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Title - How Smart Can Energy Regulation Be?

Electrical energy is the fuel of any modern economy. The sustainability and development of an economy requires that the operational risk to both the users and the suppliers of electrical energy be properly contained. A governmental mandate to an energy regulator to actively participate in the electrical energy business aims amongst others to contain this operational risk.

Opportunities to smart regulation of voltage quality exist in this smart grid. Analysis of The 5th CEER Benchmarking Report on the Quality of Electricity Supply, 2011 identified a number of smart opportunities. In this paper, it is evaluated and translated to the functional requirements of a smart grid when in use by an energy regulator.

Different models of regulating electrical energy have been seen to achieve more or less the same in developed and developing countries. A competitive Electrical Supply Industry (ESI) has the ability to self-regulate to some extent, but in developing countries a non-competitive ESI is the norm. The role (and importance) of the energy regulator is then even more evident.

It includes more than the economic principles of selling and buying. The energy regulator has to fully understand the business and technical risk presented to both the ESI and the users to achieve regulatory goals. Energy regulators can derive useful information by exploiting smart grid technology. It is needed to clarify what “smart” really means. For different role players, it signifies different meaning, even different opportunities. Suppliers of smart meters, for example, promote the widespread installation of “smart billing meters” as the first step to a smart grid. A billing meter with two-way communication is certainly smart, but the IEEE has a more comprehensive “smart” vision: “The smart grid is an electrical network from the generation of electrical energy until the delivery to end-users, which make use of the latest advances in wireless and other communications technology and intelligent information managements systems to ameliorate the robustness, reliability, energy efficiency and security of such network.”

Quality of supply was researched by the Leonardo Energy (<http://www.leonardo-energy.org/>) in 2007 to affect the European economy by at least 150 billion Euros a year. Practical experience point towards an increasing trend in losses as development and innovation with technology enabled creating levels of sophistication in energy conversion and control. It commensurate with increased levels in susceptibility of user equipment to supply disturbances. On the other hand, this equipment can contribute to increased levels of emission.

Both users and suppliers of electrical energy are affected. Users note an increase in costs operating this equipment whilst an increase in network tariffs is needed to contain the voltage disturbances. Voltage quality is a technical complex aspect of regulating the Quality of Supply.

It is therefore shown in this paper how smart grid technology can be exploited by energy regulators in developed and developing countries to “smartly” implement some of the recommendations of the Council of European Energy Regulators. Smart regulation can be made practical so “that consumers get fair prices, the widest choice of supplier and the best quality of supply possible”.