financing, as well as project development and implementation costs, with the energy savings shared between the ESCO and the client over the contract period. ESCO is assuming both the technical and the credit risk of the client

Customer-led financing
Guaranteed savings model: Shared savings model: The ESCO guarantees a certain savings on the client's energy bill. The ESCO takes on the technical risk. The client obtains financing either through bank loan, or uses their own equity, to pay contractually determined fees to the ESCO and the bank, and keeps the difference

Non-EPC ESCO models[3,4]

ESCO-led financing
tripartite Agreement: The energy company designs, installs, operates and maintains a captive power plant on either the client's premises or nearby premises. The energy company arranges the financing and receives monthly installments from the client based on the energy consumed over a long-term contract

Lease to own: Like the tripartite agreement, the energy company arranges financing, designs, installs, operates, and maintains an energy efficiency facility. However, this is done under a lease agreement in which the client pays off the facility value through fixed monthly payments

Customer-led financing
Direct Purchase: The owner pays for the energy efficiency service upfront. As result, if external financing is required it is the customer that seeks the financing

> Currently energy service companies in Uganda are yet to adopt EPC models.

All ESCO types, irrespective of business model, require similar financing across the three stages of the project life cycle

Sources: 1 European Commission, Financing Energy Efficiency, 2010 [Link] 2 USAID, Sources of Capital for mini-grid projects [Link] 3 OCA consultations

Energy efficiency projects need financing along the entire project lifecycle continuum from technology/venture/project development to construction and commercial operation of projects with the financial liability belonging to either the ESCO or energy user depending on the model adopted[1].

Technology/venture development[2,3]	Construction[2,3]	Commercial operation[2,3]
• **Stage description:** Involves conducting prefeasibility and feasibility studies, analysis of the projects including assessing the commercial and technical viability, and conducting energy audits • **Financing needs**: Largely operational with expenses going towards assessing viability. Project risk is highest at this stage and financing mostly comes from ESCOs' own funds or development partner programs in the form of grants or technical assistance	• **Stage description:** Involves the construction and commissioning of the project • **Financing needs:** Majority of the capital for the project is needed at this stage with high CAPEX requirement to purchase equipment, and materials. Some operating expenditure (OPEX) is also required to pay qualified staff. The project risk is fairly low although cost overruns are common at this stage. Most of the capital at this stage is from external sources	• **Stage description:** Involves the operation and maintenance of the project • **Financing needs**: Capital requirement at this stage is mostly OPEX for operations and maintenance to ensure the project is running smoothly to meet the ESCO's performance obligations. Project risk is lowest at this point in the project and capital expected to be leveraged at this stage is mostly from the private sector in the form of debt

Financing needs are highest at the construction stage while risk reduces along the project life cycle for ESCOs

Financing can be arranged either at project or corporate level utilizing debt, equity, grants or mezzanine instruments

Sources: 1 European Commission, Financing Energy Efficiency, 2010 [Link] 2 OCA consultations 3 CFI, A Primer on Corporate Finance, 2022 [Link] 4 USAID, Types of financing for RE projects [Link]

ESCOs are typically financed through traditional instruments such as debt, equity, grants and mezzanine finance which is a combination of debt and equity.[1] The financing can either be structured at a project or corporate level[2]

Project finance – Financing made to specific projects to reduce risk. Only project assets are at risk in the event of default[2,3]

Corporate Finance – Financing made directly to the business entity. Considers assets of the borrower in the event of default[2,3]

Instrument	Description of instrument[1,2,4]
Debt	**Finances borrowed to be repaid over time with interest.** Commercial banks, international donors and private investment firms utilize this financing instrument
Equity	**Funds given in return for partial ownership of the company.** Sources of equity include impact investors, angel investors, venture capital, investment firms and multilateral or bilateral clean energy funds
Grants	**Funding awarded that does not need to be repaid.** Common sources of grants are government agencies, international donors, private foundations and non-profit development organizations
Mezzanine finance	**Funds provided as a loan that the lender can convert to equity if the borrower does not repay.** Mezzanine finance is a hybrid of debt and equity financing

The most common traditional financing instruments are debt, equity and grants. This section of the report delves further into these instruments

Debt is the most widely used and available financing structure for EPC- & Non-EPC ESCOs – local banks are one of the key providers

Sources: : 1 European Commission, Financing Energy Efficiency, 2010 [Link]; 2 European Commission, ESCO Financing Options [Link]; 3 OCA consultations 4. Capital One Types of Debt [link]

Structure and example providers

Structure[1,2,4]

- **Debt can be structured either as a secured, unsecured, revolving (line of credit) or installment**
  - » Secured debt requires collateral as security while unsecured debt does not require any collateral
  - » A borrower can repeatedly draw down on a revolving debt facility, while for an installment debt facility the borrower can only access the facility once

Example providers[3,4]

Advantages and risks of debt financing[1,3]

Debt has several advantages for ESCOs looking to raise financing

- Relatively simple and accessible with minimal contract complexity (unsecured loans are typically quicker and easier to access than secured loans)
- Securitization options are available which may reduce the cost of the loan or allow access to a larger loan value
- Debt may also be available through an equipment supplier

The risks of debt for ESCOs include the following:

- ESCOs need to be credit worthy in order to access financing potentially locking out several local businesses
- ESCOs take on equipment performance risk

Debt is the most common type of financing for ESCOs, with products varying depending on the structure of the ESCO

Given nature of repayment terms, equity is typically used by large ESCOs looking to support growth or develop projects quickly

Sources: : 1 European Commission, Financing Energy Efficiency, 2010 [Link] 2 European Commission, ESCO Financing Options [Link] 3 OCA consultations

Structure and example providers

Structure[1,2]

- **ESCOs implementing guaranteed and shared savings models structure equity as follows:**
  - Common shares: In the event of liquidation shareholders have rights to a company's assets only after bondholders, preferred shareholders, and other debtholders are paid in full
  - Preferred shares: Shareholders have priority over common shareholders when it comes to dividends, which generally yield more than common stock

Example providers[3,4]

EDFI ElectriFI

responsAbility

ACUMEN dwb equity

Advantages and risks of using equity financing[1,3]

Equity financing has several advantages for ESCOs looking to raise capital

- There is no loan to repayment. The business doesn't have to make a monthly loan payment which can be particularly important if the business doesn't initially generate a profit
- Partnerships with equity financiers can be leveraged to bring expertise into the ESCO. Some partners might also bring a network that the ESCO can leverage

The risks of equity for ESCOs include the following:

- There is a risk of losing control of ownership especially if investors have a majority stake
- There is a risk of potential conflict especially around the strategic direction to be pursued by the various investors and the ownership of the ESCO

Equity is leveraged by large ESCOs looking to support growth and those seeking to develop projects faster

Grant providing development partners and foundations are supporting ESCOs to test feasibility of their business models

Sources: : 1 European Commission, Financing Energy Efficiency, 2010 [Link] 2 European Commission, ESCO Financing Options [Link] 3 OCA consultations

Structure and example providers

- **Grant financing for EPC ESCOs structured as:**
  - » Venture development grants to cover the cost of initial project development
  - » Investment subsidies to increase the financial rate of return on investment for ESCOs and improve cashflows
- Other forms of grant financing for models such as lease-to-own, direct purchases and tripartite arrangements are structured as equipment grants, energy audit grants or RBF grants

Example providers[3,4]

ENACCESS giz dena German Energy Agency

Advantages and risks of grant financing[1,3]

Grants have several advantages for ESCOs looking to raise financing

- Reduces capital expenditure required and provide cash flows to the ESCO
- Do not need to be paid back therefore reducing cash outflows for the business

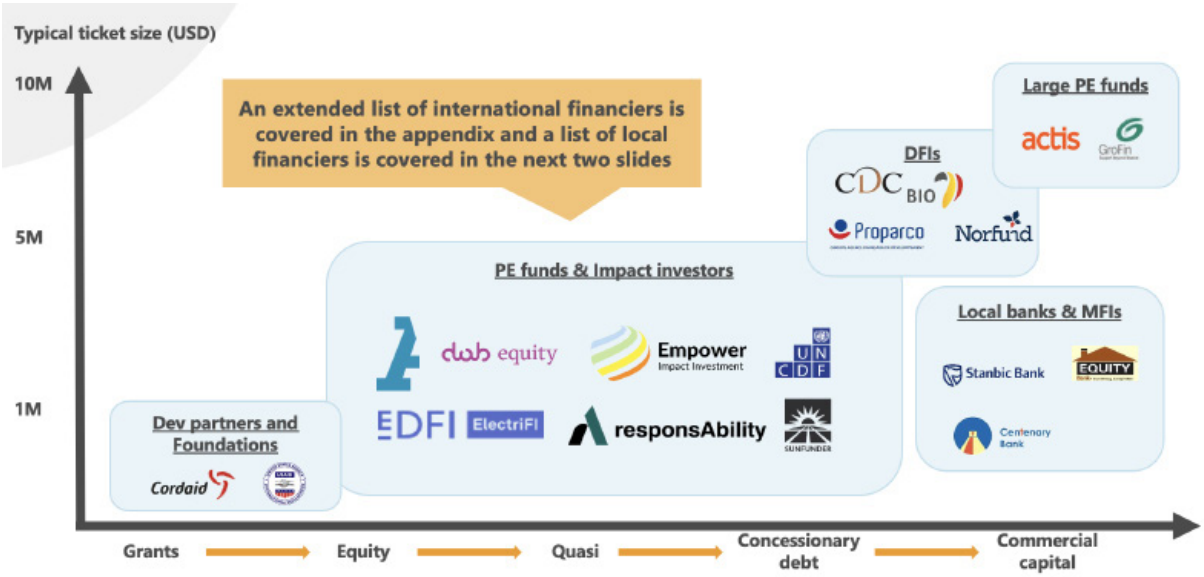
The risks of grants to ESCOs include the following:

- Grant may need to be combined with another financing mechanism as some have a requirement for co-investment
- Grant programs can have specific eligibility criteria for both business and project potentially locking out ESCOs that need the capital

Grant funding is gaining traction with most of it being leveraged to support feasibility for ESCOs

ESCOs in Uganda can seek capital from a range of local and international investors with different financing instruments

Sources: GIZ, Scale Up! Entrepreneur's Guide to Investment in Uganda, 2021 [Link]; 2 UOMA, Annual Market Map, 2018 [Link]; 3 OCA consultations



Locally, ESCOs can seek financing from commercial banks, MFIs, PE funds and DFIs

Sources: 1 GIZ, Scale Up! Entrepreneur's Guide to Investment in Uganda, 2021 [Link]; 2 UOMA, Annual Market Map, 2018 [Link]; 3 OCA consultations

No.	Investor	Geographical region	Financial instruments	Average investment size
1	ABSA Bank Uganda	Uganda	Debt	Amounts not provided
2	Acumen	Uganda, Kenya & Tanzania	Equity, Debt, Mezzanine	Up to USD 3M
3	Ascent	Uganda, Kenya & Ethopia	Equity	USD 2M - USD 15M
4	Centenary Bank	Uganda	Debt	Amounts not provided
5	dob equity	Uganda, Kenya, Tanzania & Rwanda	Equity	EUR 250K to EUR 2M
6	EFC	Uganda	Debt	Minimum loan amount starting from USD 300
7	Equity Bank Uganda	Uganda	Debt	Amounts not provided
8	FSD Africa Investment	Uganda & sub-Saharan Africa	Equity	Amounts not provided
9	GreenTec Capital Partners	Sub-Saharan Africa	Debt, Equity	Up to USD 1M
10	GroFin	Sub-Saharan Africa	Debt, Equity	USD 100K -USD 1.5M
11	HCH Financial Services Limited	Uganda	Debt	USD 28K - USD 1.4M
12	Nordic Impact Funds	Uganda, Kenya, Tanzania & Ethiopia	Debt, Equity	Up to USD 500K
13	Post Bank	Uganda	Debt	Amounts not provided
14	Resolute Ventures	Global	Equity	Up to USD 500K
15	SHONA	Uganda	Debt, Equity	USD 10K - USD 100K
16	Stanbic Bank	Uganda	Debt	Amounts not provided
17	Sunfunder	Uganda & Kenya	Debt	USD 250K - USD 5M
18	The 97Fund	Uganda	Equity, Debt, Mezzanine	USD 50K - USD 250K
19	UGAFODE Microfinance	Uganda	Debt	Amounts not provided
20	Uganda Development Bank	Uganda	Debt	Up to USD 10M
21	Uganda Green Finance Enterprise (UGEFA)	Uganda	Debt	Amounts not provided
22	XSML	Uganda, DRC Congo	Debt, Equity	USD 250K - USD 5M

Early implementors of energy efficiency projects have raised financing in form of debt, equity and grants

Sources: 1 Oikocredit Invests in SolarNow [Link]; 2 OCA consultations; 3 Sun-Connect, GoParity Crowlending SolarPipo, 2021[Link]; 4 UOMA, A2F Impact of Covid on Local SHS businesses, 2020 [Link];5 Signify Foundation electrifies 43 health centres; [Link] 6 GIZ EnDev, Last-Mile RBF, 2021

Instrument	Products	Example transactions
Debt	Commercial loans	• USD 2M loan from to SolarNow from consortium of SunFunder, Oikocredit and responsAbility in 2019[1]
	Leasing	• Equator solar in partnership with EnPower. Life installed a system at Aquarius Kigo[2]
	Concessional loans	• UNCDF made a loan of USD 500K to All in Trade through its Cleanstart program[2] • Crowdfunding platform GoParity has made several loans to Dairy cooperatives[3]
	Credit lines	• Banks such as Stanbic Bank, Centenary Bank and Equity Bank provide credit lines to renewable energy project developers[4]
Grant	Equipment grants	• Signify Foundation made equipment grants to SENDEA members including Village Energy and Anuel Energy[2,5]
	RBFs	• GIZ EnDev funded a last mile RBF for off-grid solar PV companies. Some of the beneficiaries were orgs implementing non-EPC ESCO models[6]
	Energy audit grants	• GIZ GBE is supporting the energy assessment of 50 enterprises in the ag value-chain[2] • GIZ GBE supported Equator Energy conduct an energy efficiency of tea factories in Western Uganda[2]
Equity	Straight equity	• All in Trade is currently in discussions with Sawa Energy and CAMCO for an equity capital raise of USD 1M[2]

As the market for ESCO's grow, there is potential to explore other alternative financing instruments

Sources: 1 OCA consultations; 2 UN Environment Program, Captive Solar Market: Insights from Uganda, 2022 [Link]

A few other instruments being utilized in other countries that are yet to be used in Uganda include[1]:

Instrument	Instrument description [1,2,]
Government grants	A lot of ESCO funding is through grant funding by governments. Although ESCO and energy efficiency are becoming a priority to government, there has been no grant support
Bonds	Debt security, in which the authorized issuer owes the holders a debt and, depending on the terms of the bond. These could support capital raises for ESCOs
Carbon finance	Purchase of project-based greenhouse gas emission reductions usually done through a carbon fund on behalf of the contributor. This could help reduce the cost of projects
Vendor financing	ESCOs often have relationships with equipment manufacturers of captive power plants and energy efficiency equipment. Vendor financing helps ESCOs get equipment on credit with the expectation to pay after cashflows start flowing in
Pooled procurement	Procurement through entities joining forces in procuring energy efficient products or services

Risk sharing mechanisms such as credit guarantees are also being used by ESCOs in more developed markets

Scaling financing to ESCOs requires all stakeholders to consider new approaches in the short, medium, and long-term

Notes: 1. UNREEEA - Uganda National Renewable Energy and Energy Efficiency Alliance

	Short-term	Medium and long-term
ESCOs	• Strengthen internal capacity in key areas such as record keeping, internal controls to make ESCOs more investable. ESCOs can leverage partnerships with BDS providers who offer tailored support to make ESCOs investment ready • Companies running Non-EPC ESCO models could work within existing energy associations (such as UNREEEA[1]) to improve market awareness of ESCOs models and services. This could involve seeking financing from development partners to finance awareness campaigns	• Companies running Non-EPC ESCO models could work within existing energy associations (such as UNREEEA[1]) to boost lobbying efforts for favorable policies for ESCOs. For example, lobbying for creation of regulation for energy audits that will stimulate demand for ESCOs • Explore innovative financing structures that help increase participation from a range of financiers. For example, project financing through Special Purpose Vehicles (SPVs)
Banks and funders	• Banks should partner with clean energy funds dedicated to increase debt access for ESCOs to scale lending (e.g., DTB and SunRef already have a similar partnership). More partnerships can be pursued to increase intermediated lending • Banks and funders should explore working with TA providers to boost staff capacity to assess lending risk for ESCOs and build pipeline of bankable ESCO projects	• Banks should develop tailored lending products for energy efficiency projects (e.g., allowing energy performance guarantees as collateral for lending) • Banks and funders should seek out de-risking facilities with development partners to support lending to ESCOs and energy efficiency projects
Government	• Partner with development agencies to conduct studies to better understand the ESCO financing landscape including understanding key challenges, key drivers and share learnings with industry stakeholders • Implement tax credits and tax incentives for energy usera	• Identify opportunities for ESCO services across government ministries and bodies including mandating cities and municipal councils to develop energy efficiency action plans that will support • Develop grant program to subsidize initial costs of developing energy efficiency projects for ESCOs • Strengthen the enabling environment through passing laws and regulations that increase investor protections to catalyze capital inflows for energy efficiency projects
Development partners	• Designing guarantee programs and other de-risking facilities to support on-lending to ESCOs (e.g., the Energy Access Scale-up guarantee program by the World Bank targeting SHS companies could be replicated to serve ESCOs) • Funding technical assistance support to key actors to address key barriers. For example, TA to ESCOs to improve staff capacity to conduct feasibility studies and business plan preparation for possible project proponents	• Fund advocacy programs to support lobbying of favorable laws and legislation to create a market for ESCO services or improve operation of ESCOs. For example, developing regulations for energy management systems • Develop bundling strategies that can help overcome barriers such as high cost of equipment. Bundling programs have been implemented to reduce the cost of finance for mini-grid develop in Nigeria can be used for EE projects

Appendix

International financiers

Regional & int'l financing sources can also be leveraged by ESCOs looking to expand and enter UG; funding usually >1M

Sources: 1 GET.Invest, Funding Database [Link] ; 2 OCA consultations ; 3 GIZ, Scale Up! Entrepreneur's Guide to Investment in Uganda, 2021 [Link]

No.	Investor	Geographical region	Financial instruments	Average investment size
1	Actis LLP	Eastern Africa, Western Africa	Equity	More than EUR 10M
2	African Export-Import Bank (Afreximbank)	Sub-Saharan Africa	Guarantee	Varies
3	African Trade Insurance Agency (ATI)	Sub-Saharan Africa	Guarantee	Varies
4	AlphaMundi Group Ltd.	Eastern Africa, Western Africa, Southern Africa	Debt	EUR 500K - EUR 1M
5	ARCH Africa Renewable Power Limited	Sub-Saharan Africa	Equity	EUR 1M - EUR 3M
6	Ariya Capital Group	Eastern Africa	Debt	EUR 100K - 500K
7	Belgian Investment Company for Developing Countries (BIO)	Sub-Saharan Africa, Caribbean	Grant, Debt, Equity	EUR 100K - 10M
8	Berkeley Energy	Sub-Saharan Africa	Equity	Amount not disclosed
9	Business Partners International	Eastern Africa, Southern Africa	Debt, Equity	Up to EUR 100K
10	CDC Group	Sub-Saharan Africa	Debt,	Up to EUR 100K
11	Charm Impact	Sub-Saharan Africa	Debt	USD 28K - USD 1.4M
12	Climate Fund Managers	Sub-Saharan Africa	Debt, Equity	More than EUR 10M
13	Cordaid Foundation	Sub-Saharan Africa	Debt	EUR 100K - 500K
14	DEG	Global	Grant, Debt, Equity	EUR 100K - 10M
15	E3 Capital	Sub-Saharan Africa	Equity	EUR 500K - EUR 1M
16	ecoligo.investments/ ecoligo invest GmbH	Global	Debt	EUR 100K - EUR 500K
17	EDFI Management Company	Global	Debt, Equity, Guarantee	EUR 1M - EUR 3M
18	Empower New Energy	Sub-Saharan Africa	Equity	EUR 3M - EUR 10M
19	EnAccess	Global	Grant	Up to EUR 100K

20	Energise Africa	Sub-Saharan Africa	Debt	EUR 3M - EUR 10M
21	Finnfund	Global	Debt, Equity	EUR 3M - EUR 10M
22	FMO	Global	Debt, Equity	EUR 3M - EUR 10M
23	Frankfurt School of Finance & Management, United Nations Environment Programme (UNEP)	Sub-Saharan Africa	Grant	EUR 100K - EUR 3M
24	Frontier Investment Management (FIM)	Eastern Africa	Debt	More than EUR 10M
25	Gaia Impact Fund	Sub-Saharan Africa	Equity	EUR 500K - EUR 1M
26	InfraCo Africa Ltd	Sub-Saharan Africa	Equity	EUR 1M - EUR 3M
27	Inspired Evolution Investment Management	Sub-Saharan Africa	Equity	EUR 3M - EUR 10M
28	International Finance Corporation (IFC)	Global	Equity	EUR 1M - EUR 3M
29	Lendahand	Sub-Saharan Africa	Debt	EUR 1M - EUR 3M
30	Lion's Head Asset Management	Sub-Saharan Africa	Debt	EUR 3M - EUR 10M
31	Metier SC Private Equity International	Sub-Saharan Africa	Equity	More than EUR 10M
32	Multilateral Investment Guarantee Agency (MIGA)	Global	Guarantee	Varies
33	Nordic Development Fund (NDF)	Eastern Africa, Southern Africa	Grant, Equity	EUR 100 - EUR 3M
34	Oikocredit International	Eastern Africa, Southern Africa,Western Africa, Caribbean	Debt, Equity	EUR 1M - EUR 10M
35	Persistent Energy Capital	Sub-Saharan Africa	Equity	EUR 100K - EUR 500K
36	responsAbility Investments AG	Sub-Saharan Africa	Debt	EUR 3M - EUR 10
37	Proparco	Sub-Saharan Africa, Global	Debt, Equity, Guarantee	Varies

38	Sustainable Finance Risk Consulting GmbH (sfr-consulting)	Sub-Saharan Africa	Guarantee	Varies
39	Swedfund International AB	Sub-Saharan Africa	Debt	More than EUR 10M
40	Treehouse Investments LLC	Sub-Saharan Africa	Debt, Equity	EUR 100K - EUR 3M
41	Trine	Global	Debt	EUR 100 - EUR 500K
42	Triodos Investment Management	Global	Debt, Equity	More than EUR 10M
43	Triple Jump	Sub-Saharan Africa	Debt, Equity	EUR 3M - EUR 10M
44	PG Impact Investments	Global	Equity, Debt	USD 4M - USD 5M
45	Global Innovation Fund	Global	Equity, Debt, Grant, Mezzanine	USD 50K - USD 15 M
46	Germany Energy Cooperation (Dena)	Sub-Saharan Africa	Grant	Varies
47	GIZ GBE	Sub-Saharan Africa	Grant	Varies
48	UNCDF	Sub-Saharan Africa	Grant	Varies
49	USAID Power Africa	Sub-Saharan Africa	Grant	Varies

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