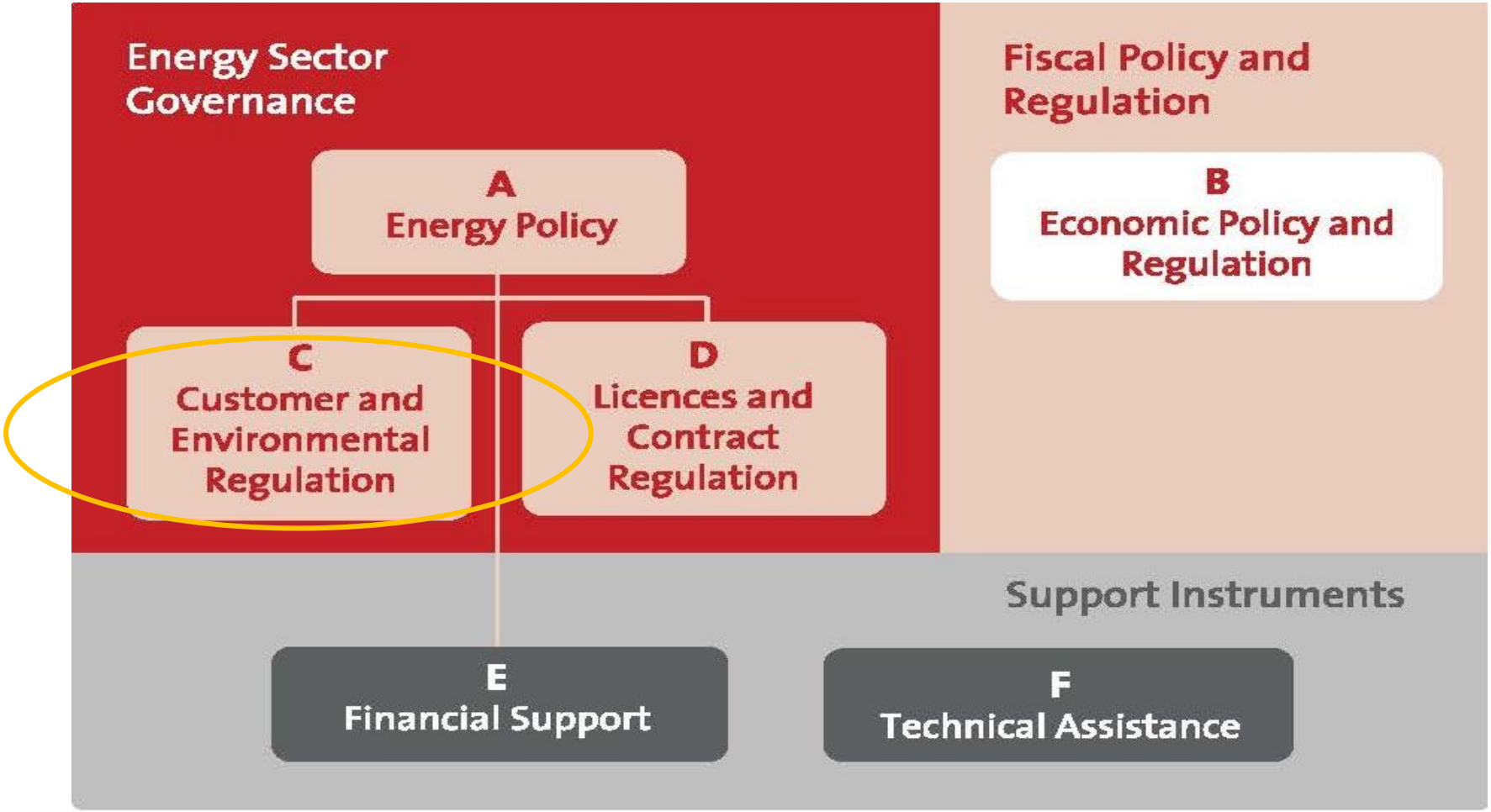
Customer Protection and Environmental Policy and Regulation for Clean Energy Mini Grids (CEMG)

Abuja, 17 to 19 July 2017

euei pdf
Strategic Energy Advisory and Dialogue Services

RECP
Africa-EU Renewable Energy Cooperation Programme

ECREEE
Towards Sustainable Energy


Energy Sector Governance
Fiscal Policy and Regulation
A
Energy Policy
B
Economic Policy and Regulation
C
Customer and Environmental Regulation
D
Licences and Contract Regulation
Support Instruments
E
Financial Support
F
Technical Assistance

Summary of the presentation

Technical Regulation (C1)

Quality of Service Regulation (C2)

Environmental Policy and Regulation (C3)

Chapter 1

Technical Regulation (C1)

Technical requirements: Objective and scope

- Technical regulation is required for all operator models **to ensure safe** and reliable operations for the protection **of customers** without being obstructive for mini-grid developers and operators
- Should have the following specific aspects:
  - **Minimum technical standards** for mini-grid generation and distribution networks
  - **Operating and maintenance requirements**
  - Safe and **robust interconnections between the utility and the mini-grid** in line with grid standards

Technical requirements: Best practices

- Should be in line with the national utility's grid standards but these technical standards should be **specifically designed for the rural context**
- Over specifying may unnecessarily increase the cost (steel versus wooden post, indoor wiring)

Technical requirements: Best practices

- Technical regulation for mini-grids should be designed, published and controlled by **one responsible regulator.** Regular control of mini-grids and their adherence to technical regulations as well as **verifying compliance with construction codes and standards** before becoming operational, and continuing with **on-going technical monitoring are required** (no need for in site certification, performance test and photos are sufficient)

- The **disbursal of performance-based subsidies can be linked to the adherence to these standards**.

Principle: International Standards

- *"In case a matter is not stipulated in the Technical Standards"*, then IEC Standards shall be applied. If it is not covered in IEC standards, then ISO Standards shall be applied. If it is not covered in ISO Standards, then internationally recognized standards shall be applied subject to the approval

- Engagement with the International Standards. The project developer will be responsible to assure that the manufacturer of the equipment and materials used to assures the transformation from DC to AC and the increase in voltage, is certified with the ISO 9001 and 14001.

Technical requirements PV modules

- Modules could be mono and polycrystalline, they must be certified with the IEC-61215. Other types of modules are possible after acceptance from the Ministry of Energy
- Thin film PV must be tested under the norm IEC-61646. The nominal power must be delivered after the stabilization of the power output
- Certification must be issued by accredited laboratories under the IECQ QC 001 002
- Certification documents must be available at any time

Technical requirements inverters

- Modular type for minimizing the replacement time in case of damage
- Should be certified by an international recognized certification body that it is in accordance with relevant Standards:
  - EMC 2004/108/EC Directive for Electromagnetic Compatibility
  - CYS EN 6 1000-3-3: 1995 Electromagnetic compatibility, limitation of voltage changes, voltages fluctuations and flicker in public low voltage supply systems
  - CYS EN 60950-1:2006 information technology equipment, safety-general requirements

Technical requirements: Scope

- Quality of electric power:
  - Voltage
  - Frequency
  - Continuity of power supply
- Prevention of electric power disasters
- Prevention of electric power outage
- Grounding, connection of conductors
- Communication system, meters
- General requirements medium and low voltage distribution facilities
- General requirements for housing wiring (insulation, grounding, protection against over-current, indoor wiring, et.)

Technical requirements: for main grid connection

- The technical requirements of the main utility need to be met. These include:
  - Overall network safety needs
  - Frequency and voltage regulation
  - Integration of the distribution system into the utility system whether the mini-grid system is able to “island” in the event of grid failure
  - Whether it is used as a “dispatchable” asset of the grid

Chapter 2

Quality of Service Regulation (C2)

Quality of service regulation

These standards generally fall into three categories:

- **Quality of product:** How useable is the electricity? Are there wide variations in voltage or frequency that damage customer appliances?
- **Quality of supply:** How many hours a day? How available is the electricity? Is it available only at inconvenient times, and how frequent are unplanned blackouts?
- **Quality of commercial service:** How good is the SPP's customer service? How long does it take the SPP to resolve a complaint?

Quality of service (product, supply, and commercial service) should:

- Be established and enforced (incl. contact point) by regulator / REA
- Be realistic and affordable to all parties

Quality of service regulation

Example: Quality of supply in Peru

Targeted SAIFI and SAIDI Standards in Peru

Types of service areas	SAIFI (number of interruptions per year)	SAIDI (hours/year)
Urban high density	12	7
Urban medium density	25	10
Rural concentrated	25	10
Rural dispersed	40	10

Source: Revolo Acevedo, 2011.
SAIDI = System Average Interruption Duration Index
SAIFI = System Average Interruption Frequency Index.

Quality of service regulation

Example: Quality of commercial service in Peru

Maximum Time for Making a New Connection (days)

		Without network adaptation	With network adaptation	With installation of new network equipment
Urban	Up to 50 kW	7	21	360
	Above 50 kW	21	56	360
Rural	Up to 50 kW	15	30	360
	Above 50 kW	30	90	360

Source: Revolo Acevedo, 2011

Quality of service regulation

Example: Quality of commercial service in Peru

Standards for Various Commercial Services

	Urban	Rural concentrated	Rural dispersed
Reconnection of service (maximum hours after payment of outstanding bill)	24	24	48
Opening hours of commercial office (hours/day)	8	8	4
Resolution of billing errors (maximum number of days)	30	30	30
Hours of service by call center (minimum hours a day)	24	24	12

Sources:

Quality of Service Standard for Electricity Providers in Peru (seventh chapter of Supreme Decree No. 020-1977-EM), and

Quality of Service Standard for Rural Electricity Providers in Peru (sixth chapter of Decree No. 016-2008-EM/DGE).

Quality of service regulation

For each of the three quality-of-service areas, five basic design questions have to be answered:

- What dimensions of quality of service will be regulated?
- What minimum levels of service will be required for each quality-of-service dimension?
- Who sets the standards? See Obs.
- How are the standards monitored?
- How are the standards enforced?

Obs.: Service standards can also be established by mutual agreement between the provider and its customers

Chapter 3

Environmental Policy and Regulation (C3)

Environmental Protection and Regulation

Environmental regulations ensure that environmental risks and hazards associated with mini-grids are minimised:

- Should include appropriate standards and norms, e.g. for waste products (emissions) or raw material sourcing (biomass, hydro resources)
- Should avoid unreasonable transaction costs (simplified for small projects)

Environmental Approvals

- Completion of an environmental review at <u>whatever level</u> is specified by the national environmental agency
- Review and approval by the river and/or irrigation authority
- Statements from the relevant government agency that the project is not in a protected area (for example, a national park, a wildlife preserve, a protected coastal region, or a protected cultural or archeologic area)

Environmental Protection and Regulation

Mini-grids, especially renewable energy-based mini-grids, are usually environmental friendly compared to traditional or conventional energy sources, and local environmental sustainability can be ensured with appropriate standards and norms

Risk to fauna/flora	Risk that project related activity damage/harm or pollute fauna, flora, groundwater, air
Risk of pollution	Effluents, thermal, air, water biocides, chemicals, dust
Risk of waste	E.g. construction / disposal

Examples:

- Requirement for appropriate plantations for biomass fuel supply to prevent deforestation
- Enforcement of recycling of solar PV panels and batteries at their end-of-life
- Building standards for small hydro plants to ensure minimal impact on river flora and fauna

Environmental Protection and Regulation

Discussion points:

- How should the environmental approvals be coordinated by the different national / regional / local authorities involved in environmental approvals? Should they be done in parallel or sequentially? If performed sequentially, what should be the sequence of approvals?
- How should the environmental approval process be structured if several separate government agencies have legal responsibilities for the sector (for example, ministry of energy, ministry of environment, ministry of agriculture and mines, ministry of natural resources)?

Discussion point specific for (Clean Energy) Mini-Grids:

Technical Regulations

Quality of Service Regulation

Environmental Regulation

Towards a Regional Regulation?

Thank you for your attention!

Tenenbaum et al, (2014). *From the Bottom Up: How Small Power Producers and Mini-Grids Can Deliver Electrification and Renewable Energy in Africa. Appendix C*

DBSA and SAIEA (2007). *Handbook on Environmental Assessment Legislation in the SADC Region.* http://www.commissionoceanindien.org/fileadmin/resources/RECOMAP%20Manuals/Handbook%20on%20Environmental%20Assessment%20Legislation_SADC%20Region_Nov%202007.pdf

The **Partnership Dialogue Facility (EUEI PDF)** currently receives contributions from the European Commission, Austria, Finland, Germany, Italy, the Netherlands and Sweden.

EUEI PDF is an instrument of the EU Energy Initiative (EUEI).