



ERGEG position paper on Smart Grids

An important dimension for cost-efficient investments

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- The consultation on the ERGEG Position Paper on Smart Grids
- ERGEG's understanding of Smart Grids and their drivers
- Smart grid solutions and regulatory challenges
- A first priority for regulators: identification and regulation of network outputs
 - Example of performance-based incentive regulation
 - Some effects and benefits of smart grids
 - Some potential performance indicators (for transmission)
- Other priorities for regulators, with focus on support to innovation

General remarks

- In 2008, the European Energy Regulators decided to define a common point of view on Smart Grids
- In June 2009, a Workshop was organised to involve stakeholders during the preparation of the ERGEG Public Consultation on Smart Grids
- On 17 December 2009, ERGEG published its Position Paper on Smart Grids for public consultation until 1 March 2010: 50 contributions were received
- On 17 March 2010, ERGEG Workshop on Smart Grids with the participation of more than 100 people
- All responses were published and the conclusions paper is being published very soon www.energy-regulators.eu

Understanding Smart Grids

- The European energy policy pillars:

Sustainability

Security of supply

Competitiveness

- ERGEG's understanding of Smart Grids (adjusted from the definition by SmartGrids Technology Platform):

Smart Grid is an electricity network that can cost efficiently integrate the behaviour and actions of all users connected to it - generators, consumers and those that do both - in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety.

- Comprises both transmission and distribution networks
- Scope of smart grids includes **smart metering**

- Large-scale renewable energy sources including intermittent generation
- Distributed generation including small-scale renewable energy sources
- Market integration and market access
- Improved operational security
- Active consumers' participation, with better information and “smarter” pricing

Smart Grid solutions

- Apply increased intelligence to the way networks are designed, planned, build, operated and maintained
- A general (not yet proven) belief that the needs from the network of the future will be delivered at lower costs with smarter solutions than with conventional solutions on a business as usual path
 - Hence smart solutions must be developed and approved through demonstration projects, otherwise there is a real risk that opportunities will be missed or delayed
 - Lack of active network evolution could constrain the delivery of the EU's goal for 2020 and further future targets

Regulatory challenges

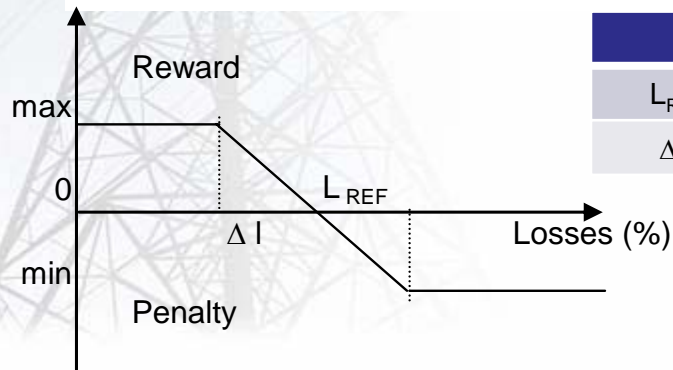
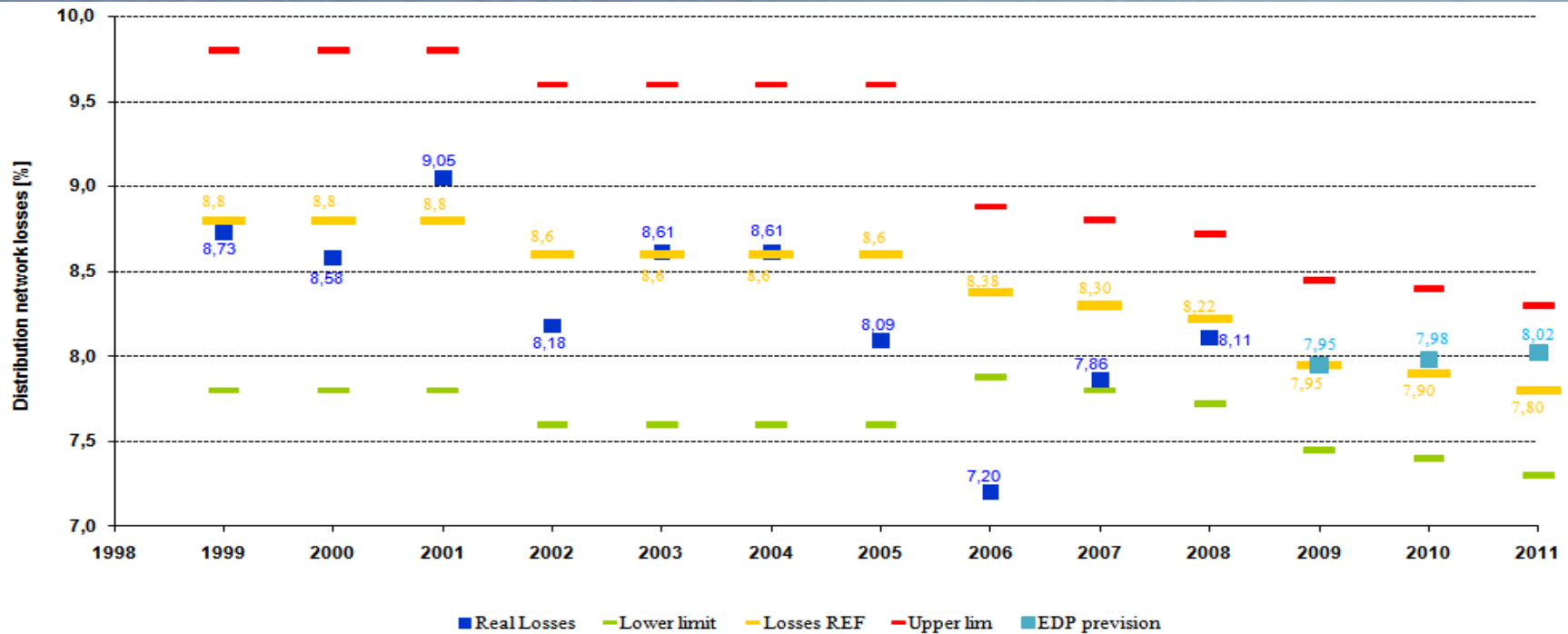
- Ensure stable long term return of investments
- Enable new services with a technology-neutral role (smart grid as a means to an end, not an end in itself)
- Allow operators to **prioritise more efficient solutions** by incentivising them
- Identify and remove barriers, e.g. decoupling of grid operators' profits from delivered volumes, which would be against energy efficiency
- Incentivise innovation, whereas protecting users' interest and ensuring **value-for-money** grid development
- Push grid companies to be more user-centric



Priority: regulation of outputs

- A key principle of good regulation is to concentrate on outputs of the regulated entity and effects of a given activity
- Regulation of outputs can be done by:
 - direct regulation, i.e. minimum requirements for certain parameters
 - performance-based incentive regulation providing financial rewards and penalties related to some parameters
 - benchmarking and comparative publication of company-specific performance results
- It requires:
 - sound definitions of performance targets and indicators, which must be available to observe, quantify and verify the regulated performance indicators, by clear and transparent measurement rules
 - performance targets strictly related to the pursued objectives and therefore cleansed of external effects outside the control of operators

Example of performance-based incentive regulation: reduction of distribution losses in Portugal



	1999-2001	2002-2005		2006	2007	2008
L_{REF}	8,8%	8,6%	L_{REF}	8,38%	8,30%	8,22%
ΔL	1,0%	1,0%	ΔL	0,50%	0,50%	0,50%

	2009	2010	2011
L_{REF}	7,95%	7,90%	7,80%
ΔL	0,50%	0,50%	0,50%

Ackgt.: ERSE

Identification of benefits and performance indicators (1)

- Identification of eight categories of Smart Grids benefits
- Example of potential metrics for transmission

Benefit	Potential performance indicators
(1) Increased sustainability	Quantified reduction of carbon emissions Environmental impact of electricity grid infrastructure
(2) Adequate capacity of transmission and distribution grids	Allowable maximum injection of power without congestion risks in transmission networks Energy not withdrawn from renewable sources due to congestion and/or security risks
(4) Satisfactory levels of security and quality of supply	Duration and frequency of interruptions per customer Voltage quality performance of electricity grids (e.g. voltage dips, voltage and frequency deviations)

Identification of benefits and performance indicators (2)

Benefit	Potential performance indicators
<p>(5) Enhanced efficiency and better service in electricity supply and grid operation</p>	<p>Level of losses in transmission and in distribution networks (absolute or percentage)</p> <p>Actual availability of network capacity with respect to its standard value (e.g. net transfer capacity in transmission grids, DER hosting capacity in distribution grids)</p>
<p>(6) Effective support of trans-national electricity markets</p>	<p>Ratio between interconnection capacity of one country/region and its electricity demand</p> <p>Exploitation of interconnection capacity (ratio between mono-directional energy transfers and net transfer capacity)</p>
<p>(7) Coordinated grid development through common European, regional and local grid planning</p>	<p>Benefit (7) could be partly assessed by:</p> <ul style="list-style-type: none"> - impact of congestion on outcomes and prices of national/regional markets - societal benefit/cost ratio of a proposed infrastructure investment - Time for licensing/authorisation of a new electricity transmission infrastructure.

Other priorities for regulators

- Identification and regulation of outputs as first priority
 - Direct requirements
 - Performance-based incentive regulation
 - Effects and benefits of smart grids
 - Potential performance indicators
- Other priorities:
 - Regulators to support research and innovation
 - Regulators to facilitate cooperation among stakeholders, with a focus on standardisation
 - Participation of regulators in the Task Force for Smart Grids

**BUT THIS IS
NOT ENOUGH!!**

Investing in innovation (1)

- Regulators should further support the increasing efforts and international cooperation in R&D in the field of electricity grids and smart solutions and promote their effectiveness
- Regulators consider it important to distinguish between:
 - R&D, usually funded by national or EU public sources
 - grid-specific demonstration and initial deployment, where **measurable benefits to identifiable users** could justify the inclusion of costs in regulated tariffs
- The performance based approach could fit well the deployment phase, whereas different approaches for incentivising the demonstration phase might be opportune

Investing in innovation (2)

- Regulators contributed to the European Electricity Grid Initiative, favouring a framework targeted:
 - to define performance indicators for each demonstration project
 - to identify ex-ante and verify ex-post their **costs and benefits to users**
 - to improve replicability and openness of the projects
- It is up to each NRA to evaluate benefits/costs of possible demonstration projects, according to national priorities and taking benefit of the suggested framework
- In cases where demonstration projects are co-financed by grid tariffs paid by network users, ERGEG recommends to ensure dissemination of results and **lessons learned** to all interested parties

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