

# Mini Grids and Off Grid Energy Technologies in East Africa

---

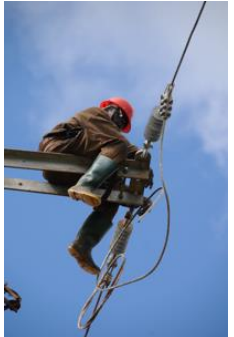
## Decentralized Renewable Energies in Tanzania Market Trends and Framework Conditions

Hannover – 9<sup>th</sup> May 2019

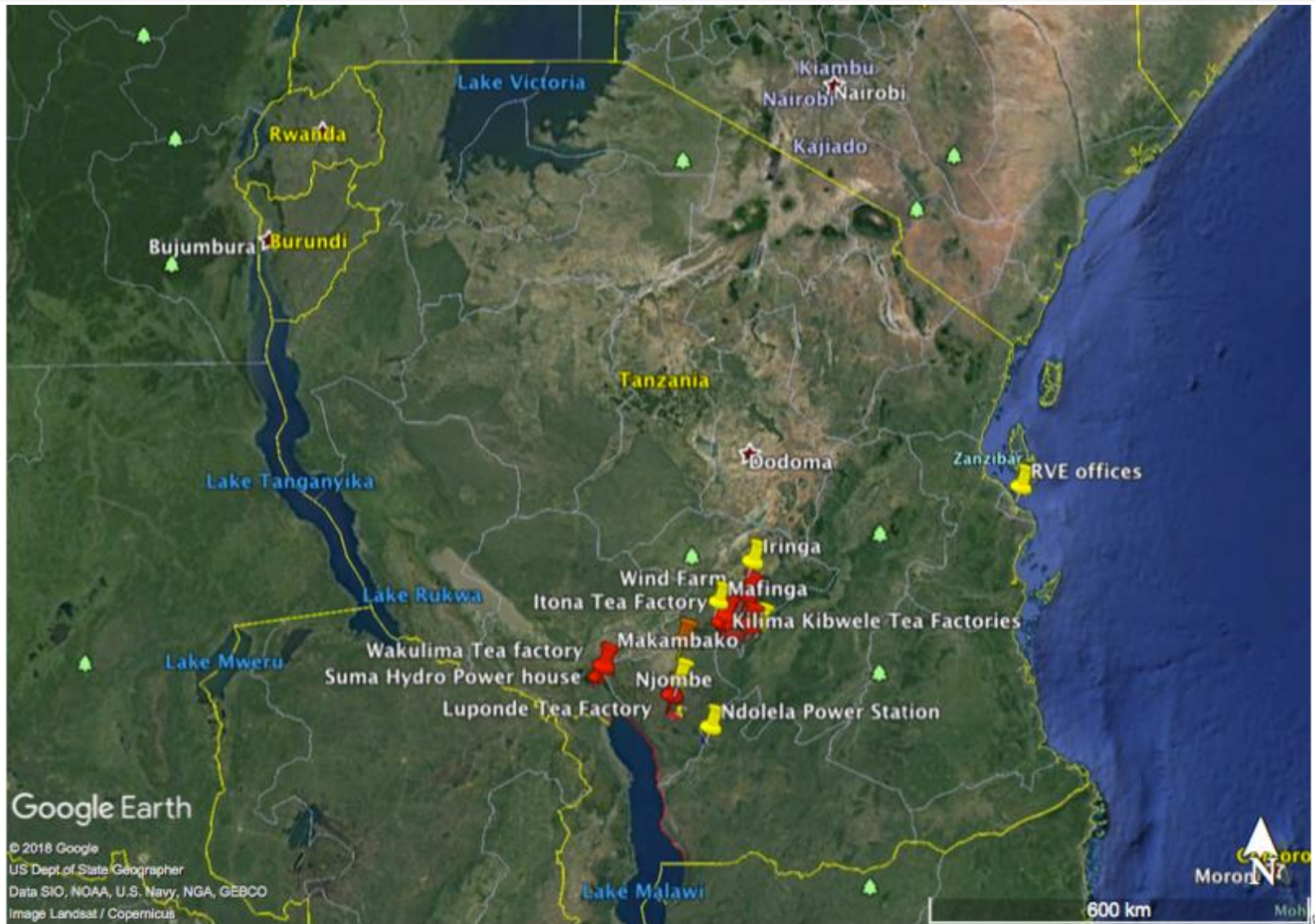


## Who Are We?

- Rift Valley Energy started out of a need for our associated agricultural business to have reliable power
- Developed the 1<sup>st</sup> greenfield project to be constructed in Tanzania under 1<sup>st</sup> Small Power Producers Framework
  - Participated in the development of 1<sup>st</sup>, 2<sup>nd</sup> and now the 3<sup>rd</sup> Framework.
- Only Private Distribution License Holder outside of the National Utility
  - Fully regulated, with tariffs cheaper than the National Utility
  - Pre paid cellular phone based electricity meters throughout
- RVE concentrates on grid tied hydro projects in areas with significant underlying industrial demand growth potential.

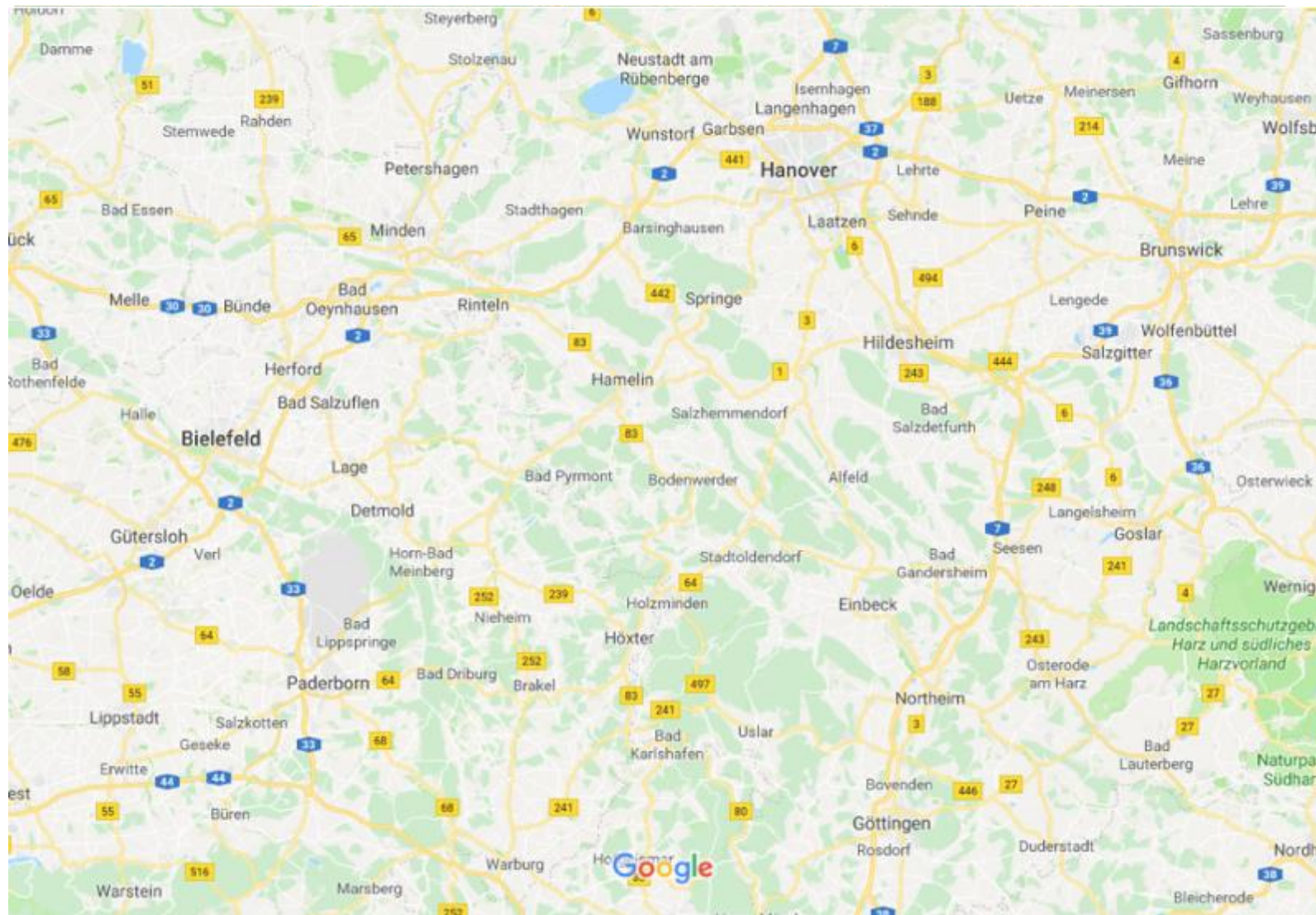


# Where Are We?





# Current Mwenga Hydro Mini Grid Layout



65 transformers currently installed across 35 villages, with approx 4000 connections

Further 20 transformers expected to be installed in planned densification work over next 2 years

Approx 300 km of 33 kV lines installed to date

Estimated population of current license areas is 90,000



# Mwenga Hydro – Generating Plant



# Mwenga Future Generation Capacity



- 2.4 MW wind farm currently under construction to boost available generation capacity during the dry season
- Will be the 1<sup>st</sup> wind farm in Tz
- Future storage dam is planned, so as to allow us to prepare for time of use tariffs, that we anticipate will arrive within the next 5 years



# Luponde Hydro Project and Associated Mini Grid



## Productive Use of Electricity – an important component



- Rapidly evolving small scale mobile sawmilling sector that looks set to consolidate into several mid size (electrically powered) sawmills
- Growing downstream timber processing sector
- Significant agricultural activities present with untapped potential for downstream food processing
- Numerous commercial irrigation points that operate during the dry season



## General Mini Grid Facts in Tanzania

---



- More than 100 mini-grids present currently
- First country in Africa to develop robust mini-grid regulations
- Regulations have been subsequently adopted in relatively similar form by Nigeria, Rwanda, & Mali

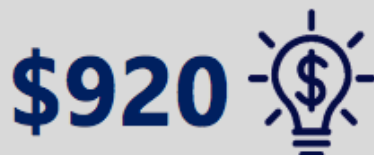
## General Mini Grid Facts in Tanzania



**\$7**

**ARPU**

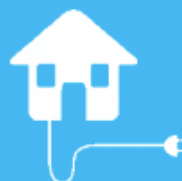
Average Revenue  
per User<sup>1</sup>  
(Monthly)



**\$920**

**AIPU**

Average Investment  
per User<sup>1</sup>



**11**

kWh/mo.

Tier 2

Average residential  
consumption<sup>2</sup>

Average generation  
capacity<sup>2</sup>

**34**

kW



**85%** vs **15%**

A/C

vs

D/C



**3 Years**

Average Number  
of Years in Business  
(Range of <1 year to 6 years)

OPEX as a % of Revenue<sup>4</sup>

**58%**



**≈ 100**

Average  
Number of  
Connections<sup>3</sup>

Average Number  
of Years in Business  
(Range of <1 year to 6 years)



**95%**

Provide 24/hr Power

<sup>1</sup> Includes the sole Hydro DESCO in the sample (\$7 ARPU and \$920 AIPU)

<sup>2</sup> Excludes the sole Hydro DESCO in the sample, which is an outlier for average residential consumption and generation capacity

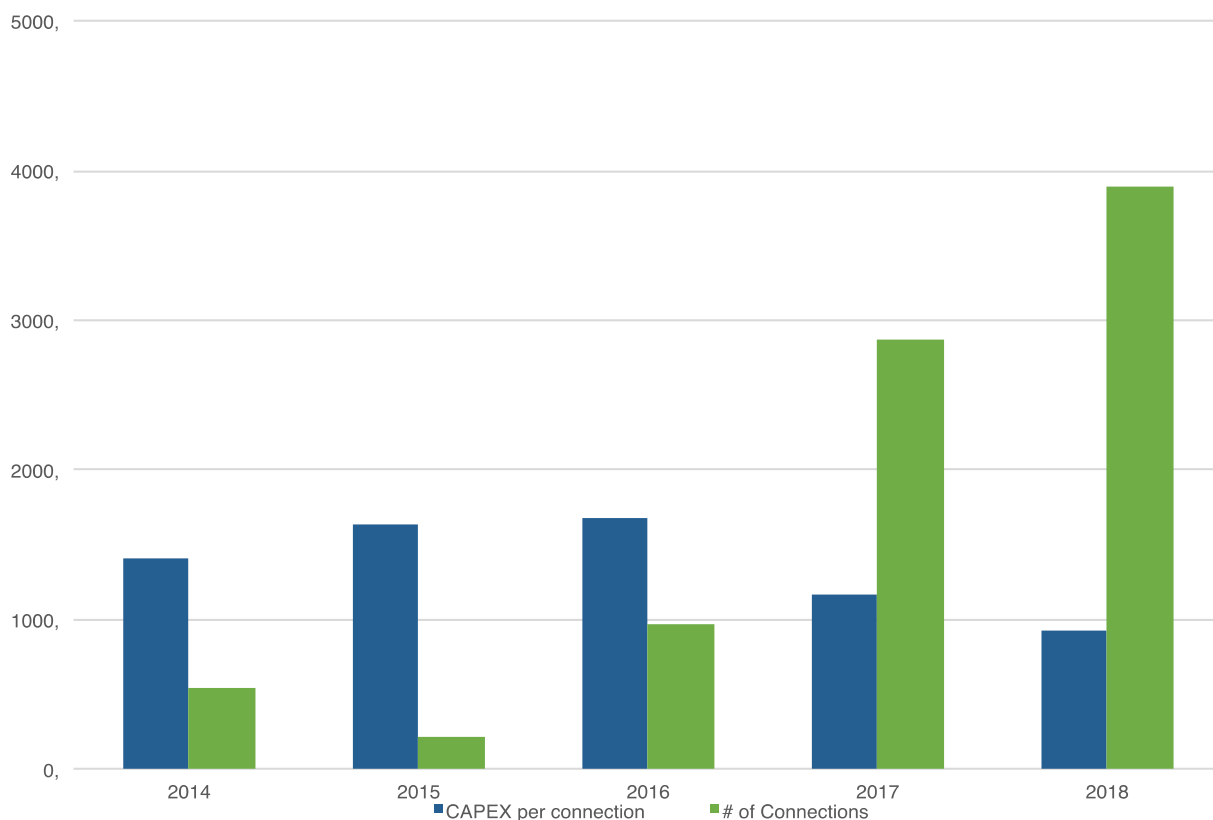
<sup>3</sup> Excludes 2 Outliers

(one hydro DESCO & one PV with higher connections)

<sup>4</sup> Only 13 respondents



## General Mini Grid Trends in Tanzania



Significant connection cost reductions noted across sector as numbers of connections increase

- 2017: \$1163/connection
- 2018: \$938/connection
- 2020 (estimated): \$600 to \$700/connection

Competition between developers not really a factor yet. Unpredictable Main Grid expansion more of an issue to developers.

## Energy Sector Evolutionary Trends in Tanzania

- TANESCO generation mix price has dropped sharply over last 7 years due to replacement of expensive liquid fuelled emergency generation plants with much more affordable natural gas generation plants
- Commissioning of a new 400kV backbone across the country has reduced transmission losses considerably
- This combination has led to a much improved financial (and operational) position of TANESCO, which is now showing in an associated (much) improved payment performance to GENCO's
- The willingness to pay any premium (long term) price to private GENCO's to boost available supply has consequently reduced considerably
- The 'ever decreasing' apparent cost of power produced from large scale renewable energy plants internationally has been recognized by government as a future opportunity (but only once demand justifies it)
- The value of Distributed Generation has been recognized as strategically (and politically) important to many areas of the rapidly expanding rural network from both a loss reduction / voltage support viewpoint, as well as a grid resilience viewpoint



## Regulation Framework Evolutionary Trends – Sub 10 MW GENCO's

- Every five years the Small Power Producers Framework is revised.
- The 2<sup>nd</sup> Framework was revised in 2014 and released in 2015, but was essentially rejected by TANESCO as being too investor friendly. Multiple Rule revisions within the 2<sup>nd</sup> Framework did not break the deadlock, and a 3<sup>rd</sup> Framework has now been developed through extensive consultation and is currently being adopted.
- Key Recent Changes Include:
  - Lower pricing, shorter PPA term and removal of inflationary tariff adjustments
  - Projects must be located only in recognized strategic areas, and bring commercial and operational benefits to TANESCO
  - Treatment of potential main grid and GENCO plant outage events clarified
  - Solar and Wind projects remain likely to be driven by a competitive tender procedure that will be launched only when TANESCO is ready to do so
- New pricing will unfortunately close some of the projects that had been under development – though does ensure that the various projects that do go on to get developed will be regarded as genuinely useful to Government, and hopefully can now be smoothly implemented.

## Regulation Framework Evolutionary Trends in Tanzania – DISCO's

- High private mini grid tariffs no longer acceptable politically over longer term, though prompt delivery of reliable power to isolated rural communities is still very much appreciated by all stakeholders.
- Political recognition that power supplies need to be unconstrained, and scalable to prevent unintended development barriers to industrial activities within the areas served.
- Recent 3<sup>rd</sup> Framework changes now bring:
  - A mandatory Registration requirement for mini grids (when previously exempt)
  - Letter of support from Ministry now required for mini-grid development
  - Tariff regulation of mini grid tariffs now introduced
  - Strengthened framework relating to what will likely happen when the main grid reaches the mini grid
- In an unrelated but parallel development, a new set of Micro Finance Regulations has been introduced to Tanzania that has (presumably unintentionally) stalled the use of 'on bill financing' of connection and appliance fees.



---

# **Thank You**

## **Any Questions?**