



**Energy and Rural Industrialisation**  
Decentralised Renewable Energy Projects  
in International Development



# About me

Project Manager  
German & EU Development  
Cooperation

- 2012: Uganda's National Development Plan
- 2014: Solar mini-grid technical pilots
- 2016: First African multi-site mini-grid tender
- 2019: Adviser to regulators on market design



# Uganda

East Africa

Area 241,038 km<sup>2</sup>

GNI ~USD 45B

Population ~ 46M

Households ~ 9M

Connections 1.76M

Installed generation ~1300 MW

Grid Tariff USD 0.20 / kWh

Urban population ~ 28 %



# Electrification

Grid extension unviable

Electricity demand < 10 kWh/m

Affordability < \$5 /m

Villages less than 200 hh

Solar home systems < 100 Wp

Africa-wide, 600M unelectrified

Est. ~ USD 200B p/a



# Mini-grids

Isolated from national grid

Solar PV panels ~ 25 kWp

Battery storage ~ 50 kWh

LV distribution ~ 100 connections

CAPEX USD 100,000

2012 scenario

14 MGs, 50% operational

Community-owned, high OPEX, low tariffs, no margins, no regulations

National electrification < 20%

# How government responds to challenges

Increase sector funding

Revise policies & strategies

Establish new agencies

Stimulate private sector

Engage civil society

**Seek innovation**





# How can government innovate in admin?

... and encourage private sector to innovate in technology

1. Increase trust in private sector
2. Adopt new tech in planning
3. Light handed regulations
4. Grants, calls & subsidies
5. Flanking, integration, coherence



# 1. Trust Private Sector

Create the steering function  
for government

Assess and compare projects

Create an honest broker

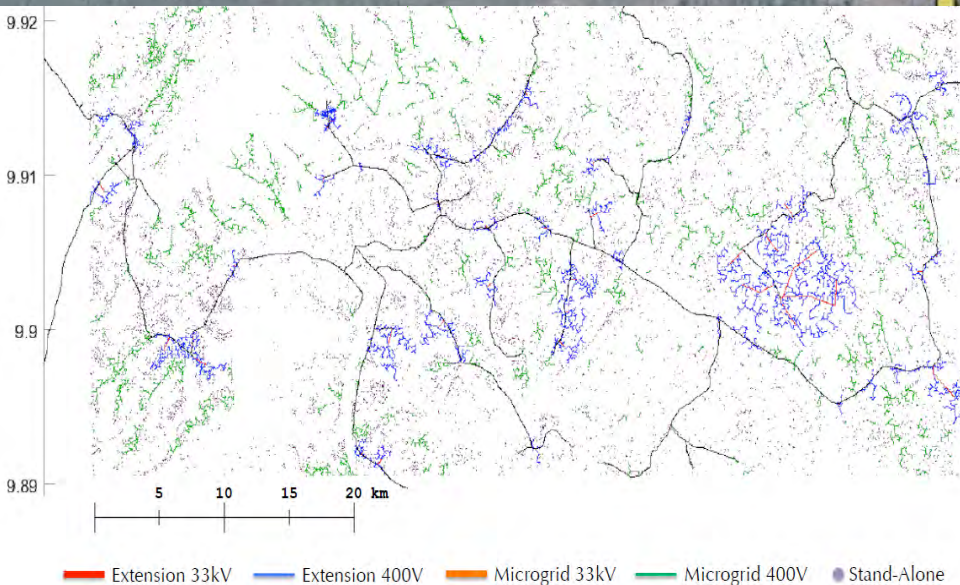
Strong planning and regulation

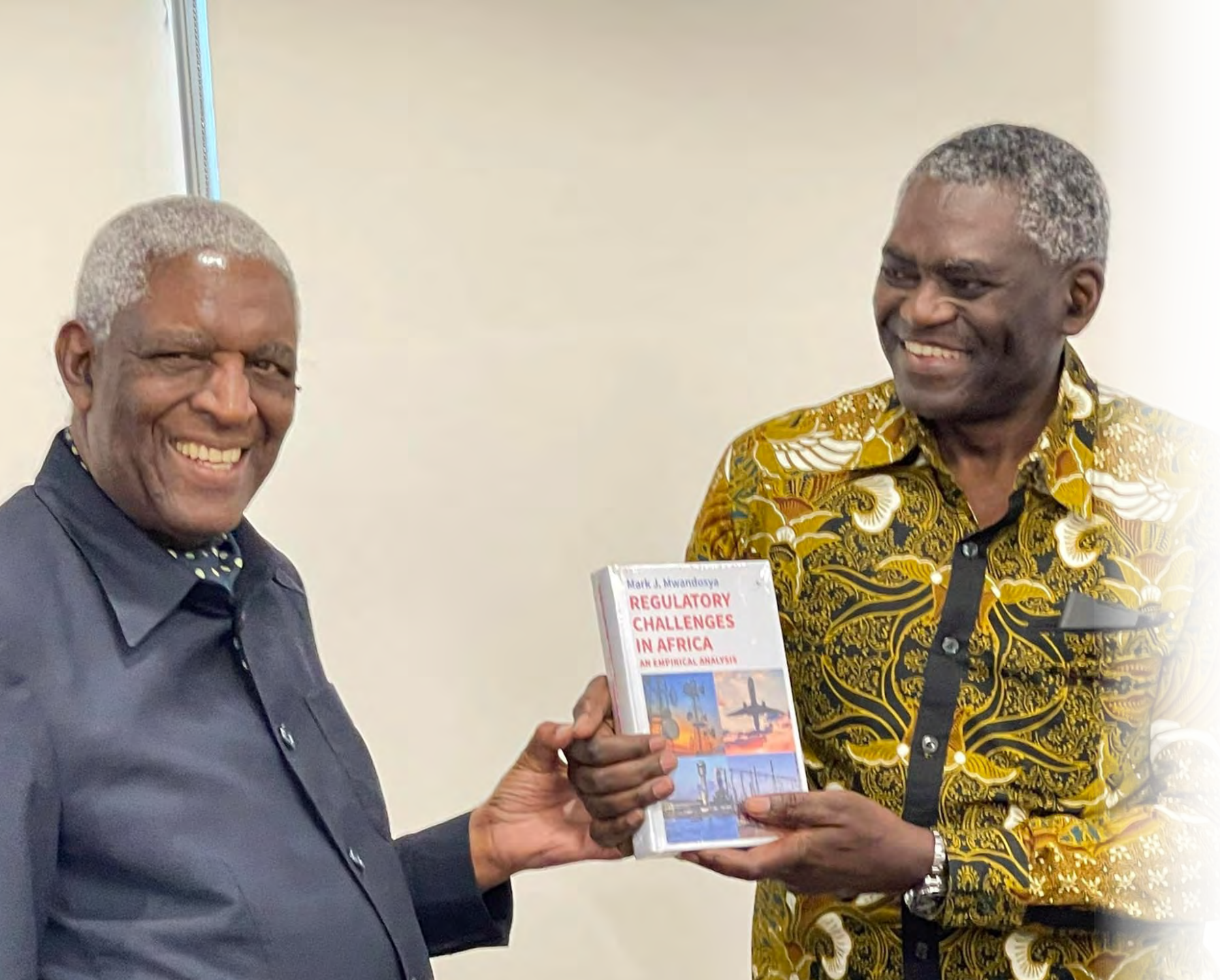


## 2. New Tech in Planning

Innovative projects need  
investment security

New technologies require new  
methods of planning





# 3. Light-handed Regulations

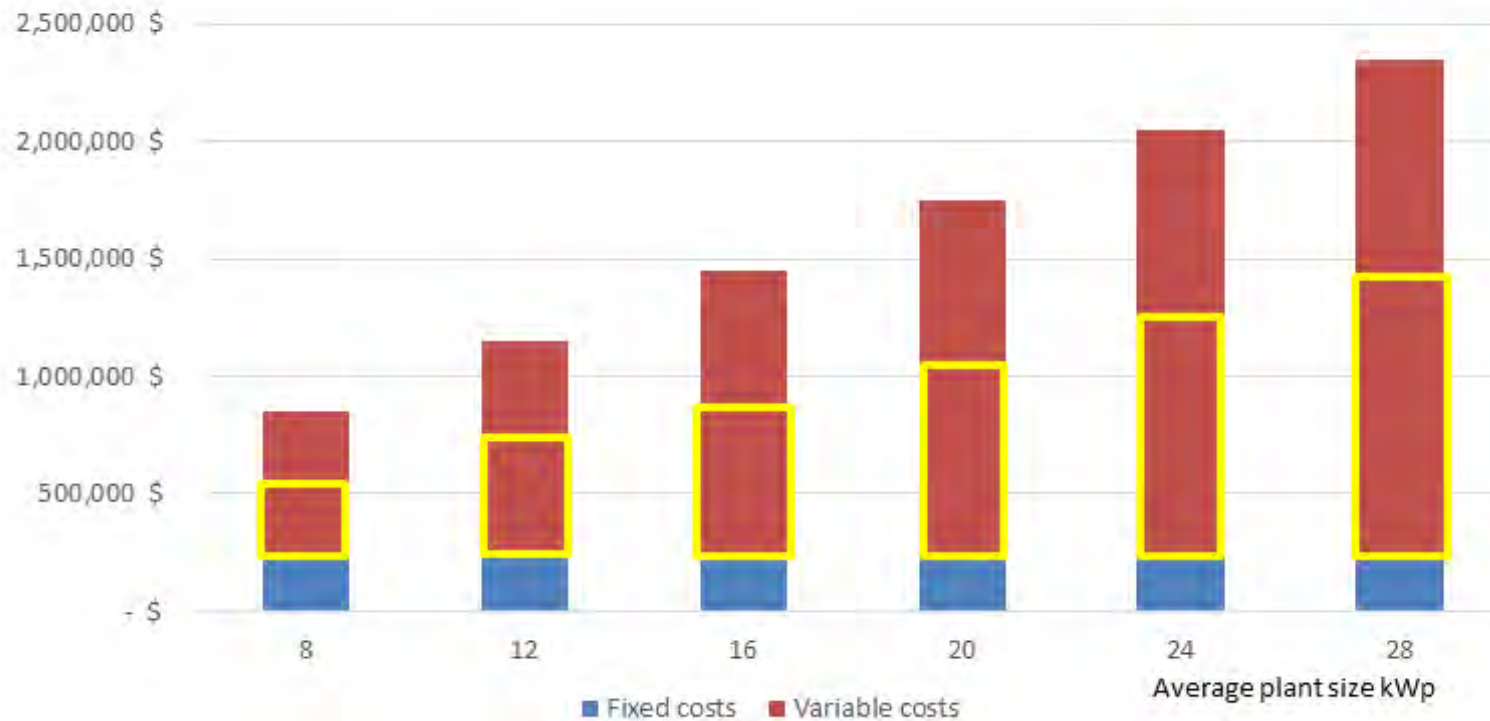
No regulation = no security

Financial regulation

Technical regulation

Performance standards

## Variable subsidy of \$2 per Watt peak installed



Estimated CAPEX	\$850.000	\$1.150.000	\$1.450.000	\$1.750.000	\$2.050.000	\$2.350.000
Subsidy in \$	\$360.000	\$540.000	\$720.000	\$900.000	\$1.080.000	\$1.260.000
Subsidy as % of CAPEX	42%	47%	50%	51%	53%	54%
Tariff	\$ 0,60	\$ 0,47	\$ 0,40	\$ 0,37	\$ 0,34	\$ 0,32
Tender score	61,0	73,0	82,4	89,1	96,1	100,0

## 4. Grants, calls & subsidies

Bang for the public buck?

Getting good bids

Providing good specs

Leaving room for companies to shine at what they do

Finding space for transparency

# Energy for Rural Industrialisation Productive Use of Energy 2.0

NEW SCALING OPPORTUNITIES AND  
INNOVATIONS IN THE SECTOR

Ashley Wearne, Jeroen van der Linden, Zachary Bloomfield



## 5. Flanking, integration, coherence

Long-term project success

Accompanying measures

Coherent planning & policies

Local economic integration

## New solar grid to light 3,000 homes in Lamwo

Thursday, November 25, 2021



State minister for Energy Okaasai Sidronius Opolot (centre) flanked by the head of the European Union Delegation to Uganda, Mr Attilio Pacifici, during the commissioning of the solar-powered mini grid at Paloga Sub-county headquarters in Lamwo District on Tuesday. Photo/Tobbias Jolly Owiny

## Current status

25 village mini-grids installed

New funding for 100 more villages

Knowledge sharing across Africa

Mini-grid connections doubled during Covid

“Billions of dollars continue to be poured into parastatal utilities that fail to deliver quality services, but minigrids, which outperform utilities on service, connection rates and costs, remain marginalised.”

- AMDA, Benchmarking Report 2022

