



# SIGMA FINAL DISSEMINATION EVENT

## Insights from the Tanzanian study

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# Presentation Outline

- Background
- Country context
- Mini grids status
- Interaction with stakeholders
- Information on visited Minigrids
- Field work findings
- Current challenges in mini grids
- Conclusions and recommendations

# Background

Mini-grids are considered a potential electrification option for the islands and remote rural areas.

Tanzania offers policies and regulatory framework that encourage minigrid investment and development.

The SIGMA project investigates on issues of Sustainability, Inclusiveness and Governance of mini grids.

# Country Context

- National electrification targets to achieve connectivity access rate of 100% by 2030.

By 2023

- Population– 61.5 million
- 35% urban; 65% rural

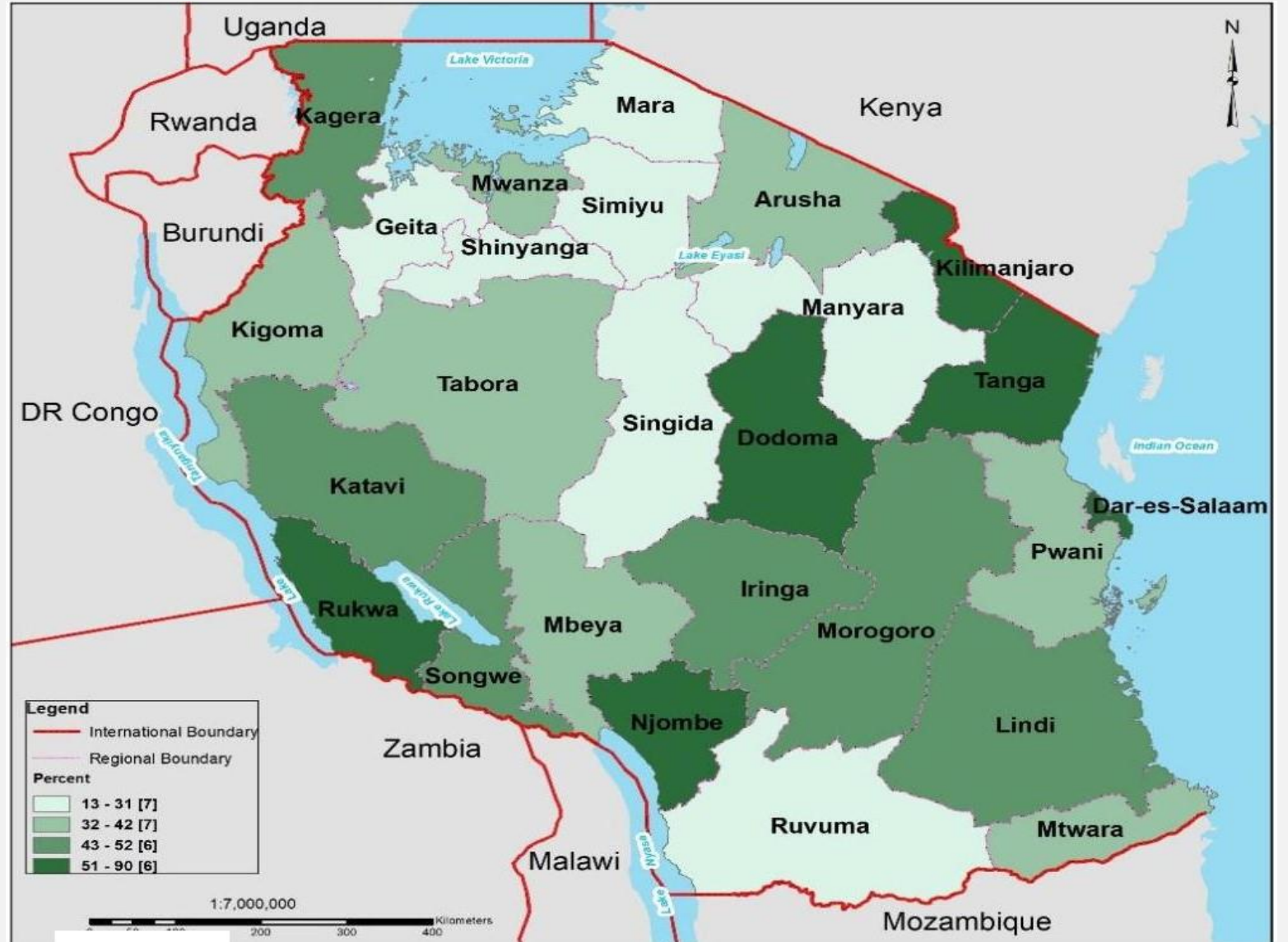
Electricity proximity Access Rate (2020)

- – 78.4% of population
- Urban access rate 99.6%
- Rural proximity access rate 69.8%

Connectivity access Rate 39.6 %

- Rural 24.5% of which 30.4% is solar based solutions
- Urban 73.2 %

## PERCENTAGE OF HOUSEHOLD CONNECTIVITY BY REGIONS





Energy source	Existing No of plants	Grid	Isolated	Total kW	Percentage (kW)	Connections
Hydro	57	11	42	33,485	21	14279
Bio-fuel	25	7	18	48,886	30	562
Solar	75	1	74	7347	5	82147
Wind	1	1	0	2,400	1	
Diesel/natural gas	14	0	14	68,332	43	181,951
Hybrid	4	0	4	216.8	0.13	785
All sources	176	20		160,666.70	100	279723

**Note: This data is for only the registered mini grids by the regulator**

## Mini-grids status

By 2022, Tanzania Mainland had up to 176 existing MGs in 21 regions with total installed capacity of 160.7MW connecting 279,723 customers.

# Interaction with stakeholders

S/N	Category of stakeholder
1	Ministry of Energy (MoE)
2	Energy & Water Utilities Regulatory Authority (EWURA)
3	Rural Energy Agency (REA)
4	Power Utility (TANESCO)
5	Mini-grid Developers, Owners and Operators
6	Households, Institutions, SMEs (productive uses)
7.	Equipment and technology suppliers
8.	NGOs, Community organisations, Associations
9.	Development partners & Financiers

# Information on Visited MG sites

Type	Number	OP/NOP	Grid/MG	Grid/MG coexist	Private/ Public/ Community /Faith based
Hydro	4	2 OP/2 NOP	3 Grid/1 MG		2Pr/1 Pb/1FBO
Wind	1	1 OP	1 Grid & MG		1Pr
Biomass	3	2 OP/1NOP	2 Grid/1MG		2Pr/1PPP
Diesel	1	1 OP	1 MG		1Pb
Biodiesel/ diesel	1	1 NOP	1 MG		1Pr
Solar PV	4	3 OP/1NOP	4 MG		4Pr
Biomass + solar hybrid	1	1 OP	1 MG	1 Coexist	1Pr
Solar PV + diesel hybrid	3	3 OP	3 MG	3 coexist	3Pr
<b>Total</b>	<b>18</b>	<b>13OP/5 NOP</b>	<b>6 Grid/ 12MG</b>	<b>4 coexist</b>	<b>14Pr/2Pb/1PPP / 1FBO</b>



# Study Findings

## Sustainability of MG:

### Technical

- Limited data to enable proper designs lead to oversizing of MG.
- Lack of technical expertise to design and install MGs.
- Difficulties to obtain operational data.
- Lack of technical expertise for major maintenances.
- Spare parts availability and affordability is a problem.
- Low MG capacity utilization.

### Environmental

- Water basin authorities and MG developers educate villagers.
- Soil erosion due to human activities lead siltation of MG.
- Sewage and disposal systems availed in bagasse MG.
- Weather variation (cloudy or drought) affect the performance of MG.
- Environmental regulators rarely monitor and evaluate MG.
- End of life disposal of MG components is a challenge.





# Sustainability of MGs cont.....

## Financial

- Financing sources of mini-grids are equity, grants, subsidies and loans,
- Credit facility and risk guarantee is not readily available.
- Securing financing for local mini grid developers is difficult.
- Local MG developers lack capacity to prepare bankable documentation.
- Financial sustainability is guaranteed:
  - ❖ By selling electricity to anchor customers.
  - ❖ when tariff is cost reflective and affordable.
  - ❖ via smart metering.
- Unexpected grid extension to MG sites lead to commercial uncertainty and risks.

# Inclusiveness and Governance

## Inclusiveness

- Due to limited capacity local communities are sidelined.
- Local communities are rarely involved in tariff setting.
- Gender inclusion in management and operation of MG observed
- MG developers support social services as part of corporate social responsibility

## Governance

- SPP regulatory framework is governed by policies and other legal instruments.
- SPPA and SPPT/FIT regulations for MGs.
  - ❖ 2008-April 2015, 1<sup>st</sup> generation framework FITs based on DNO's avoided costs and is technology neutral
  - ❖ 2015-2017, 2<sup>nd</sup> generation framework FITs is technology specific, size dependent and US Dollar pegged
  - ❖ 2017, 3<sup>rd</sup> generation framework; allowed a single license for MGs at multiple locations, defined MGS for tariff review and allowed MGs to operate on islanded mode when the main grid is out
- Currently VSPP of capacity 15 to 100kW are being regulated.
- Economies of scale have generation tariff for main grid lowest, SPPs higher and , and VSPPs highest..
- Similarly Retail tariffs offer same results, VSPP tariffs are 16 -40 times higher.





# Current Challenges for Mini grid Development in Tanzania

- Tariff issues for the VSPP are controversial.
- Lengthy and complicated planning and licensing processes.
- Inadequate local capacity.
- Limited access to affordable financing.
- Low level of coordination among key stakeholders.
- Tariff setting complexities not well understood.
- Low affordability.
- Limited data availability.
- Low awareness of MG development process.



# Conclusions and Recommendations

## Conclusions

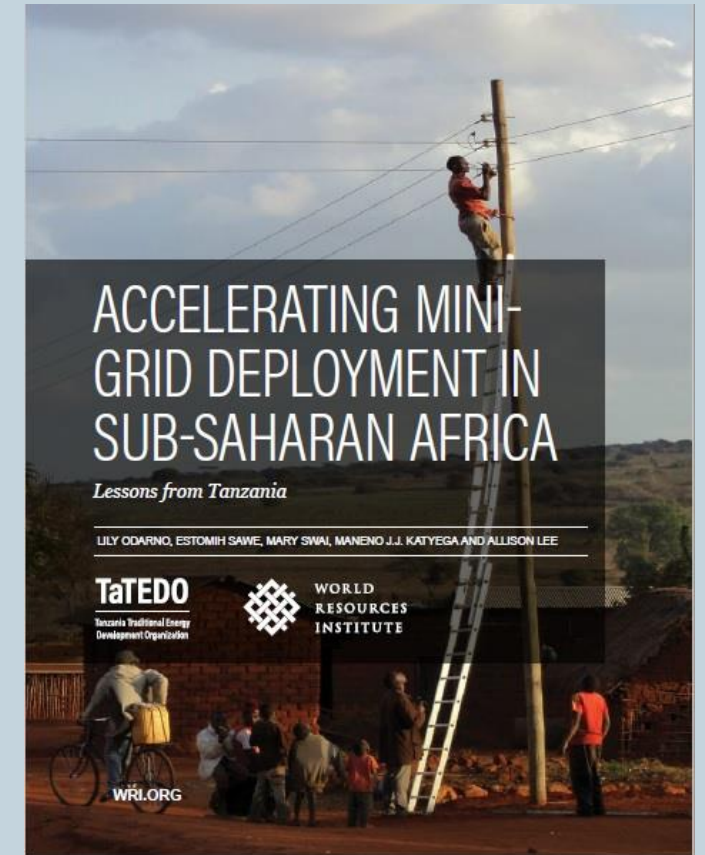
- MG selling electricity to anchor customers tend to be financially sustainable.
- VSPP models appear not sustainable.
- Women and children benefit most from access to MG electricity services.
- Key mini grid drivers include right policies, regulation, financing and effective business model.
- Hinders of mini grids are political interventions, high tariffs, limited knowledge and access to financing.
- Tanzania's comprehensive SPP regulatory framework is key accelerated deployment of MG in the country

## Recommendations

- Regulator should undertake M&E of VSPPs supply quality and tariffs.
- For Social equity reasons, electricity services from VSPPs be considered to be directly subsidized.
- Metering system should be convenient to both suppliers and customers



# Thank you for your attention!!



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