



Standardization and

microgrids for rural electrification

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Introduction

- **IEC** is a global organization that publishes consensus-based international Standards and manages Conformity Assessment Systems
- IEC, ISO and ITU are the three organizations that prepare international Standards to comply with the World Trade Organization Agreement on Technical Barriers to Trade
- **167 countries** are part of the IEC
- The Standards development process ensures transparency about the requirements standardized and their approval (one vote per country)



Scope of the IEC Standards

- Apply to millions of electric and electronic devices that use or produce electricity.
- Deal about safety, performance, interoperability, environmental aspects, electromagnetic compatibility, etc.
- More than 9000 Standards in catalogue
(approx. 500 new or revised Standards published per year)
- The IEC standardization work is divided into **178 subsectors**, each of them being under the responsibility of a Technical Committee / Subcommittee.
- The Standards are written by a community of 20000 experts from the industry, government, testing laboratories, academia, and consumer groups.



| Energy | Efficiency | Label |
|-------------------|------------|-------|
| More efficient | A+++ | A |
| Efficient | A++ | B |
| Medium efficiency | A+ | C |
| Less efficient | A | D |
| Least efficient | A- | E |
| Least efficient | G | F |

And much more !!



Systems approach at IEC

Why?

- multiplicity and convergence of technologies (mobile phones...)
- large-scale infrastructures (Smart Cities, Smart Grid, Internet of Things, ...)
- need to address complexity and inter-operability

Objectives

- build larger collaboration platforms outreaching other standardization organizations
- top down standardization: Systems level standards first

Implementation

- **Systems Committees (SyC):** platform engaging several Technical Committees and external standardization organizations
- **Systems Evaluation Groups (SEG):** temporary open groups evaluating the relevance of the Systems approach for an emerging subject

More on the IEC web site 

Microgrids and electricity access



Community microgrid



Interconnecting communities



Urban suburbs

- **interconnecting several homes of a community**
- **second stage: interconnecting microgrids to create regional grids**
- **allows sharing of resources and to offer punctual high power**
- **not only in rural areas but also urban suburbs**

Microgrids and standardization

Standards provide reference technical information about:

- safety and protection against electric shock
- microgrid design: modelling tools, benchmarking of design options and supplier solutions, etc.
- energy metering
- microgrid management:
 - installation and test
 - operation (balance consumption versus production, etc.)
 - maintenance
 - interoperability of microgrids
 - integration into the main grid (connection / disconnection / synchronization process, power quality requirements, etc.)



Microgrids and standardization

Standards provide reference technical information for:

- issuing tenders and comparing offers
- developing regulations
- detailed interpretation of the law

IEC International Standards are recognized by the World Trade Organization (WTO) as contributing towards compliance with the WTO Agreement on Technical Barriers to Trade



SEG 6 microgrids



Systems Evaluation Group 6 - Non-conventional distribution networks / microgrids

Background and rationale:

- The recent technology evolutions speed up the deployment of microgrids, the industry requests standardization.
- Microgrid technology is a complex transversal technical sector, there is the need to have a holistic approach.

Tasks of SEG 6:

- Address all microgrid types: in large cities for disaster recovery, to prevent black outs at peaks of consumption, for electricity access, etc.
- Analyse the status of the standardization, evaluate the gaps, the stakeholders, and propose a global strategy for the IEC.

SEG 4 LVDC



Systems Evaluation Group 4 - Low Voltage Direct Current applications, distribution and safety for use in developed and developing economies

Background and rationale:

- increasing use of DC loads (LEDs, multimedia & mobile devices, e mobility, etc.)
- increasing use of DC power generators and DC power storage (solar and wind energy, batteries)
- A large number of standards need to have DC provisions added to the existing AC one, but in a coordinated way.

Tasks of SEG 4

- provide a global strategy to shape the IEC for addressing LVDC standardization
- focus on electricity access



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