Project document

Smart grids
in Latin America and the Caribbean

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Executive summary

Aim of the study:

The study aims at unveiling the potential of smart grids technology deployment in the Latin America and the Caribbean (LAC) Regions. Founding on a general discussion of the smart grids functionalities and on the description of the progressive evolution of an electricity system from the present state towards the full deployment of smart grids concept, the study puts the concept into the LAC context through the preliminary analysis of the present situation in six representative countries. Challenges and opportunities for the evolution of the local systems towards smart grids are pointed out, motivating policy makers to address the subject and understand its potential. Although acknowledging the wide difference between the network situations in the LAC region, the different drivers that may motivate the network development and the consequent variety of targets to be reached, a general Decalogue is proposed highlighting the most important implementation priorities to be considered. The instrumental role of CEPAL in this process is also put in evidence, at the light of the recent developments in the international smart grids community.

Definition:

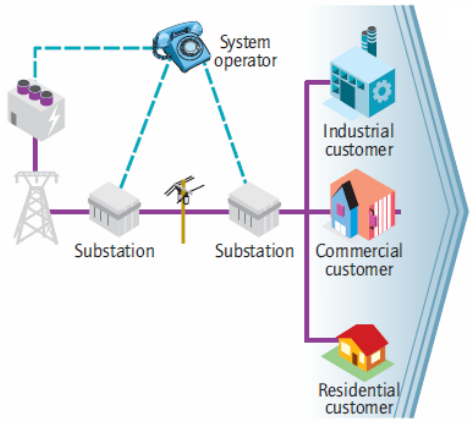
According to the Technology Roadmap on Smart Electricity grids recently published by the IEA[1], a smart grid is "an electricity network that uses digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end-users. Smart grids co-ordinate the needs and capabilities of all generators, grid operators, end-users and electricity market stakeholders to operate all parts of the system as efficiently as possible, minimising costs and environmental impacts while maximising system reliability, resilience and stability".

Functionalities:

Smart grids constitute therefore the progressive evolution of the electricity network form the situation represented in Figure 1 in which electricity produced in (large size) power plant (based on different types of primary energy: fossil, nuclear, hydro, geothermal etc.) flows unidirectionally, through the transmission and distribution systems, to final users (industrial, commercial, residential), towards the full-features deployment shown in Figure 2, where the smart grids potential is fully deployed.

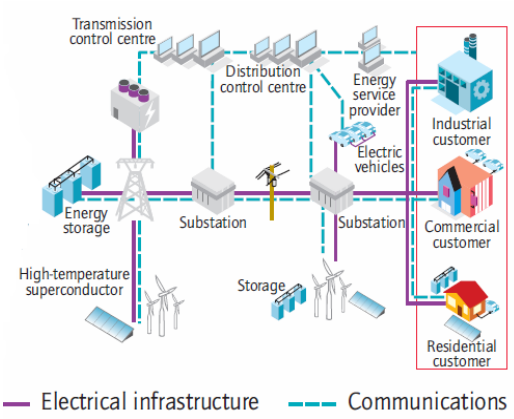
[1] Technology roadmap Smart grids – IEA – downloadable from the website: www.iea.org

FIGURE 1
SCHEME OF THE ELECTRICITY SYSTEM BEFORE THE TRANSITION TO SMART GRIDS



Source: IEA.

FIGURE 2
SCHEME OF THE ELECTRICITY SYSTEM SHOWING A FULL DEPLOYMENT OF SMART GRIDS FEATURES AND TECHNOLOGIES



Source: IEA.

The electricity system integrating the smart grids technologies and functionalities is constituted by an additional information layer applied on top of the power system and by additional power equipment. The information layer enables the implementation of system automation and protection features enhancing the capacity to integrate large shares of variable renewable energy sources on the generation side and