Smart electricity grids in a context of sustainable development objectives – the industry perspective

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EURELECTRIC

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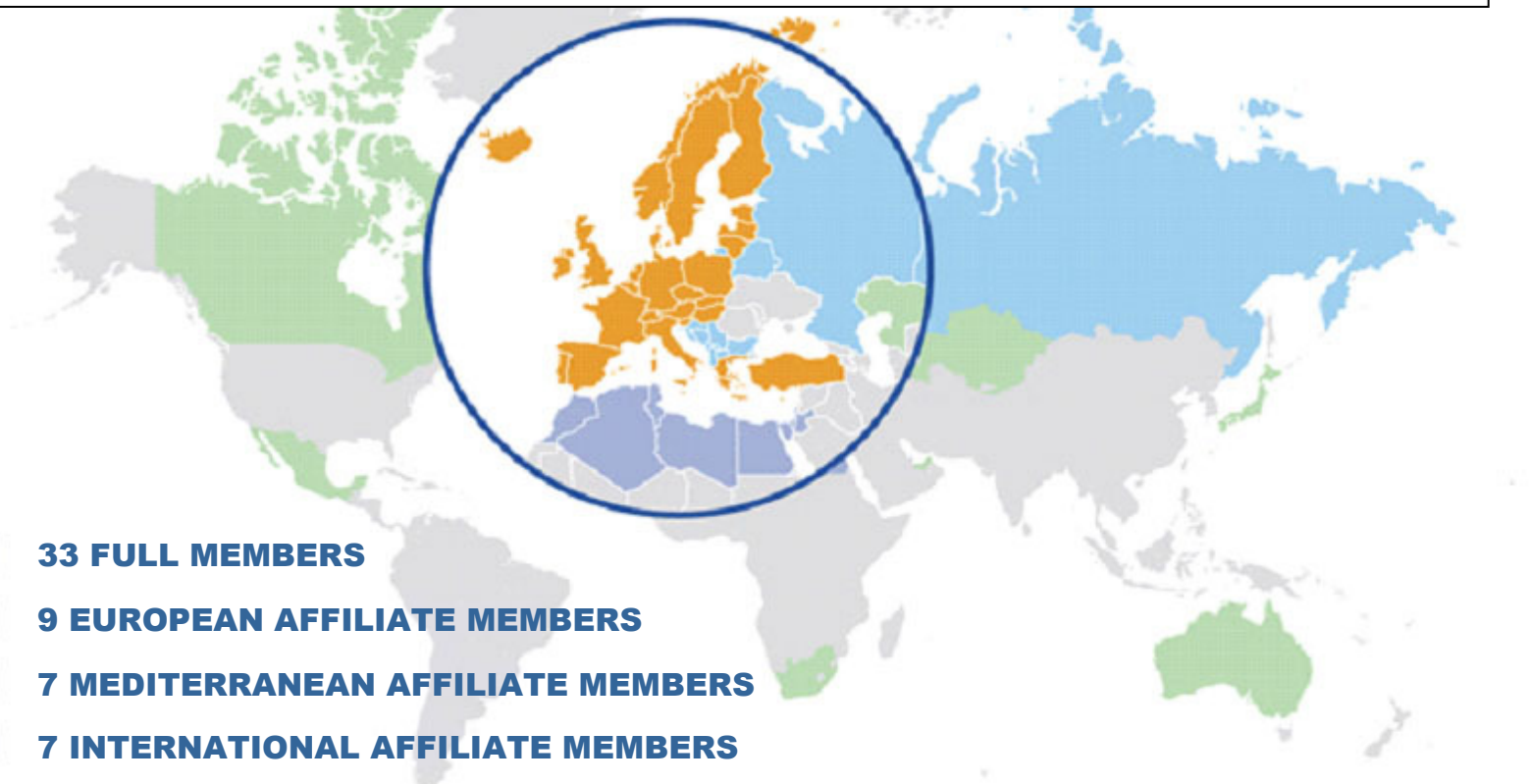

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EURELECTRIC represents the whole value chain of the European electricity industry

Generation > Trading/ Wholesale > Retail > End-customers

Generation > Transmission > Distribution > End-customers

(MoU with TSOs)

Highlights

1. We need smart grids to achieve energy policy goals
2. We need smart regulation to enable grid companies to invest in new technologies and facilitate market development
3. We need to add “smartness” to the regulatory framework

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We all know these targets…

2020

20%
20%
20%

Do these targets imply a Smart Grid….and will the sum add up to 60?

The IEA sees about 6 500 billion USD investments into the global power grid by 2030

Distribution
4 500

Transmission
2 000

Extension and renewal

Power
Generation
7 200

∑ 13 700

Cumulative rounded
in billion USD (without inflation)
Years 2008-2030

Source: IEA World Energy Outlook 2009; p.106; own calculations

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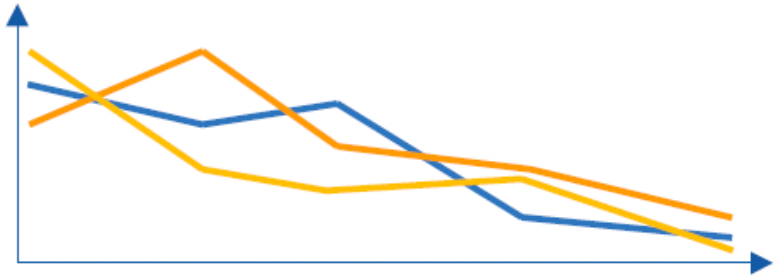
Smart metering

- Smart meters
- AMI and customer information portal
- Tariffs and billing systems
- Database for network information

Power management

- Integration of distributed generation
- Preparations for large market penetration of EV/PHEV
- Power flow and power balance control
- Island operation



Fault management

- Network automation equipment
- Smart assets (substations, cables etc.)
- Self-sectioning/self-healing network
- Outage management systems
- Mobile equipment (generation, transformer, switchgear etc.)

Asset management

- Monitoring and diagnostics
- Decision support tools (risk based analysis)
- Net and asset strategy planning tools

Communication and system integration

- Communication infrastructures
- Communication standards
- System integration
- Cyber security

Smart Grids is a concept that describes an evolution rather than a revolution

+ Network reinforcement and interconnection
+ Network automation
+ Distributed Generation
+ DSM
+ Data management

= Smart Grids

Evolution

Revolution

The role of electricity: The 20-20-20 targets are interlinked

- **Triple efficiency benefits of using electricity:**

- 20% reduction in CO2 emissions

- 20% increase in energy efficiency

- 20% contribution of renewables in the energy sector (resulting in 35% for the electricity sector)

….and the grid is there to connect and facilitate…

The requirements of the 20/20/20 targets, customer needs and electric vehicles integration will change DSO mission

New Challenges:

- Much higher share of distributed and/or intermittent generation
- Consumers will participate actively in the market (producing, managed load)
- Energy efficiency targets
- Facilitate the moving load (electric vehicles)

Balancing intermittent power requires network investments in one way or the other

- Better connection of markets in order to get a better balance of generation and consumption
- Better physical interconnection of the transmission grid and new lines in order to allow wide area transmission and balance
- Increased use of energy storage options
- Installation of additional peak power plants
- Increase of capacity and interconnection of distribution grids
- To be a transparent gateway to Demand Side Management

Stronger case than ever for DSM (Demand Side Management)

- **More useful:** More intermittent power (renewables) that needs to be balanced -> volatile power prices
- **More to play with:** Higher energy efficiency increases electricity demand (electric vehicles, spatial heating…) and distributed generation
- **Better tools:** New Information and Communication Technologies available to steer demand based on demand analysis

Electrical grids play an important role

- The future will be greener, however, it also will be more electric
- Smart grids for smart customers
- If you like renewables you also have to have like electrical lines

Highlights

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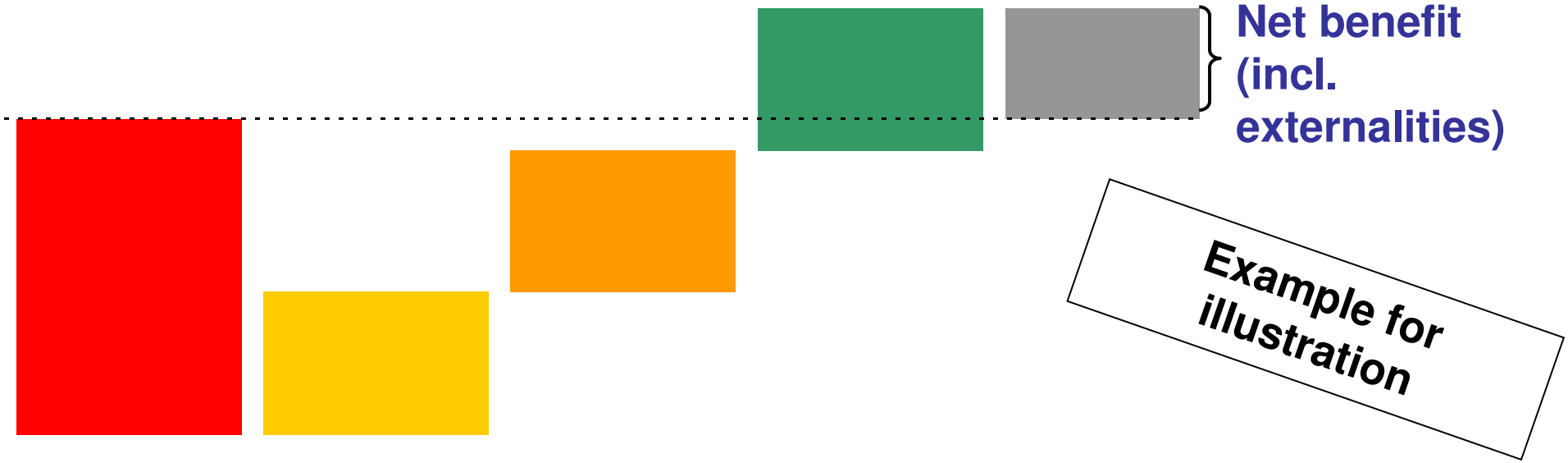
Investments for smart grids might benefits several parties but are often only done by DSOs



Unbundling poses a challenge to the development of smart grids and has to be dealt with

- Existing unbundling rules pose a challenge for synchronisation of network investments and the creation of new services.

- Interoperability standards enable the market to compensate for lack of synchronisation due to existing functional and information unbundling

- Not everything must be regulated but regulation is needed to create the right environment for a market to be developed

A stable and predictable regulatory framework ensures market development and avoid stranded investments

- Danger of stranded investments (smart meters)
- For customers to put trust in new technologies data protection issues must be addressed in a credible and predictable manner
- In order to give equal access to new players in the new market interoperability of technology is key for success.

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The cost and risks incurred cannot all be covered by the market or existing recovery mechanisms

Eurelectric is willing in continue to cooperate with the regulatory bodies in order to establish the best possible solutions for the future market to work.

Ideas for adding "smartness" to the regulatory framework (1/2)

- Internalise positive externalities
- Foster collaboration projects among stakeholders
- Tariff of use – reallocate network tariffs among stakeholders

Ideas for adding "smartness" to the regulatory framework (2/2)

- **Performance based ratemaking** (guaranteed/overall standards)
- **Smart Grids factor** in regulation formula (direct effect on DSOs revenues)
- **Load revenues** – charge customers for actual load (capacity tariff €/kW)

Conclusion: Regulation must…

- Open new market opportunities for existing suppliers and new players
- Empower the customers to make use of new possibilities
- Contribute to define the right market model
- Incentivise investments in new technologies with positive externalities

Thank you!

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