

Summary Report - Session 6 Electricity distribution business and impact of regulation

Chairman Pertti LINDBERG

Finland
pertti.lindberg@energia.fi

Special Rapporteur Jarmo PARTANEN

Finland
jarmo.partanen@lut.fi

Introduction

The role of electricity will be crucial to meet the EU 20-20-20 targets; the reduction of CO₂ emissions, an increase in energy efficiency and enabling renewable generation in 2020. The car industry is in a turning point, and the take-off of electrical vehicles may be quite near. The electricity markets in the future will call for intelligent demand response actions based on market price, energy saving, management of dynamic/mobile loads, energy storages and local generation. These processes will involve new business and regulation models for distribution networks as well as new technical solutions and include new organisational structures and administrative routines, new solutions for a customer gateway, automatic meter management systems and commercial IT system tools.

Session 6 reflects on the above topics, and the 85 accepted papers for the session were grouped accordingly into the following blocks.

Block 1 was related to Smart Grid programs, the present state and future expectations of regulation and their impact on the networks and business of the DSOs. For the block, 29 papers were selected, out of which six were chosen for presentation in the main session. 23 papers will be presented in the poster session.

Block 2 was related to experiences of smart metering and applications based on AMR. For the block, 15 papers were selected, out of which six were chosen for presentation in the main session. 9 papers were presented in the poster session.

Block 3 was related to the demand response and business impact of electrical vehicles. For the block, 17 papers were selected, out of which six were chosen for presentation in the main session. Six papers were presented in the RIF (research oriented papers) session and five papers in the poster session.

Block 4 was related to the role of information systems in a Smart Grid Environment. This block also included papers

focusing on pricing and tariffs, on the risk management and organisational structures of DSOs. For the block, 24 papers were selected, out of which six were chosen for presentation in the main session. 18 papers were presented in the poster session.

In round table sessions topics of “Role of DSOs in Smart Grid environment”, “Smart grid development programs in different countries” and “AMM and energy services” were analysed and discussed.

Key contributions and findings

Smart Grid development programs

Research and development of a Smart Grid environment and applications have exploded worldwide. In most countries there are ongoing wide-scale Smart Grid programs. In Europe there are more than 50 large scale programs going on. CIRED working group “Smart Grids” led by prof. Markus Zdrallek is determining the state of art and main functionalities of Smart Grids. In future it is important to have a good interaction between SG development programs and by that way reach results as good as possible. Informing about the results effectively and openly to all interest groups and adapting the results widely are very important.

Main focus on Smart Grid programs is to develop systems, technology and business models enabling DG integration, dynamic load response and energy efficiency at customer level and enhance the reliability of distribution grid.

AMM and energy services

In many countries large scale AMM projects and “roll outs” are going on, for instance Endesa - Spain with 13 million meters and ERDF- France with total volume of 45 million meters. In the first phase Smart Grid applications are based mainly on AMM. Worldwide challenge is to efficiently utilize the information available from smart meters. One new and significant application area of smart meters is the management of safety and quality of supply

of low voltage networks. In Nordic countries, where AMM systems are already in use, distribution companies have got first experiences about service potential. E.g. Vattenfall Ltd has integrated smart meters data and operation management for LV fault management. It has got huge benefits of smart meters during major storms; applications for automatic disconnection of customers having broken neutral and enquiry of lv-customer connectivity has shown their applicability in practice.

Regulation

Regulation of electricity distribution business in different European countries is seems to be more harmonized slowly. However at the same time regulation is evolving into more detailed topics and rules. In practice there exists huge difference in regulation models applied in different countries.

The regulatory framework concerning achievability of regulated Rate of Return and regulatory stability differs very much. In Great Britain, Finland and Slovenia the situation is best, in Spain and Norway it seems to be worst. Other countries are between (paper 0292)

One the most important topics in regulation to be developed is the question "How regulation can enable and accelerate the development of functionality of Smart Grids". Paper 0292 written by EURELECTRIC focuses on the challenges faced by the European DSOs when investing in Smart Grids and introduces principles towards smarter regulation. In the paper, the results of the survey of the status quo of economic regulation are presented.

The message for regulators is to enable all investments required in Smart Grid development. Special incentives for high risk innovative investment programs are needed, too.

Role of DSOs in Smart Grid environment

What is the role of DSOs in future Smart Grid environment. That question was dealt in many discussions and in paper 0836 introducing EEGI and EDSO the initiative to develop European Smart Grids. In many countries the role of retailer on customer connection and services is increasing. It seems that in most cases the retailer will be the contact partner to end users (one door principle). Demand response and load control are the key functionalities in Smart Grid concepts. In management of demand response resources the main perspective seems to come from the energy market point of view. However, it is important also for the DSOs to have a good understanding of possible changes in the load curves, peak powers and grid losses when demand response resources are activated by the customer, energy supplier or aggregator. As a result of demand response load curves seen by distribution grid will be dynamic and controlled mainly by retailer and customers. Energy efficiency functions and increase of customer level

production set also new challenges for estimating future powers and energies transmitted through distribution grid.

Changes on distribution tariffs seem to be inevitable if customer level incentives also for efficient use of distribution network capacity are wanted. Trend for capacity based (€/A) distribution tariffs seem to be one feasible solution from DSO point of view.

Electrical vehicles and business of DSOs

A lot of research and development work is going on with the smart integration of electrical vehicles and electrical grids. Most of the presented papers deal with the management and operation of a recharging eco-system. As a conclusion a managed charging is required. In the long term (after 2020) V2G functionality is expected, too.

In some countries there are plans to require a standardized charging equipment having functionality to communicate with DSO's operation systems. By that way it's possible to manage the charging without overloading of distribution network

On-line management of charging transactions requires cooperation with the power and ICT sector players. Plans for common European level clearing housing system for billing management was presented in two papers, 1273 and 0398.

The penetration of EV's is estimated to grow slowly in near future, in 2020 5-10 % of new cars will EVs..