



**RENEWABLE ENERGY
DEPARTMENT**



**ITC experiences on Microgrids and
rural electrification with RES in Africa**

- ITC experiences:
 - PV-RO Desalination stand-alone system in Ksar Ghilène (Tunisia)
 - Rural electrification in Vale da Costa (Cape Verde)

- Key points to get success in rural electrification and microgrids projects

- Where are we going?

Case of success:

PV-RO Desalination stand-alone system in Ksar Ghilène (Tunisia)

Environment

- Isolated village of 300 inhabitants
- 150kw away from the nearest electrical grid
- 60km away from the nearest freshwater well

Project

- To desalt brackish water by using PV energy
- To create a structure of local management which guarantees a proper running for as long as possible
- To achieve the social acceptance of the inhabitants



Case of success:

PV-RO Desalination stand-alone system in Ksar Ghilène (Tunisia)



Keys to success:

- Bottom-up identification of needs
- Social awareness
- Accurate design and technology selection
- Training for local technicians (installation, operation and maintenance)
- Involvement of the local population and local government

Failed case:

Rural electrification in Vale da Custa (Cape Verde)

Leontxo García:

“In chess, the loser is who learns more”



Failed case: Rural electrification in Vale da Custa (Cape Verde)

Environment

- Isolated village of 700 inhabitants
- 3 kw away from the nearest electrical grid
- 10km away from Praia

Project

- Hybrid microgrid to provide electricity to Vale da Custa
- Hybrid system formed by a PV generator, three wind turbines, a genset and batteries



Failed case:

Rural electrification in Vale da Custa (Cape Verde)

Timeline

- 2010 AECID approved and funded a Project to electrify Vale da Custa
- 2012 the hybrid power plant and electrical grid was built
- 2013 it starts the first problems related to the power meters
- 2013 it starts the problems related to the lack of maintenance
- 2014 system running during a few hours per day because a anarchic operation model (lack of model)
- 2013-15 ITC cooperates on O&M tasks to restart the power plant
- 2015 awareness campaign for Vale da Custa inhabitants
- 2015 ECREEE funded the FORGES Project in which it was developed a business model
- 2017 lack of implementation of a business model causes continuous operation problems

Failed case:

Rural electrification in Vale da Custa (Cape Verde)

Lessons learnt

- Importance of awareness campaign
- Need for a suitable legal framework
- Definition of the whole stakeholder roles and responsibilities
- Development a suitable business model
- Training for local technicians to develop the O&M tasks
- Importance of local market to supply spare parts
- Selection of more suitable technology, taking into account present and future

Failed case:

Rural electrification in Vale da Custa (Cape Verde)

Lessons learnt

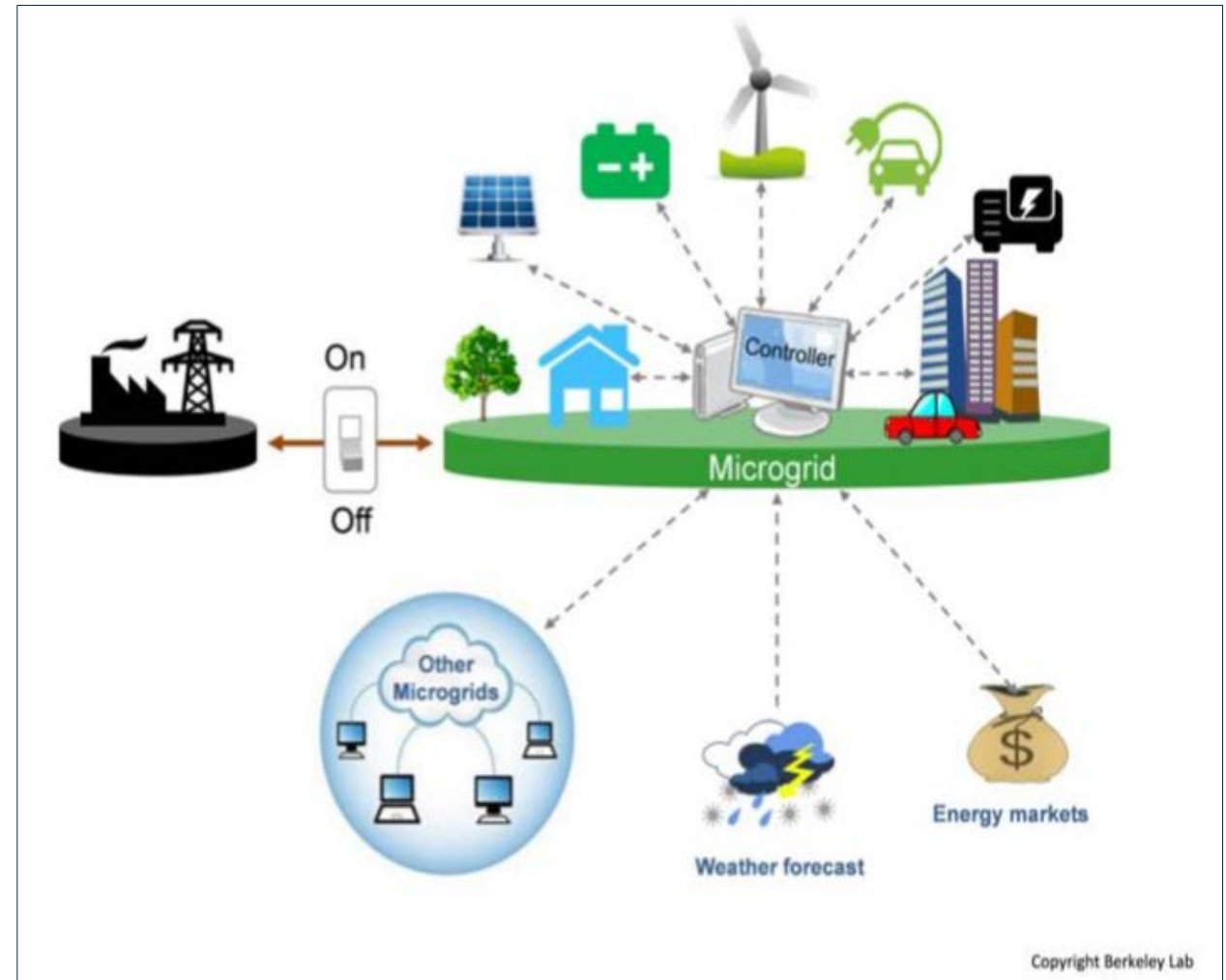
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Key points to get success in rural electrification and microgrids projects

- Access to finance
 - High upfront investments cost
- Policy and regulatory framework
 - Procedures to become a power producer
 - Official documentation for power purchase agreements
 - Specific regulation to protect consumers and producers
- Capacity building
 - Technical training
 - Business and management training

Where are we going?

- More electrification coverage
- New technologies
- Enhance power electronics
- Smart technologies
- Changes in the energy model
- Improvements in telecommunications



Where are we going?



MICROGRIDBLUE

Objectives:

Development of innovative tools to encourage distributed RES integration in power grids, in order to manage the microgrids jointly with other electrical stakeholders

- Development of new regulatory frameworks
- Development of novel solutions to control and manage smart microgrids
- Implementation in pilot projects
- Technology transfer

Where are we going?



MICROGRIDBLUE

Microgrid-Blue Concept:

Improve the interaction among prosumers, utility microgrids and system dispatch operators

Define the border among the different business models (consumers, utilities and operators) and regulations

Flexibility markets among the stakeholders, energy prices, ancillary services

Multi-microgrid coordination



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