



WEBINAR CONCEPT NOTE

Uptake of Captive PV In Uganda

Challenges to opportunities

Wednesday, 8th September 2021 | 10:00
am - 11:30 am



Background

UNEP DTU Partnership in collaboration with Finding XY, conducted research on Climate Technologies with emphasis on Captive Solar under the project, Technology, Markets and Investment for Low Carbon and Climate Resilient Development (TEMARIN). The TEMARIN project is a three-year, DANIDA (Danish Development Agency) funded project covering the countries of Kenya and Uganda with the overall aim to support countries in accelerating the transfer, diffusion, and uptake of specific climate technologies.

The aim of this component is to explore the market potential and the challenges for further C&I uptake. The project has generated relevant market insights from C&I Solar companies understanding the sizes of systems installed, financing mechanisms, types of customers and engaged various stakeholders including policymakers, associations financial institutions identifying critical bottlenecks and opportunities in the sector.. The project has generated a report to inform C&I consumers on who are the relevant actors, market drivers, financing models, regulatory challenges, and user experiences.

Purpose of the Webinar

The aim of this webinar is to turn challenges into opportunities. The event speakers will present findings from our recent market study in Uganda and facilitate a discussion of how to address challenges and capitalize on opportunities in the Ugandan captive market segment. Discussions will also bring into play insights and lessons learnt from the C&I sector in Kenya and prepare to develop partnerships necessary for the growth of the sector

Objectives

The webinar sought to:



Share the experience and lessons from different stakeholders in the captive solar industry in the country as well as experiences from stakeholders in the Kenyan market.



Discuss Finance and Regulation challenges, solutions and forward action measures.



Explore opportunities to be derived from the challenges.

Expected outcome of the Webinar



How to prototype solutions to policy, technical skills and financing challenges identified and create partnership approaches.



Concretizing these solutions through a follow on co-creation workshop to stimulate further market demand with agro enterprises, financiers, or with industry for C&I

Target Group

The virtual event targets all stakeholders interested and involved in the Uptake of Captive PV in Uganda.



All Solar companies



SMEs like Manufacturers, Agribusinesses, and Hospitality.



Policy makers and government representatives



Investors



Financial Institutions



Development partners



BDS service Providers



National and International support programs

Agenda

- | | |
|------------------------|--|
| 10:00 am -
10:10 am | <ul style="list-style-type: none">• Introductions to the Technology Markets and Investment For Low Carbon and Climate Resilient Development project (TEMARIN)• UNEP DTU Partnership (Mathilde Brix Pedersen) & Finding XY (Eddie Sembatya) |
| 10:10 am -
10:30 am | <ul style="list-style-type: none">• Introduce findings from the study• Presentation by Julius Magala |
| 10:30 am -
11:10 am | <ul style="list-style-type: none">• Panel Discussion - Finance and Regulation of Captive for C&I in Uganda - Moderator Joel Essien a) Challenges b) Opportunities |
| 11:10 am -
11:20 am | <ul style="list-style-type: none">• Poll Q&A or Mentimeter on; a) Regulation b) Finance c) Skilling• Invite Feedback and insights from participants on highlights and findings |
| 11:20 am -
11:30 am | <ul style="list-style-type: none">• Introduce co-creation workshop• Closing Remarks - UNEP DTU Partnership |



Mr. Eddie Sembatya
Managing Director Finding XY

Mr. Eddie Sembatya has over 14 years of professional experience in the field of Impact Investment, Economic Development, and Business Development working with MSMEs, Investors, and Development Agencies. Before Finding XY, Eddie held several corporate positions and was an entrepreneur himself running businesses in agriculture, real estate, financial services and distribution, real estate, financial services, and distribution.



Dr. Mathilde Brix Pedersen
UNEP DTU Partnership

Mathilde is a researcher and consultant with 10+ years of experience in research and project work in the areas of climate mitigation, clean energy transition, and market-led diffusion and uptake of climate technologies, particularly in Sub-Saharan Africa. She is currently leading Danida-funded work to support technology diffusion and market strengthening for climate technologies in Kenya and Uganda.



Mr. Julius Magala
Energy Access Coordinator
UNCDF

Mr. Julius Magala is a renewable energy market development professional with over 12 years of experience in delivering energy access in underserved markets. His areas of expertise include energy access, productive use of energy, energy financing, business development, consumer awareness campaigns, and policy advocacy.



Mr. Joel Essien
Renewable Energy Project
Governance Expert

Mr. Joel Essien is a senior clean energy specialist in the transition to universal energy access by 2030, captive solar, energy innovations, low-carbon electrification, and gender roles in the clean energy space.



ENG. Ziria Tibalwa Waako,
CEO Electricity Regulatory
Authority (ERA) ,

ENG. Ziria Tibalwa Waako possesses over 30 years of work experience and vast knowledge of Uganda's Electricity sub-Sector, 15 of which have been at the Senior Management Level. Eng. Waako is a Registered Engineer with the Uganda Institute of Professional Engineers and the National Engineers Registration Board; as well as a Member of the Institute of Electrical and Electronics Engineers (IEEE) of New York, United States of America.

Mr. Kiyingi George William,
Grants and Strategic
Partnerships Manager, Post
Bank Uganda

Mr. Kiyingi George William has 10 years of banking experience. George has worked with Barclays bank (now ABSA), Diamond trust bank, KCB BANK, MTN Uganda, and now Postbank Uganda Limited. George is in charge of the Bank's Grants and strategic partnerships. George has been with the bank since 2016.



Mr. Lubowa Muhammed,
Managing Director All in Trade

Mr. Lubowa Muhammed is experienced in business development management and spearheading organizational growth in a dynamic and progressive manner. He is an Affiliate Member- European Energy Centre and an award winner for the First-Ever Green Climate Fund (GCF) 2019 competition.



Joseph Nkandu, Founder
National Union of Coffee
Agribusinesses & Farm
Enterprises (NUCAFE)

Mr. Joseph Nkandu is a practicing and professional social entrepreneur that has spearheaded empowerment of over 1.5 million Uganda smallholder coffee farmers in the profitable nodes of the coffee value chain increasing their household income by 250%. He is a compassionate leader who has created over 200 coffee farmers' enterprises as associations and cooperatives that are business and impact-oriented.

*Represented by Mr. David Muwonge,
Finance Administration & Compliance
Manager NUCAFE*

The **TEMARIN** Project

UNEP DTU Partnership is a UN Environment Programme and Technical University Denmark Collaborating Centre and a leading international research and advisory institution on energy, climate and sustainable development.

TEMARIN: Technology, Markets and Investment for Low Carbon and Climate Resilient Development



OUR FOCUS AREAS



Climate Planning and Policy



Climate Transparency and Accountability

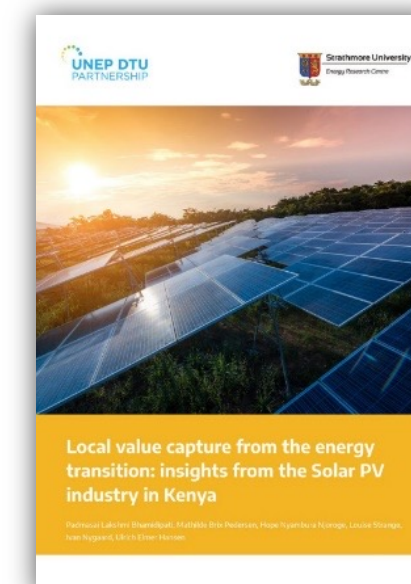
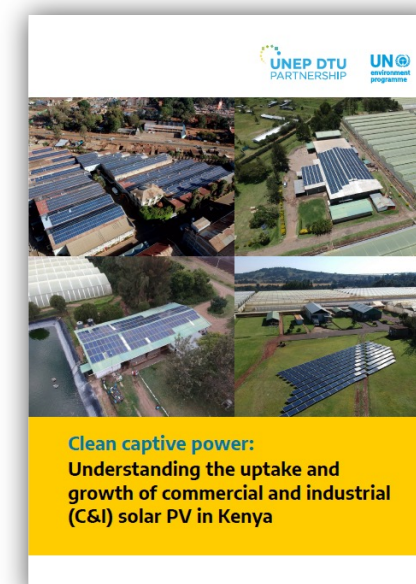


Business Models and Markets

Strengthening markets for climate technologies in Kenya and Uganda

- analyses of market-led interventions
- support partnerships for transfer and diffusion
- strengthen domestic markets and industries

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COMMERCIAL AND INDUSTRIAL SOLAR PV IN UGANDA



Technical
University of
Denmark



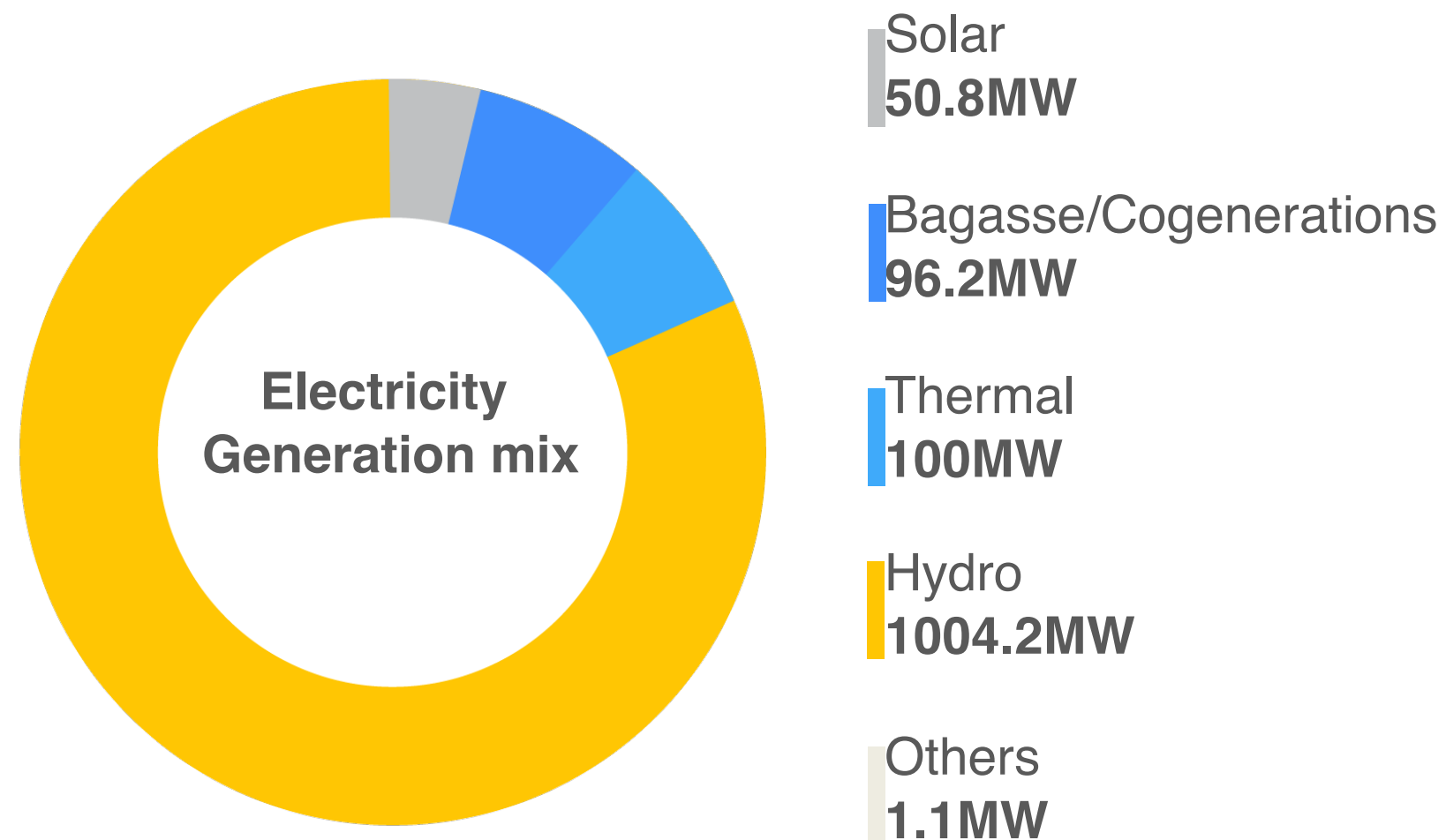
Photo credit: GRS



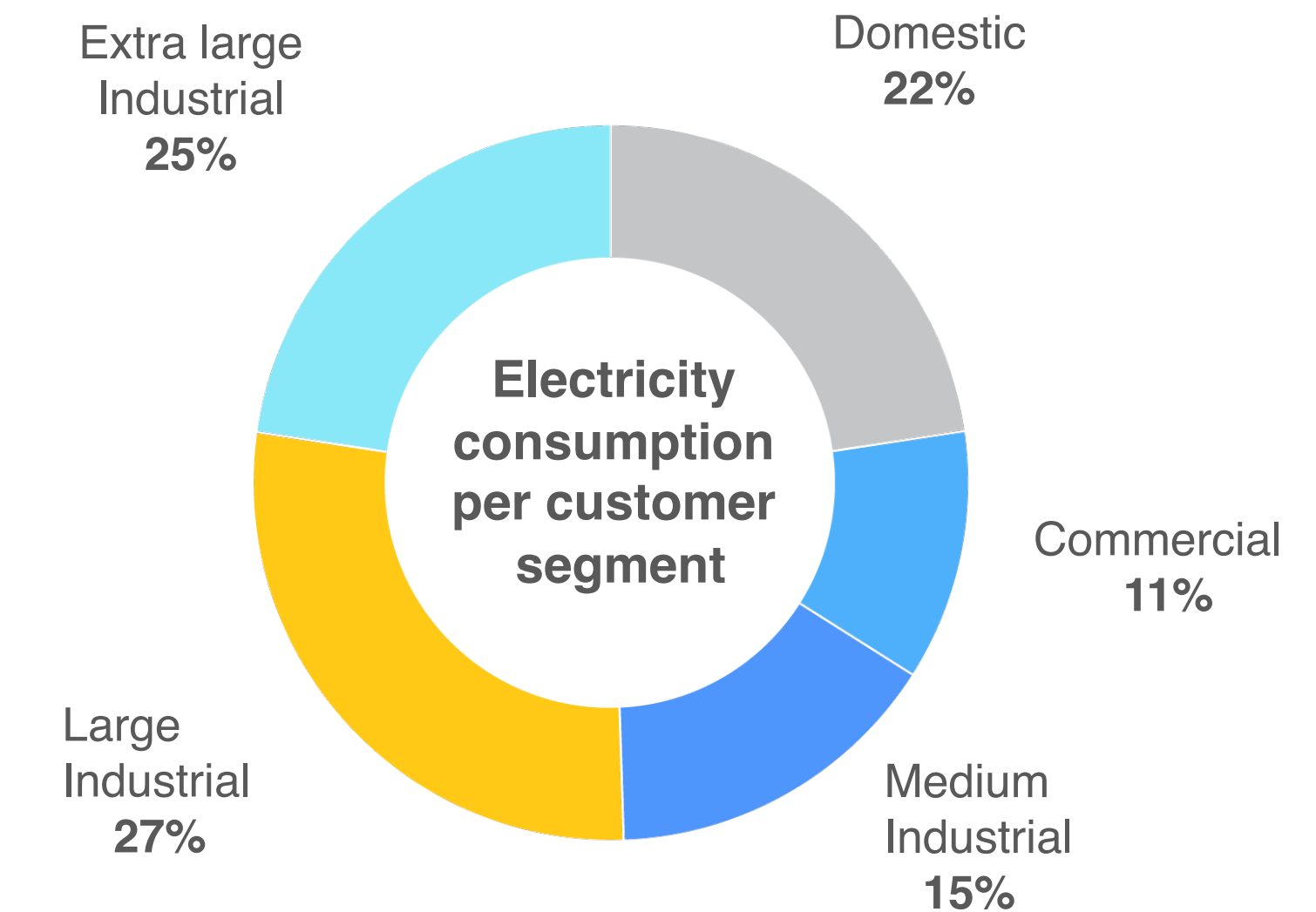
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- 02 Key Findings
- 03 Constraints to uptake of Captive Solar
- 04 Conclusions

Electricity Profile of Uganda



Source: MEMD annual report, 2019, Draft Energy policy



Source: ERA Statistics

- Total Installed capacity at **1,252.4 MW**
- Electricity Access Rate: **28%**
- Rural Areas: Grid-8%, Solar **28%** & Minigrids **1%**.

- Energy consumption: **4,171.4 Gwh**
- Number of Customers: **1,620,505**
- **93,004** are commercial and industrial
- Industries consume most of the energy: **67%**

Introduction to Captive Power

Captive Power is also known as embedded or distributed generation. Refers to self-generation in larger commercial, industrial, or institutional facilities as opposed to domestic or small business usage.

Size: Varies between 10 kW to 20 MW. In Uganda, Captive solar ranges from 10kW to less than 1 MW while bagasse generation is upto 20 MW.

Why does Captive Power matter?

- Electricity cost savings
- Improved power reliability and quality
- Lowering carbon footprint.

Implementation Models: Self owned or third party owned without connecting to the grid.

Types of Captive Solar PV options

PV Grid-tied System:

If consumers have high electricity consumption during the day and are connected to the grid, this PV system can supplement the day time consumption.



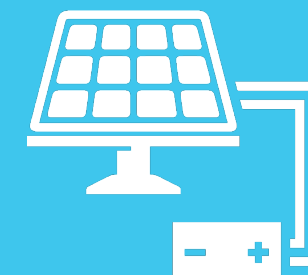
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PV- Diesel hybrid: grid tied or off-grid: if consumers are running diesel generators as their main power source or have unreliable electricity grid. They couple a PV system to the diesel generator.



02

PV battery storage hybrid: if consumers are not connected to the electricity grid.



03

Methodology

1.Desktop Research

2. Stakeholder interviews

3. Validation

4. Report





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Summary of Key Findings

1. C&I Solar Plants generating less than 500kW must **register at a fee** and those generating more than 500kW must **apply for a generation licence**. For self consumption **a licence of own use** is provided by ERA.
2. Since 2013, more than **1.9 MW of C&I solar Pv** has been commissioned in Uganda. **A pipeline of 2MW** is expected to be executed in 2021 and early 2022.
3. 84% of the captive solar plants are **self owned and financed** and 16% through leasing and energy supply contracts.
4. ESCO's are financed by **impact and crowd funding investors** to install C&I solar plants. There is limited involvement of local commercial banks.
5. Though market is still in the infancy stage, there are **early adaptors** within the **commercial buildings segment** and **agro-processing and light industries** show potential for growth.

Regulatory framework for Captive Power



The Republic of Uganda
Ministry of Energy and Mineral Development

- Policy formulation
- Sustainable utilisation of energy resources



- Issuance of electricity licenses
- Tariff setting and approval



- Standards setting and enforcement
- Quality assurance

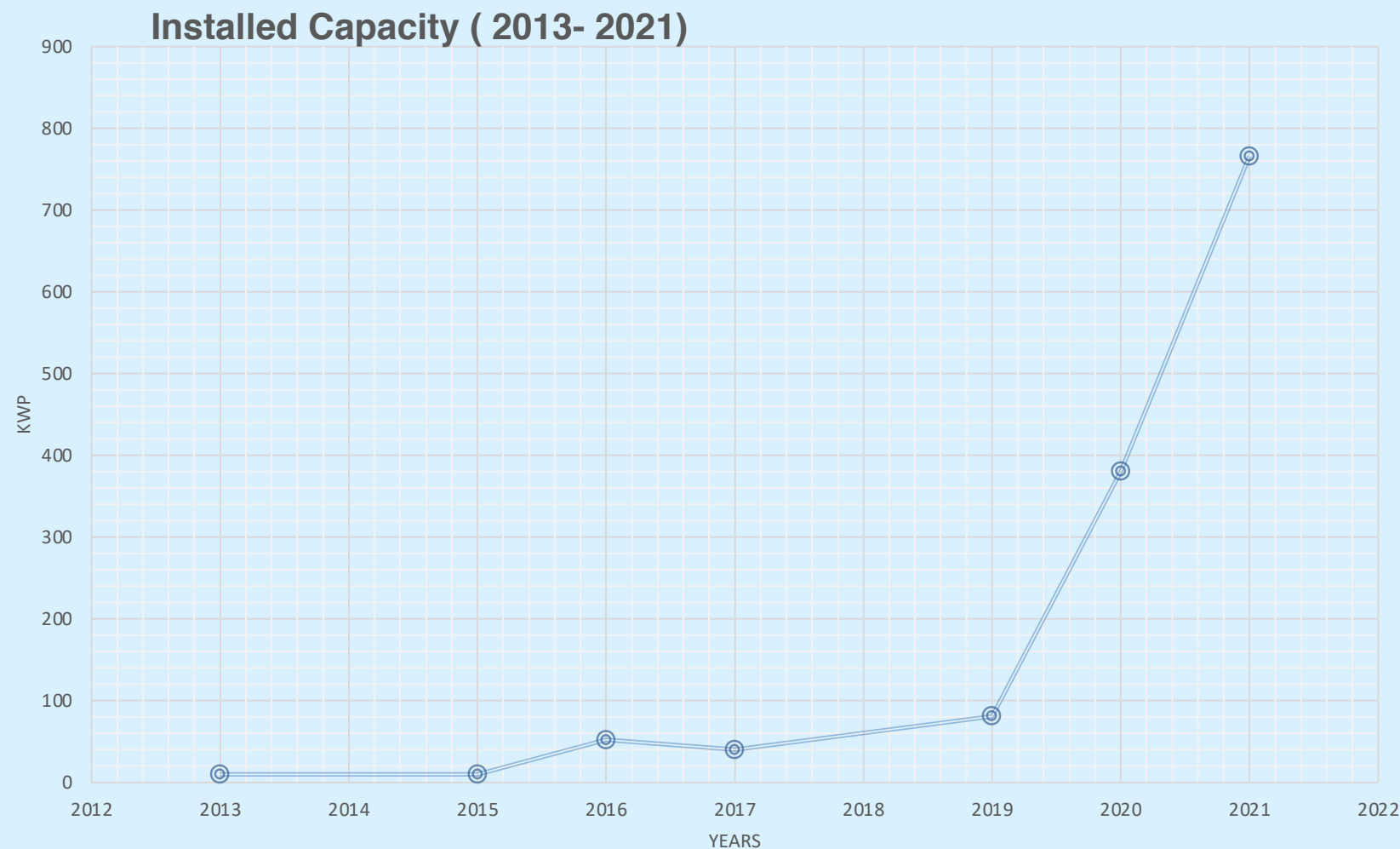


Uganda Revenue Authority
DEVELOPING UGANDA TOGETHER

- Revenue collection and accountability
- Policy Advice on revenue sources

- Captive Solar plants with capacity of less than 500kW must be registered at a prescribed fee.
- Those with a capacity of more than 500 kW are **required to have a generation licence**. In case of self consumption, **a license of own use** is required.
- Companies and individuals installing Solar PV captive power plants must hold a **Class X** and **Z** installation permit respectively.
- **Net metering** is considered under the new metering code being developed.

Installed capacity of captive Solar PV



Type of facility	No of systems	PV capacity	Average system size(kWP)
Building	9	668	74.2
Coffee processing	2	272	136
Dairy processing	5	268.5	53.7
Education	7	173	24.7
Health	6	432	72
Horticulture	1	30	30
Hotel	1	30	30

- More than **1.9 MW** commissioned since 2013 ranging from **10kW** to 500kW.
- **65%** are grid tied of which **3%** with batteries and **15%** are off-grid.
- Commercial installations contribute 74% and Industrial are 26% of installed capacity. Commercial buildings and agro-processing industries are highest contributors.

Market potential for Captive Solar in Uganda

- Over 93,000 C&I customers connected to the grid.
- More than 2 MW of captive solar plants are expected to be executed in 2021 and early 2022.
- **56%** are Industrial plants while **44%** are commercial. Manufacturing and agro-processing industries with the highest capacity and hotels.

Facility	Number	Size(kWp)
Fish processing	1	30
Hotel	1	100
Packaging	1	1,500
Industry	1	200
Mall	1	20
Agro processing	2	138
Health centres	2	38.82

FINANCIERS

GODARITY

Funded 79 kW in the commercial sector

enPower.life

Funded 30kW in the commercial sector

 **SunFunder**

Debt Financing for installation of captive solar.

Financing Captive Solar Power

- ESCO's are funding Captive PV installations finance through crowd funding platforms and impact investors. Limited involvement of local commercial banks.
- 84% are owned and financed by consumers and 16% by third parties through finance lease and energy supply contracts.
- Duration of leasing and energy supply contracts last between 5 years and 20 years respectively.



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Constraints to uptake of Solar Captive Power

Limited access to finance: Ticket sizes for available funds are high compared to the need, high country credit risk profile leading to high interest rates for foreign debt.

Limited technical expertise in design and installation of higher capacity and hybrid systems.

Low customer confidence in solar for commercial and industrial use. Due to substandard solar products and few show cases for C&I projects in the country.

Unclear regulatory framework for captive power plants.

- How to register a captive PV plant;
- Application and fees for license for own use.
- Legalities of PPA's between Developer and Customer for self consumption.

Others: High upfront costs, Inconsistent application of tax exemptions for solar

Conclusions

- Captive solar plants must be registered and acquire a generation license for capacities below and above 500kW respectively.
- The installed capacity of captive solar plants is expected to double from 1.9MW to 2MW in 2021/22.
- Market is expected to grow especially in commercial buildings and agro-processing industries with conducive economics and regulatory framework.
- Financial support and technical skills building is needed to grow and sustain the market.



Thank you!!

UPTAKE OF CAPTIVE PV IN UGANDA

End

CONCEPT