

Regulation for Smart Grids

The **Union of the Electricity Industry–EURELECTRIC** is the sector association representing the common interests of the electricity industry at pan-European level, plus its affiliates and associates on several other continents.

In line with its mission, EURELECTRIC seeks to contribute to the competitiveness of the electricity industry, to provide effective representation for the industry in public affairs, and to promote the role of electricity both in the advancement of society and in helping provide solutions to the challenges of sustainable development.

EURELECTRIC's formal opinions, policy positions and reports are formulated in Working Groups, composed of experts from the electricity industry, supervised by five Committees. This “structure of expertise” ensures that EURELECTRIC's published documents are based on high-quality input with up-to-date information.

For further information on EURELECTRIC activities, visit our website, which provides general information on the association and on policy issues relevant to the electricity industry; latest news of our activities; EURELECTRIC positions and statements; a publications catalogue listing EURELECTRIC reports; and information on our events and conferences.

EURELECTRIC pursues in all its activities the application of the following sustainable development values:

Economic Development

- ▶ Growth, added-value, efficiency

Environmental Leadership

- ▶ Commitment, innovation, pro-activeness

Social Responsibility

- ▶ Transparency, ethics, accountability

Regulation for Smart Grids

Subgroup Regulation for Smart Grids – Networks Committee

Manuel RODRIGUES DA COSTA (PT) Chair

Louise BANBURY (GB); Ignacio CASTRILLON (ES); Han J. DAMSTE (NL); François DISPOT (FR); LINQUIER Erik (FR); Carlos GONZALEZ GUTIERREZ-BARQUIN (ES); Oliver GUENTHER (DE); Per HALLBERG (SE); Jörg JASPER (DE); Michel LEFORT (BE); Sandra MAEDING (DE); Marcus MERKEL (DE); Jens NOACK (DE); Niels Christian NORDENTOFT (DK); Andy PHELPS (GB); Manuel RODRIGUES DA COSTA (PT); Bengt SODERLUND (FI); Trond SVARTSUND (NO); Ludmila VRBOVA (CZ).

Contact:

Pierre Schlosser, Adviser

pschlosser@eurelectric.org

Gunnar Lorenz, Head of Unit

glorenz@eurelectric.org

Table of contents

1. Executive Summary	7
2. Introduction	9
3. Smart grids need smart regulation	13
3.1 Smart grids are driven by real needs	13
3.2 Smart grids imply more capital expenditure for DSOs	14
3.3 Smarter regulation is fundamental	15
4. EURELECTRIC survey on the status quo of economic regulation related to smart grids	17
4.1. The CAPEX time-shift problem	17
4.2 A narrow view of cost-efficiency measures does not take into account the added value of smart grid investments	19
4.3 Both suboptimal rates of return and regulatory instability are hampering smart investments in distribution grids	19
4.4 Can output regulation solve it all?	21
4.5 Lack of clarity and an uncertain horizon for cost-recovery are slowing down Europe's smart metering roll-out	22
4.6 Clear roles and responsibilities for data management are needed	23
5. EURELECTRIC recommendations towards lifting the barriers to an optimal smart grids implementation using smarter regulation	27
• General recommendations	27
• Recommendations to ACER/ERGEG, national energy regulators and European Member States	28
• Recommendations to the European Union	30
ANNEX 1	31
ANNEX 2	31

“Expanding and improving Europe’s energy networks will be vital for Europe’s transition to a low-carbon economy. Smarter distribution grids will be needed to integrate increasing amounts of decentralised generation, electric vehicles and heat pumps into the network and encourage consumers to actively manage their energy demand. This will require additional investment in new infrastructure.”

1. Executive Summary

Expanding and improving Europe's energy networks will be vital for Europe's transition to a low-carbon economy. Smarter distribution grids will be needed to integrate increasing amounts of decentralised generation, electric vehicles and heat pumps into the network and encourage consumers to actively manage their energy demand. This will require additional investment in new infrastructure.

Examining the current regulatory frameworks across Europe, EURELECTRIC has found that they often do not provide adequate incentives for network companies to undertake the higher levels of investment required to deliver necessary improvements. This paper highlights some of the major shortcomings of the current frameworks and urges national regulators to establish a 'smarter' approach to regulation that will incentivise Europe's network operators to make these much-needed investments. It also makes a number of detailed recommendations to feed into related discussions with the European Commission, ACER/ERGEG/CEER and other stakeholders.

The survey found that:

- **Sub-optimal rates of return and regulatory instability are hampering investment in smarter distribution grids.**
- **The roll-out of smart meters is being delayed by a lack of clarity regarding the roles and responsibilities of individual market players.**
- **Regulators are taking a narrow view when evaluating cost efficiency, penalising extra expenditure on R&D or smart grid pilot projects and encouraging business-as-usual expenditure instead.**

Based on these results, EURELECTRIC considers efficient regulation at national level to be the key tool for driving the European development of a highly modernised grid. To ensure investments in smart grids, national regulators should focus more strongly on long-term requirements and provide a fair rate of return. This will imply revising the regulatory models of certain EU Member States.

EURELECTRIC invites the European Commission to keep the momentum on smart grids and continue pushing for their development and implementation in Europe. A political signal from the EU, as a first step in the form of a Communication on the implementation of smart grids, would raise awareness on regulatory barriers and missing incentives for DSOs to invest in smart grids at national level. In addition, EURELECTRIC is in favour of assessing legislative measures such as annexes to the existing directives or a specific Directive on Smart Grids along with national roadmaps that should confirm the leading role of DSOs on smart grids.

Lastly, EURELECTRIC strongly supports the SET Plan and the European Electricity Grid Initiative, believing that large-scale demonstration projects will be needed to accelerate and optimise smart grid implementation in Europe to the benefit of customers.

“The current regulatory framework does not sufficiently encourage investments in distribution grids. Any business-as-usual approach will thus not lead us into the future.”

2. Introduction

Europe's Distribution System Operators (DSOs) are facing considerable challenges, mainly driven by the need to achieve the 20 % Renewable Energy Sources (RES) target by 2020. This target will result in the large-scale integration of RES (mainly wind and photovoltaic) by DSOs.

Although European DSOs are convinced that this growing share of decentralised generation will contribute to a low-carbon society, connecting these often intermittent distributed generation capacities to the distribution grid will also lead to increased challenges in balancing the power grid and making the overall power system more flexible. Expanding and improving Europe's electricity networks is therefore vital for the smooth integration of decentralised energy resources such as RES, electric vehicles, heat pumps and storage.

However, the current regulatory framework does not sufficiently encourage investments in distribution grids. If unaddressed, this problem will result in congestion in the distribution networks, higher risks of outages, bottlenecks for RES integration and a loss of quality of supply. **Any business-as-usual approach will thus not lead us into the future.**

Investments in Europe's distribution grids will hence need to be incentivised by national energy regulators. Once this critical condition is met and DSOs dispose of favourable investment conditions, they will face two options:

1. They can follow the “**fit and forget approach**”, often referred to as the “copper-plate scenario”. This approach entails heavy investments in additional distribution lines in order to prepare distribution grids for a large intake of RES electricity. This means over-sizing the distribution grid to avoid congestion during the few periods of strong wind or sunshine – comparable to building four- or five-lane automobile highways to avoid potential congestion hours.
2. Alternatively, DSOs can follow the “**smart grids approach**” which consists of investing in Information and Communication Technologies (ICT) that will help them to better manage the electricity flows and limit the need for new lines. By using ICT (including smart metering) to monitor, control and automate the distribution grid, DSOs can optimise the use of current assets.

While the “smart grids approach” provides a better allocation of resources in the long run, it is very likely to result in higher capital expenditures (mainly in ICT) in the short and medium term, compared to the “fit and forget approach”. However, the “smart grids approach” will also bring about many benefits to other actors such as energy suppliers and, most importantly, to customers.

European DSOs look forward to taking up the important role they will have to play in enabling the upcoming changes in both generation and consumption. To accommodate this transformation process, we are convinced that grids will have to become smarter and that innovation will be needed in both engineering and regulation to find the correct solutions. **While EURELECTRIC favours the “smart grids approach”**, this report will also explain that the existing economic regulation does not favour investments in distribution grids, even under the “fit and forget scenario”.

Accordingly, the purpose of this paper is to assess the current regulatory challenges which European DSOs face when investing in smart grids, and to establish principles towards smarter regulation. EURELECTRIC intends to contribute to the discussion with ACER/ERGEG/CEER, the European Commission and other stakeholders on smart regulation for smart grids.

To that effect, we have conducted a **survey among EURELECTRIC members to gather information about the effectiveness of current regulatory schemes in incentivising network investment, including smart metering**. Based on the results, this paper analyses the main barriers hindering the smooth transition to smarter grids in Europe. The paper then recommends key principles for effective regulation to support this transition.

“According to figures from the International Energy Agency, the investment needs in the European distribution network will amount to 480bn euros up to 2035.”

3. Smart grids need smart regulation

Smart grids should not be implemented for their own sake, but should be considered as a possible solution to operational and societal challenges. They will address new needs (3.1) and will also result in positive benefits and return in the long run (3.2). Regulation will play a key role in incentivising a smart allocation of resources by DSOs over the next 40 years (3.3).

3.1 Smart grids are driven by real needs

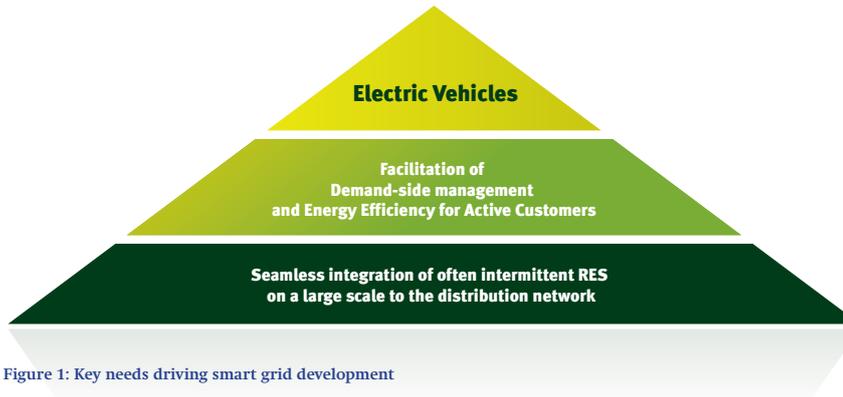


Figure 1: Key needs driving smart grid development

A useful definition of smart grids has been developed by the EU’s Smart Grids Technology Platform, according to which smart grids are “electricity networks that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.” More concretely, smart grids are about upgrading, expanding, operating and maintaining the electricity networks of the future in a way which will also help to meet the EU’s 20/20/20 objectives and contribute to a low-carbon economy. These ambitious targets for the year 2020 include a 20% reduction in greenhouse gas emissions, a 20% share of renewables in final EU energy consumption, and 20% savings in consumption by improving energy efficiency.

Smart grids are key to reducing carbon emissions, improving energy efficiency and enhancing a better asset management by:

- Facilitating a higher penetration of renewable (e.g. wind, solar) and distributed generation (e.g. small windmill or micro-CHP plants) in compliance with operational security, power system and electricity market efficiency;
- Helping consumers to participate more effectively in the market not only by using their energy more efficiently (e.g. through smart metering and “smart homes”), but also by allowing consumers to act as producers selling back their excess electricity (e.g. CHP or plug-in electrical vehicles);¹
- Enhancing DSO grid operation tools

¹ ERGEG Factsheet “Smart Grids and Smart Regulation Help Implement Climate Change Objectives”.

3.2 Smart grids imply more capital expenditure for DSOs

Although smart grids will enable more efficient grid operation and a better integration of RES, and will accommodate stronger demand-side participation, they will – at least at the outset – also lead to higher capital expenditures. Implementing smart grids requires additional investment in the grids and their automation, and thus also in the communication infrastructure between grid operators, the grid and customers (generators, consumers and even storage owners) as well as in adequate metering systems. The future challenges of “smartening” the electricity networks will differ greatly from the challenges faced in the past.

Adapting the networks to growing electricity demand and new requirements, as well as investing in necessary replacements will therefore require significant capital expenditure on the part of European DSOs. According to figures from the International Energy Agency, **the investment needs in the European distribution network will amount to 480 bn euros up to 2035².**

As shown in the graph below, the benefits from these investments will accrue throughout the value chain from generators, suppliers and customers to society as a whole. This is why economic regulation defining the conditions for the so-called socialisation of a major part of the investments is key for the successful implementation of smart grids. Indeed, the current financing model applied by the national regulators to DSOs has traditionally been geared towards driving down costs. It is therefore not an appropriate tool to enable DSOs to fulfil their expanding role in the future. As a result of the current regulatory formulas, DSOs are under-investing in modernising the grids.

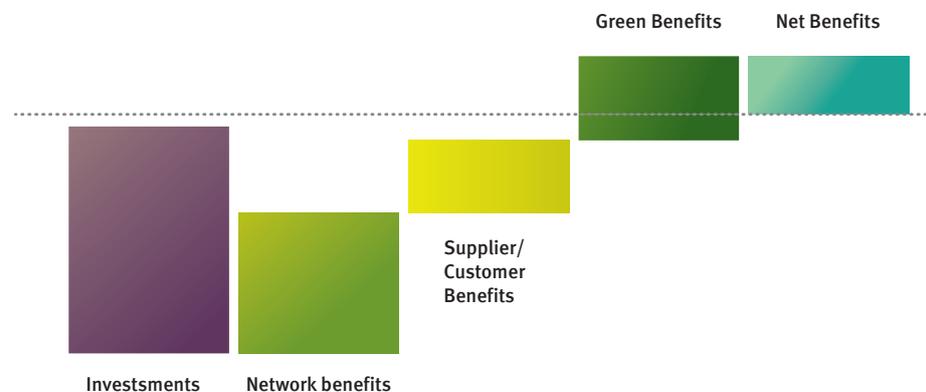


Figure2: Investments for smart grids bring benefits to all actors along the electricity value chain and above all, to society as a whole

A EURELECTRIC study has revealed that three quarters of the 45 European DSOs surveyed in 2007³ showed a lower return on invested capital in 2007 than their weighted average cost of capital (WACC) – regulation is leading many DSOs to destroy, not create economic value. The current regulation provides DSOs with incentives to improve their cost-efficiency by reducing operating expenses. However, after many years of ongoing endeavour to reduce those expenses, DSO managers are now increasingly concerned that the current financing model will severely undermine the profitability of their companies. A rethink of the current regulation is urgently needed.

² Projected investment in the EU 27 distribution network. IEA World Energy Outlook 2010 – New Policies Scenario (655 bn \$).

³ The Financial Situation of DSOs, EURELECTRIC, 2009.

3.3 Smarter regulation is fundamental

EURELECTRIC is therefore calling for a revision of the regulatory financing model applied to DSOs. Such a model needs to be based on a clear-sighted, broad analysis of the benefits of DSO investment both in terms of customer service and environmental benefits, and to guarantee a fair long-term return on invested capital. In brief, smarter regulation⁴ is required.

For example, energy regulators in several EU Member States do not recognise smart grid investments in the Regulatory Asset Base of European DSOs. In other member states regulators follow a narrow approach in their cost benefit analysis for smart meters and smart grids, thereby dismissing the rationale for smart grid capital expenditures and excluding the benefits that will accrue to all actors of the electricity value chain. As a consequence, DSOs (who are ‘natural monopolies’ and hence rely on a favourable regulatory framework) are reluctant to invest in smarter grids. They replace the grids, but often do not upgrade them towards what we think is “smart”.

In other words, a fair rate of return is an essential requirement for smart grid investments, along with the recognition that these investments which should be accepted in the regulatory asset base with the specification that they will require a shorter payback period. This regulatory revision must be made in line with the needs of an energy-efficient power system and a low-carbon economy.

It would however be misleading to say that all European regulatory schemes are backward-looking: there are also some best practices emerging in Europe. In Italy for example, the energy regulator has recently launched a competition-based procedure to incentivise smart grid/demand response projects. The selected projects will be granted an extra WACC (+2 percentage points) for a period of 12 years. In the UK, an Innovation Funding Incentive was introduced in 2005 allowing up to 0.5% of annual revenue to be spent on innovation. More recently in 2010 the Low Carbon Networks Fund was set up to allocate £500m over the period 2010-2015 for trialling new DSO initiatives to prepare for smarter electricity networks. The RPI-X@20 project suggests an even stronger stimulus extending to other sectors and encouraging third parties to lead some of the initiatives. This may apply from 2013 onwards in the transmission and gas distribution price reviews.

In this section, we have developed a high-level explanation of why we consider smart regulation essential for the implementation of smart grids. The next section provides the results of our survey on investment incentives in Europe and gives a more detailed insight into the barriers which are hampering investments in smarter grids.

⁴ As set out by the Florence School of Regulation, smart regulation is “*regulation [which] reconfigures the incentives and coordination tools of grid companies and grid users and aligns them towards the new policy objectives*” Smart Regulation for Smart Grids, Meeus, Saguan, Glachant, Belmans, Policy Brief, Florence School of Regulation, June 2010 (see more in Annex 1).

“Our survey reveals that while positive examples of smart regulation exist in some EU member states, severe shortcomings remain in many countries. A major constraint on investments derives from the delayed recognition of capital expenditure (CAPEX) when setting allowances for revenues and prices.”

4. EURELECTRIC survey on the status quo of economic regulation related to smart grids

In order to assess the current regulatory schemes which determine the conditions under which European DSOs will invest or refrain from investing in smart grids, EURELECTRIC prepared a questionnaire on the current regulation. The questionnaire was completed by representatives from 16 European countries: Austria, the Czech Republic, Denmark, Finland, France, Germany, Great Britain, Italy, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, and Sweden. The detailed results of our analysis can be found in Annex 2.

Our survey reveals that while positive examples of smart regulation exist in some EU member states, severe shortcomings remain in many countries. This section summarises the status quo of regulatory stability in Europe as well as the current distortions reducing the achievable rate of return. This is followed by a deeper analysis of the regulatory framework underpinning smart metering roll-outs in the EU.

4.1. The CAPEX time-shift problem

A major constraint on investments derives from the delayed recognition of capital expenditure (CAPEX) when setting allowances for revenues and prices. Figure 3 illustrates this issue.

The “CAPEX time shift problem” is intrinsic to incentive-based regulation if total costs are decoupled from revenues. Figure 4 presents the general regulation framework in Europe. It shows that 6 out of the 14 countries surveyed have implemented a rate of return-regulation of capital cost (hybrid mechanism) and have therefore avoided distortions.

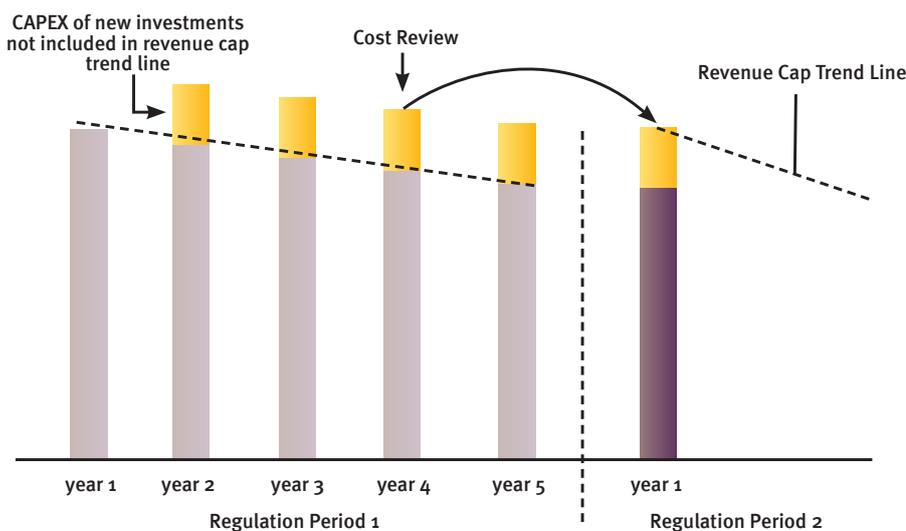


Figure 3: Conceptual explanation of the CAPEX time-shift problem without compensation

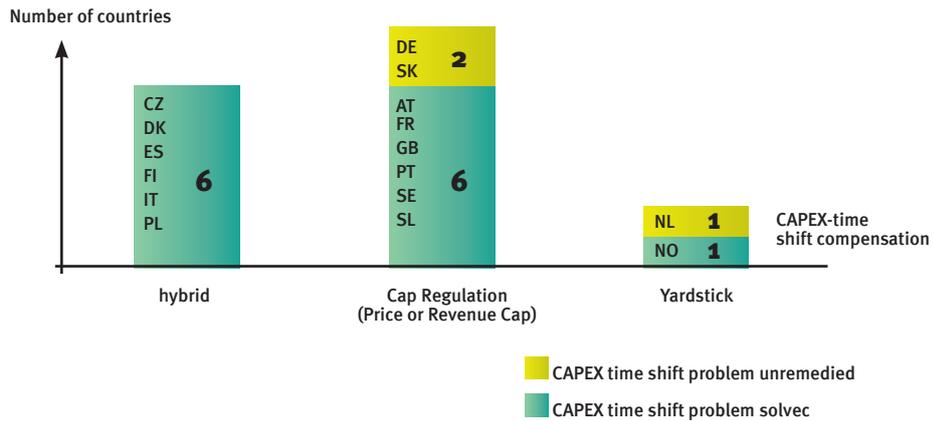


Figure 4: Overview of countries where the CAPEX time shift has/has not been solved

- Three of the remaining countries – Portugal, France and Great Britain – combine revenue cap regulation with a planned costs approach, thereby evading the problem completely.
- Austria has introduced an “investment factor” reducing the CAPEX time shift to two years. Moreover a “mark-up” on the WACC is granted, thereby increasing the regulated rate of return if book values increase.
- Norway has acknowledged the distortions resulting from the delayed revenue adjustment and has therefore adopted an “adjustment parameter” to compensate for the negative effect on the achievable rate of return. Nevertheless, the complex calculation method used to arrive at the yardstick factor influencing the CAPEX-compensation means that a negative effect remains. From 2009 onwards there has been a gradual modification of the time shift compensation. For example investments in 2011 will be reviewed by the Norwegian regulatory authority in 2012, and the actual increase in CAPEX will be approved for the year the investment was made and the following year (in this case 2012) as well. They also will be approved if the actual CAPEX are higher than planned.

By contrast, the “CAPEX time-shift problem” remains persistent in Germany, the Netherlands and Slovakia. In Germany there is a delay of three to seven years between investments and the integration of the resulting capital expenditures within the revenue cap, making it impossible for DSOs to achieve the expected rate of equity. Provided investment incentives such as the investment premium are without effect due to the restrictive interpretation by the regulatory authority. In the Netherlands, revenues are on average delayed by four years.

Moreover, our survey highlights other negative effects on the achievability of the rate of return (set by the national regulators) that are hindering smart grid investments. These factors are discussed in the following subsections.

4.2 A narrow view of cost-efficiency measures does not take into account the added value of smart grid investments

One aspect concerns the evaluation of efficiency which is either based on benchmarking methods, reference networks and/or standard cost. If these methods are not adjusted to the new challenges by covering the requirements for the desired development towards smart grids, smart grid investments will not be accepted as “efficient costs”.

Benchmarking methods and reference networks should be carefully used, and expenses for research and development and smart grid pilots should be excluded from the benchmarking process. The effect of high efficiency requirements on the achievable rate of return also has to be taken into account. For example Portugal and France approve additional capital expenditure but set strong efficiency requirements for operational expenditure, reducing the companies’ scope of action and the achievable rate of return.

Standard cost methods have to be reviewed and matched with smart grid requirements. For example in Finland the regulatory authority evaluates the reasonableness of capital expenditure by means of a standard cost catalogue in which smart grid investments are treated like any other investments. If the smart grid components are more expensive than ordinary components, companies have to negotiate higher prices. It then remains up to the regulatory authority to decide whether to promote these kinds of investments.

4.3 Both suboptimal rates of return and regulatory instability are hampering smart investments in distribution grids

Besides the effects of regulation on the achievable rate of return – which is the major driver for investments – regulatory stability, in particular the evaluation of risk, plays a substantial role. The analysis conducted in the 16 countries concludes that three main issues define the current state of regulatory stability:

- **The legal basis (clear rules and mandates)** refers to the fact that development may have overtaken the legal means and responsibilities may therefore not be defined.
- **The “ease of understanding” of regulatory methods (e.g. benchmarking)** refers to the expected outcome of regulatory instruments. The Norwegian model, for example, leads to an unpredictable return on investment. In such cases better “ease of understanding” and predictability of regulation is of greatest importance.
- **The stability of the regulatory system** refers to the number and frequency of changes. Regulation will, of course, need to be developed to match the current framework. In addition, if changes are made too often and with not enough notice and information, companies will lose confidence. This problem occurs for example in Poland.

Figure 5 summarises the status quo of regulation in Europe and indicates the strength of current barriers to investment.

- **The achievability of the regulatory rate of return is evaluated on the y-axis** and shows the return which is set and approved by the regulator (regulatory rate of return) in each country and serves as a reference. Responses from DSOs located in the lower two-thirds (“below” and “significantly below”) of the graph show that they can only achieve a rate of return which is below the regulatory rate of return. This is due to the CAPEX time shift and/or to the (ex post) denial of investments in the course of the efficiency analysis. The latter brings particular problems if it does not adequately consider the investment needs. The stronger the impact, the greater the effect on the cost of capital and the shorter the time allowed for eliminating “inefficiencies”. 7 out of the 16 countries surveyed face strong barriers to investments due to a significantly lower achievable rate of return compared to the regulatory rate of return.
- Barriers may also exist if regulatory stability is low. Hence the **regulatory stability is evaluated on the x-axis**. Companies in the left two-thirds (low & moderate) face low planning reliability due to an unstable regulatory system, legal uncertainties and/or difficulties in understanding regulatory mechanisms. As it is uncertain whether capital expenditures will be accepted at all, this kind of uncertainty cannot be compensated by a higher risk premium. Regulatory stability is high in only four out of the 16 countries. As both regulatory stability and a fair, achievable rate of return are crucial for promoting investments, only the three countries located in the upper right-hand box do not face strong constraints on investments. The remaining 13 countries require improvements to their regulatory system in order to foster smart grid investments.

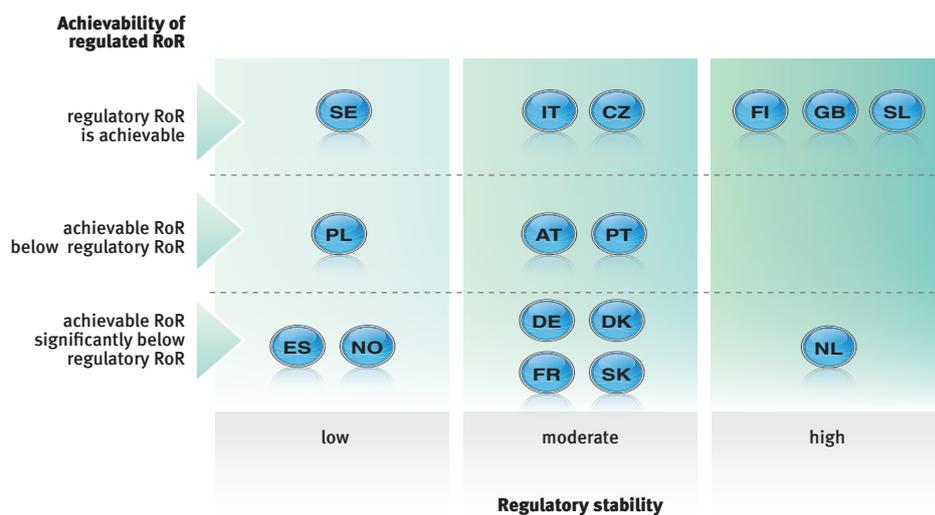


Figure 5: Regulatory framework – achievability of rate of return (RoR) vs. regulatory stability

A positive example can be drawn from Finland which is currently introducing a roadmap describing regulatory challenges until 2020. This might be a good way to enhance regulatory stability and commitment for consumers, policymakers, regulators and network operators, as all these various characteristics have a considerable impact on investment behaviour.

While the analysed countries show serious constraints on investments hindering the development towards smart grids, incentives aimed particularly at smart grids are rare. Only Great Britain has implemented innovation incentives; no other country has introduced any kind of smart grid incentive. In addition, British regulator Ofgem is moving towards more output oriented regulation.

4.4 Can output regulation solve it all?

Output orientation, measured by suitable criteria instead of input (i.e. technical details), is basically a sensible regulatory element. Its main problem is that suitable performance criteria are sometimes difficult to define. In order to set undistorted incentives, it is vital that:

- DSOs have the **ability to influence** the output which is measured by the criterion.
- Incentives are **consistent**, e.g. smart grid investments must not reduce a DSO's measured efficiency.
- The system is **flexible**: output indicators must be responsive to different grid situations.

Therefore, implementing an adequate output orientation is a great challenge for regulators and still requires additional research. In general it is not a suitable method for compensating current constraints to investments without first reviewing the entire regulation system with a view to removing the current constraints to investments. In addition, the amount and structure of operational expenditures will change as well. Dynamic loads and generation sources will increase the importance of local and regional balancing, along with constraint management and market facilitation, and will lead to new functions.

In its position paper on smart grids⁵, ERGEG/CEER has expressed its intention to develop performance targets and indicators allowing national regulators to assess progress on smart grid investments. However, suitable performance indicators which would allow for European-wide benchmarking exercises are hard to define. Indicators should be carefully analysed, and any benchmarking exercise should take into account that the results also depend on demand characteristics and other factors such as climate. Carefully designed indicators should therefore take into account additional external factors such as the historic evolution of the network infrastructure, geographical location, rural areas, etc. Their design should also be based on the definition of smart grids, which will be developed in parallel. Care should be taken not to design smart grid incentives which are not adequate for the challenge.

⁵ *Position Paper on Smart Grids*, ERGEG, 10 December 2009.

4.5 Lack of clarity and an uncertain horizon for cost-recovery are slowing down Europe's smart metering roll-out

As illustrated above, a growing share of distributed generation poses operational and control challenges for the traditional design and operation of European distribution grids. It is therefore one of the key drivers for smart grids.

Challenges include among others voltage and reactive power management, maintaining system stability and operational security. In developing new approaches, the existing best practices from Member States with considerable distributed generation should be benchmarked. DSOs will have to become much more involved with regard to innovative voltage control, power flow management and dynamic circuit ratings, most probably resulting in novel forms of cooperation between TSOs and DSOs. This cooperation should for example include the reporting of actual power and energy values for all participants in the new market places down to distribution level for settlement but also for data analysis for planning (active or automated). The frequency, handling time and duration of this reporting will depend on the purpose and products offered on a given market place. Beyond doubt, a new ICT-infrastructure combined with smart meters with the appropriate functionalities will be key technologies for the deployment of innovative solutions.

As an essential part of this wider reliance on ICT, the sufficient roll-out of smart meters will pose a major challenge within all European countries. However, our survey highlights that this roll-out is still lagging behind in most countries. It concludes that the main drivers for a quick roll-out of smart meters are a clear mandate and a fair return on the required investments. Figure 6 illustrates the status quo of the roll-out in 2010 while Figure 7 presents the strength of regulatory incentives for a quick smart metering roll-out across Europe.

Status quo of smart meter roll-out (smart meter penetration)



Figure 6: Smart meter roll-out at the end of 2010

Apart from Italy, Sweden and Finland – the three countries with the current highest penetration of smart meters⁶ – Spanish DSOs also have a clear legal mandate for the smart meter roll-out. In most other countries the responsibility and financing for the smart meter roll-out has not yet been assigned or the legislation is still being developed. To speed up the roll-out process, we would welcome the swift performance of a cost benefit analysis in those countries which have not yet conducted one.

⁶ In this report "smart meter" is used as a generic concept. EURELECTRIC is aware that smart metering technologies are constantly developing and maturing, resulting in a more complex reality on the ground.

Due to the specific nature of the British market design, energy suppliers rather than DSOs will be responsible for the roll-out. The mandate is nonetheless clear. In Germany, the smart meter business is liberalised, and the national energy regulator has not (yet) set a clear mandate for the roll-out. As a result, a negligible number of smart meters are currently installed in Germany.

Despite the critical need to foster smart meter investments by effective regulation, opposite regulatory incentives often exist in practice. Figure 7 illustrates the current possibilities for recovering smart meter costs as well as the legal basis. It clearly shows that the climate for smart meter investments is only positive in Finland, Sweden, Italy and Slovenia. In most other countries the cost recovery for smart meters and their installation is either uncertain, as in the Netherlands, Norway, Poland, France and the Czech Republic, or not given at all, as in Denmark, Germany, Portugal or Slovakia.

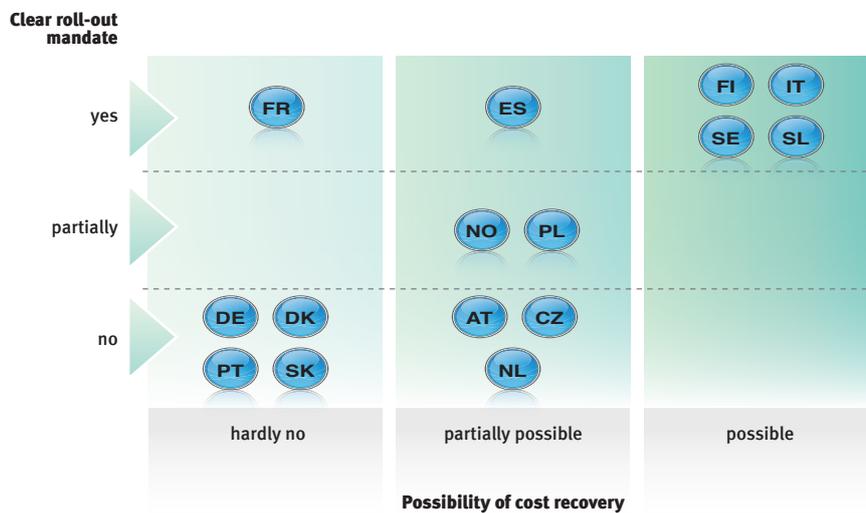


Figure 7: Are there strong incentives for smart meter investments?

4.6 Clear roles and responsibilities for data management are needed

Our survey reveals that besides the smart meter roll-out, in the future Smart Grid development process, data management will be challenging. Since certain types of data may be relevant to more than one party, the deployment of smart meters prompts decisions at national level about the requirements of the various market participants, the nature of data (individual or aggregated) and how data flows should be managed.

Decisions in this area will reflect national market structures and industry systems, but they will also affect the commercial and customer services that smart meters will enable. Data privacy rules and regulations must also be adhered to. Where DSOs are responsible for managing consumption information, DSOs should act as enablers of demand side participation in the form of information hubs. DSOs should be responsible for gathering consumption data (through meter readings) and dispatching it in a swift, reliable and non-discriminatory way to licensed service providers (suppliers,

aggregators, etc.) thereby safeguarding confidentiality of information by restricting the ability of third parties to access confidential information.

The responsibility for administration of verified and validated master data currently lies with the metering responsible party. In most European countries it is the DSO. Through communication tools metering operators will potentially facilitate commercial parties to provide additional services to customers.

Attention will need to be given to ensuring that all privacy and system security recommendations will be adhered to. Consumer must be the one who decides who should have access to what data and when; it should always be clear to the customer who has access to his data and what is done with it.

New business models and service offerings will evolve as commercial parties take advantage of the new information that results from the new data sources that become available to them. Smart meters will open new opportunities for end-customers to manage their energy consumption. In particular, we believe that home-automation will offer the ability to customers to control individual appliances in response to the information obtained from the meter. It should be up to suppliers and ESCO's to offer such services to customers.

Moreover, smart meters will allow for improvements in the accuracy and efficiency of information flows between DSOs and suppliers, enabling customers to be billed on their actual consumption on a frequent basis and in a format that will help them compare offerings in the market. Additional operational expenditures due to changed energy data management and new required services hence have to be accepted by the regulatory systems.

“What is needed is a balanced regulatory framework that provides long-term incentives for efficient delivery on the one hand, including incentives for innovation, and on the other hand provides the necessary financial resources to allow DSOs to invest in R&D, demonstration and implementation of smart grids.”

5. EURELECTRIC recommendations towards lifting the barriers to an optimal smart grid implementation using smarter regulation

• General recommendations

Our survey revealed a lack of consistency in national regulation and the overall European energy policy. European DSOs are keen to examine ways in which they can contribute to tackling climate change both by reducing their own impact on the environment and by responding positively to the changing needs of customers and other market players. Yet there is an urgent need for action to remove regulatory constraints to investments. The low achievable return on investment is an important issue, but so is the fact that missing investment incentives and the overall attitude of national regulators towards smart grid costs are diametrically opposed to the European climate change targets.

EURELECTRIC therefore considers that **economic regulation at Member State level should be revised to incentivise the implementation of smart grids** where it is economically viable. The traditional regulatory framework has incentivised DSOs to reduce costs, including expenditure in areas such as R&D and skills renewal, whose benefits often extend beyond the lifetime of a price review period. A paradigm shift is necessary: allowances should be dealt with in a long-term perspective. What is needed is a balanced regulatory framework that provides long-term incentives for efficient delivery on the one hand, including incentives for innovation, and on the other hand provides the necessary financial resources to allow DSOs to invest in R&D, demonstration and implementation of smart grids.

Efficient national regulation is the key tool for driving the European development towards a highly modernised grid. Respect for the principle of subsidiarity is essential in this discussion: smart grids cannot be rolled out in a top-down and one-size-fits-all manner. Consequently, developing smart grids will differ according to current regional modernisation levels of the distribution grid, and smart grids will need to be implemented step by step. Regulators will be key facilitators in the process of modernising Europe's electricity networks.

In addition to the growing need for investment, the uncertainties surrounding smart grid development are increasing. The implementation of new technologies is more expensive than that of proven ones, while advantages are often delayed and new innovative technologies may, in some cases, be unsuccessful. Encouraging – or at least not hindering – the large-scale implementation of new technologies is therefore particularly important. Following the “business-as-usual approach” as outlined in the introduction will only lead to higher costs in the long term. Instead, obstacles to smart grid investments should be resolved to make sure that the “smart grids approach” is chosen.

• Recommendations to ACER/ERGEG/CEER, national energy regulators and European Member States

1 › Rewarding and incentivising capital expenditure (CAPEX) for smart grids

A fair rate of return is an essential requirement for smart grid investments (for example ICT investments) along with the recognition that these investments should be accepted in the Regulatory Asset Base with the particularity that they will have a shorter payback period.

For example, energy regulators in several EU member states do not recognise smart grid investments in the regulatory asset base of European DSOs. In other member states, regulators follow a narrow approach in their cost benefit analysis of smart meters and smart grids, thereby dismissing the rationale for respective capital expenditure. As a consequence, DSOs (who are ‘natural monopolies’) are reluctant to invest in smarter grids: they replace the grids, but often do not upgrade them towards what we think is “smart”.

Yet basing future revenue allowances only on traditional needs will become increasingly problematic. We hence recommend **clear rules for adjusting revenues during the regulation period** in order to lift investment barriers, for example by means of a planned cost approach or by allowing investment and research budgets. Regulatory models with a capital cost time shift need to include a compensational element to foster investments, for instance through a RoR regulation for CAPEX or by using a planned cost approach.

Regulatory stability is important, but does not equal static. On the contrary: today’s increasingly dynamic environment requires a certain flexibility of regulatory allowances. Revenue allowances set at the beginning of a regulation period should take future needs into account. There should also be clear rules for adjusting revenues during the regulation period. On the whole, **regulation should become more flexible and focus more strongly on long-term needs**, thereby promoting long-term regulatory stability rather than narrow, short-term optimisation.

If the achievable rate of return is too low or the risk of stranded investments is not adequately considered, strong constraints on investments will occur. Investment in the roll-out of smart meters and in the implementation of an ICT infrastructure are of particular importance, as they will both play an essential role in the successful functioning of smart grids.

2 › Improving the evaluation of operational expenditure (OPEX)

Due to the increasing risk of future stranded investments, efficiency standards should be carefully applied. Expenses for research & development and for smart grid pilots should be excluded from benchmarking since the efficiency of innovation cannot be easily evaluated (i.e. the knowledge that technologies do not work in a specific way can also prove important).

Moreover, smarter grids will affect the amount and structure of operational expenditure. Dynamic loads and generation sources will increase the importance of local and regional balancing, constraint management and market facilitation, leading to new functionalities. For this reason, it is important to equalise incentives between CAPEX and OPEX and define efficiency on a long-term basis. As an example, regulatory systems should accept additional operational expenditures arising from changed energy data management and new required services.

3 › Incentivising innovation and R&D funding

Over the last 20 years, DSOs have faced little technological innovation in the way they plan, invest in and operate their networks. Instead, innovation has been mainly about reducing OPEX or creating new, more efficient financial structures. In the future however, significant technological innovation is needed for networks to play their part in the efficient delivery of a low-carbon economy through smarter grids. New technologies, in particular communication technologies, will need to be tested to determine what works in practice and what is cost-effective. For this technological shift to occur, **DSOs will need appropriate incentives to innovate.**

An “innovation factor” for smaller scale projects may also prove promising for fostering R&D.

4 › Clarifying roles and responsibilities

Clear mandates and responsibilities are important for driving smart grid investments (including smart metering) forward. An optimal smart meter roll-out will represent a major challenge for all European countries⁷. If the DSOs are responsible for this roll-out, a fair cost recovery mechanism is indispensable.

A parallel problem concerns the uncertainty regarding the roles and responsibilities in the interface between DSOs/retailers/meter operators and customers. As long as this uncertainty prevails there is an obvious risk that the introduction of smart grids will be delayed. **National regulators should assist in clarifying roles and responsibilities in a smart grid environment.**

To speed up the roll-out process, we would welcome a swift performance of CBAs in those countries which have not conducted them so far.

5 › Safeguarding regulatory stability

Besides a stable regulatory system, a regulatory roadmap (for example until 2020 as in Finland) may be a suitable instrument to enhance regulatory stability and commit to future development needs.

⁷ See EURELECTRIC policy statement on smart meters.

- **Recommendations to the European Union**

- 6 › **The European Union should provide additional guidance in order to keep the momentum on smart grids and help stimulate their development**

EURELECTRIC invites the European Commission to keep the momentum on smart grids and continue pushing for their development and implementation in Europe. A political signal from the EU, as a first step in the form of a Communication on the implementation of smart grids, would raise awareness on regulatory barriers and missing incentives for DSOs to invest in smart grids at national level. In addition, EURELECTRIC is in favour of assessing legislative measures such as annexes to the existing directives or a specific Directive on Smart Grids along with national roadmaps that should confirm the leading role of DSOs on smart grids.

EURELECTRIC is keen to contribute further to this discussion in the course of 2011 as an active participant of the European Commission's Task Force on Smart Grids, in particular within Expert Group 3.

- 7 › **EU financing of large-scale smart grid demonstration projects is essential**

Smart grid projects entail inherent uncertainty as they have not yet been tested on a large scale. Given that large-scale demonstration projects would generate new information on how smart grid technologies perform in practice, these projects would lead to positive externalities for all smart grid actors.

EU policymakers can help to accelerate the development of smart grids by **facilitating financing options for smart grid projects**. Indeed, this should be one of their main focuses. EURELECTRIC strongly supports the SET Plan and the European Electricity Grid Initiative, believing that large-scale demonstration projects will be needed to accelerate and optimise smart grid implementation in Europe to the benefit of customers.

Policymakers should also encourage a broad dissemination of results and best practices gained through smart grid demonstration projects. EURELECTRIC is ready to contribute to this exercise by establishing a platform for sharing information and best practice examples.

ANNEX 1

Box 3 - Regulation gets smarter when it...

Recognises the new grid service requirements and their respective costs

- Includes these service outputs in the revenue drives of grid companies by defining and measuring new services
- Allows grid users to participate in this definition so that they can value the services they ask for

Addresses grid technology innovation separately

- Extends output regulation over several regulatory periods
- Establishes specific additional incentivising regulatory mechanisms to ensure the transition from R&D to value for money grid services
- Identifies and ranks the beneficiaries of the technology innovation
- Provides for public money to contribute to ensure the electric system transformation process
- Considers the regulatory framework as a whole and identifies the existing regulation which may possibly work against grid innovation
- Experiments and ensures that learning loops will take place

Extracted from “Smart Regulation for Smart Grids”, Policy Brief, Florence School of Regulation, 2010, p. 15.

ANNEX 2

From August to December 2010 representatives from 16 European countries were asked to complete a questionnaire on the status quo of regulation. By means of standardised categories a major aim of the survey was to reflect the actual situation in an objective way by asking for the formal rules which apply to all companies of a member state in the same way. Questions focused on the general regulatory system setting the overall framework for investment incentives and therefore for the development of smart grids. Besides special incentive mechanisms for investments in general, smart grid investments and smart meters in particular and for research and development including pilots were highlighted. Finally, the representatives were asked to evaluate the regulation system as a whole.

Complementary expert interviews and discussions of the results were carried out to ensure a correct interpretation of the results. The following table presents an executive summary of the results. The main findings are illustrated within this document.

	REGULATION SYSTEM	REGULATION PERIOD	EFFICIENCY REQUIREMENTS
ES	Hybrid Revenue Cap and Rate of Return Regulation.	4 years	<ul style="list-style-type: none"> • No general efficiency requirement. • In the currently proposed model capital costs are allowed using a reference grid model which looks upon the built-in system efficiency in the grid. Additional costs are not taken into account. • OPEX: Allowances are based on standards cost and negotiations on the efficiency requirement.
AT	Revenue CAP regulation	4 years	<ul style="list-style-type: none"> • A weighted average of DEA (2 methods) and MOLS gives the efficiency score. • Cost input and of relevance are the total costs (TOTEX). • Additional costs for SG are not considered in the structure-parameters and will so decrease the efficiency-score of the DSO.
NL	Yardstick regulation. In case of a significant and exceptional investment a rate of return is applied.	3 to 5; until now 3 years chosen.	<ul style="list-style-type: none"> • Revenue allowances are based on “yardstick-costs” which are defined as the average cost of all grid operators. • The yardstick is calculated with a DEA based on total costs, each grid operator is required to move gradually to that common average. • Costs for pilots etc. are treated as ordinary costs.
FR	Revenue Cap Regulation with target values for investments	4 years	<ul style="list-style-type: none"> • OPEX: Allowances are based on negotiations. General efficiency requirement of 2 %.
DE	Revenue Cap Regulation	5 years	<ul style="list-style-type: none"> • General efficiency requirement: currently (2009-2013) 1,25 %. • The individual efficiency requirement refers to a DEA and a SFA based on total costs, requirement is relevant for adjustment of total costs.
SE	revenue cap regulation planned for 2012; currently light handed regulation	4	<ul style="list-style-type: none"> • Only general efficiency requirements. 1%per year in real terms on costs possible to influence. • The RAB via standard costs approved by the Regulator.
IT	Price cap regulation on OPEX - rate of return regulation on CAPEX	1 year	<ul style="list-style-type: none"> • Efficiency requirements for OPEX. • Additional costs for smart grids do not have in the actual regulatory period specific impact on efficiency requirements.
DK	Hybrid Revenue Cap and Rate of Return Regulation.	1 year	<ul style="list-style-type: none"> • No general efficiency requirement • Specific benchmarking model (referent network) used to derive the relative efficiency requirement based on the “total cost per component” . • Extra ordinary costs and losses are neither included in the benchmarking. • Smart meters are considered extra ordinary costs. It has not been clarified whether other smart grid investments will be given same status.

	REGULATION SYSTEM	REGULATION PERIOD	EFFICIENCY REQUIREMENTS
GB	Revenue cap with incentives / penalties based on performance.	From 2015 - 8 years	<ul style="list-style-type: none"> • Cost allowances based on efficiency analysis of past performance using various econometric techniques based on normalised costs. • Analyses based on Opex and total network costs. No single approach is taken. • If a DSO wants to spend additional costs on smart grids it will need to justify them as part of its business plan submission to the NRA during price control review discussions. • Expenditure using money from the LCNF will not be included in any comparative efficiency analysis.
PT	Revenue Cap Regulation with target values for investments.	3 years	<ul style="list-style-type: none"> • Efficiency analysis of the past performance using various techniques have been performed. • NRA has privileged results from SFA models based on data from business units of EDP Distribuição. • The efficiency requirement is applied to the Opex. Additional costs for smart grids, like pilot projects, were included in allowed revenue for the current regulatory period.
FI	Hybrid Revenue Cap and Rate of Return Regulation.	4	<ul style="list-style-type: none"> • Both individual and general efficiency requirement only applying to OPEX. • general efficiency requirement: 2,06 % per year. • Method used to calculate the individual requirement is an average of DEA and SFA. All controllable operational costs are included in the efficiency requirement, also all costs for R&D and pilots regarding Smart Grids. capital cost are included as well.
NO	Yardstick regulation.	min 5 years	<ul style="list-style-type: none"> • Revenue allowances are based on “yardstick-costs” which are calculated by means of a DEA based on total costs. • The Yardstick-factor refers to total costs.
CZ	Hybrid Revenue Cap and return on invested capital.	5 years	<ul style="list-style-type: none"> • Efficiency is defined through OPEX only. Base is defined at the beginning of regulation period; sector efficiency factor is 9,75% for the whole period. • No DEA or SFA methods used due to small number of distribution companies in the Czech Republic. Sector efficiency factor was set by negotiations of NRA with DSOs.
PL	Hybrid Revenue Cap and return on invested capital.	1 year (3 years for OPEX)	<ul style="list-style-type: none"> • Efficiency requirements for OPEX only. • Regulatory OPEX (operation & maintenance) was calculated by Regulator as a result of a benchmarking. • Model for OPEX for next regulatory period (2011-2013) is unknown.
SI	Revenue Cap Regulation with target values for investments.	2 years (past: 3 years)	<ul style="list-style-type: none"> • General efficiency requirement: 1.5 % of OPEX.
SK	Revenue Cap Regulation with target values for investments.	3 years (ending in 2011)	<ul style="list-style-type: none"> • Efficiency requirement of 5% annually, but RPI-X can not be lower than zero, so in practice it is leading to flat prices across the period. • Efficiency ratios applicable for accepted losses volume for each voltage level separately.

	RECOGNITION OF CAPITAL EXPENDITURES FOR DETERMINING REVENUES	TREATMENT R&D AND PILOT PROJECTS
AT	<ul style="list-style-type: none"> Fully recognition of CAPEX via investment factor in the 2nd regulation-Period (1.1.2010 - 31.12.2013). Time-delay of two years. Mechanism: Additiv term in the regulation formula, which simplified is the difference between the CAPEX of the actual year (t-2) and the CAPEX of 2008 plus a “Mark-up” (1,05% of the Increase of the book-value in the actual year). 	<ul style="list-style-type: none"> No cost recognition for R&D
ES	<ul style="list-style-type: none"> Allowed revenues reflect CAPEX partially due to differences between actual investments and those obtained from the reference grid model. Investments due to environmental restriction or technical requirements imposed by Regional or Municipal Administrations are not modeled. Capital costs are included in the allowed revenue with one year delay. 	<ul style="list-style-type: none"> There is no specific public programme to fund smart grid pilot projects. Although some basic R&D projects are partially financed in the national and European R&D programs, the current pilots are fully funded by the companies which are developing them.
NL	<ul style="list-style-type: none"> Allowed revenues based on total costs. Sector wide total cost recovery. Capital costs are included in the allowed revenues on average 4 years delayed, revenue path adjusted every 3 years. 	<ul style="list-style-type: none"> As other cost.
FR	<ul style="list-style-type: none"> Capital expenditure is agreed at the start of any regulatory period. Differences between concession and regulation mechanism (municipals receive revenues which are not included in the tariffs) reduces achievable Rate of return significantly. 	
GER	<ul style="list-style-type: none"> Allowed revenues reflect CAPEX partially (deduction due to efficiency requirement). revenue adjustment 3 - 7 years delayed: revenue path is adjusted every 5 years (based on a cost review). 	<ul style="list-style-type: none"> All additional costs for smart grids would not be approved by the NRA.
SE	<ul style="list-style-type: none"> All investments are included in the RAB based on their replacement value at standard costs. 	<ul style="list-style-type: none"> As other cost.
IT	<ul style="list-style-type: none"> New investments are included in the RAB and sector WACC is applied to them. 	<ul style="list-style-type: none"> As other cost.

	RECOGNITION OF CAPITAL EXPENDITURES FOR DETERMINING REVENUES	TREATMENT R&D AND PILOT PROJECTS
DK	<ul style="list-style-type: none"> Allowed revenues only increase as a result of necessary investments giving supply to new geographical areas or improving continuity of supply (replacement of overhead by underground wires). System yields problems in case of increasing needs for replacement investment and in case of increasing DG on distribution level. 	<ul style="list-style-type: none"> As other cost.
GB	<ul style="list-style-type: none"> Revenue path is adjusted every 5 (soon to be 8) years. Capital expenditure is agreed at the start of any review and is taken into account in the revenue allowance. There are different incentives depending on the level of CAPEX requested by companies (in comparison with the NRA's estimate) and whether the CAPEX target is exceeded. In future recovery will be assessed according to whether prescribed outputs are delivered. 	<ul style="list-style-type: none"> Before 2010: Innovation Funding Incentive which allowed up to 2% of annual revenues to be spent on innovation. This continues but has been augmented by the LCNF which is a fund of £500m available (payable by all GB consumers) for DSOs to use to trial new technologies and commercial arrangements (DSM etc). DSOs compete with each other for the finance; the successful DSOs have to share their experiences etc with all other DSOs.
PT	<ul style="list-style-type: none"> Capital expenditure is agreed at the start of any regulatory period. NRA has accepted the proposals from the DSO (EDP Distribuição) for operational investment; the proposed values have been added to the Regulated Asset Base. 	<ul style="list-style-type: none"> Some public funds supporting R&D in general. A pilot project on smart grid was accepted by the regulator. The corresponding investments were included in the regulated asset base.
FI	<ul style="list-style-type: none"> All investments are included in RAB based on their current (technical) replacement value at standard costs. 	<ul style="list-style-type: none"> As other cost.
NO	<ul style="list-style-type: none"> allowed revenues reflect CAPEX partially (deduction due to yardstick-factor), Some compensation with calibration-parameter. 	<ul style="list-style-type: none"> As other cost.
CZ	<ul style="list-style-type: none"> New assets increase fully RAB and sector WACC is applied to them. Old assets (investments before 2010) are in RAB at the level of 60 % of overrated value and algorithm of elimination difference is accepted. 	<ul style="list-style-type: none"> As other cost.
PL	<ul style="list-style-type: none"> For new assets (built since 1.01.2009) book value is a base for calculation of return on capital. Old assets (\leq 2008) special 5-6 years path to reach book value. 	<ul style="list-style-type: none"> As other cost.
SL	<ul style="list-style-type: none"> Allowed revenues reflect CAPEX fully. CAPEX is defined at the start of regulatory period. Investments are evaluated on the basis of 10 years network development plans. 	<ul style="list-style-type: none"> There is no special treatment of pilot projects. They were part of 10 years network development plan and fully recognized in revenue like any other investment.
SK	<ul style="list-style-type: none"> CAPEX has no influence on the regulated revenues (neither under nor over-performance), no target CAPEX set 	<ul style="list-style-type: none"> Not recognised at all.

	MANDATES AND STATUS QUO OF ROLL-OUT	RECOGNITION OF SMART METER COST FOR DETERMINING THE ALLOWED REVENUES / PRICES
AT	<ul style="list-style-type: none"> The DSO is responsible for SM-implementation. 	<ul style="list-style-type: none"> In the Moment the costs are not subject to regulation and are treated like other costs as far it is an investment (see above explained investment-factor). No recognition of additional operational costs of SM (e.g. telecommunication-costs...).
ES	<ul style="list-style-type: none"> DSO is responsible for the roll-out. Roll-out until 2018 mandatory by law. 30 % penetration required in 2010. 	<ul style="list-style-type: none"> Investment cost of the meter (incl. installation) is regulated separately through a meter hire charge. These latter are supposed to be treated like other investments, but allowed revenues do not currently reflect them.
NL	<ul style="list-style-type: none"> It is not yet clear, whether the DSOs will be responsible for the smart meter roll-out. legislation should pass Parliament in 2011. 	<ul style="list-style-type: none"> It is not clear today how costs will be recovered. There will probably be a monitoring of the smart metering.
FR	<ul style="list-style-type: none"> DSO is responsible for the roll-out. Roll-out until 2017 mandatory by law. 	<ul style="list-style-type: none"> Cost for the pilot are covered by network tariffs. Cost recovery of the smart grid roll-out is not regulated yet.
GER	<ul style="list-style-type: none"> Currently no complete smart meter roll out, hence DSO is not responsible. In new buildings and for reconstruction smart meters are mandatory. 	<ul style="list-style-type: none"> Additional costs for smart meters will not be approved by the NRA.
SE	<ul style="list-style-type: none"> DSOs are responsible for Smart Metering roll-out. Roll-out is already completed. 	<ul style="list-style-type: none"> Smart Meter costs are included in the regulation. Smart meters are included in the RAB at the standard cost.
IT	<ul style="list-style-type: none"> DSOs are responsible for Smart Metering roll-out. Roll-out is already completed. 	<ul style="list-style-type: none"> Smart Meter cost are treated like other cost.
DK	<ul style="list-style-type: none"> Smart meter installation volunteer Around 1/3 smart meter penetration, soon 1/2. 	<ul style="list-style-type: none"> Smart meter costs are not considered necessary costs and therefore they do not increase the allowed revenue.

	MANDATES AND STATUS QUO OF ROLL-OUT	RECOGNITION OF SMART METER COST FOR DETERMINING THE ALLOWED REVENUES / PRICES
GB	<ul style="list-style-type: none"> • DSO is not responsible for the roll out. 	<ul style="list-style-type: none"> • Does not apply.
PT	<ul style="list-style-type: none"> • DSOs are responsible for metering, no law yet concerning smart meter • 100% for HV/MV ; 0.5% for LV 	<ul style="list-style-type: none"> • Does not apply.
FI	<ul style="list-style-type: none"> • DSO is responsible for smart meter roll-out. • 80 % Roll-out until 2014 mandatory by law. • Companies aim a 100 % roll-out. • Currently 40 -50 % smart meter penetration. 	<ul style="list-style-type: none"> • Smart meters are included in the RAB at the standard cost. • If the company can purchase the meters at a lower price it will benefit the difference.
NO	<ul style="list-style-type: none"> • DSO will be responsible for Smart Meter implementation. • Smart meter implementation is voluntary. • Currently about 7.5 % smart meter penetration. 	<ul style="list-style-type: none"> • The regulator considers the need for charges in the regulation. • Today there are no special mechanism for smart meters.
CZ	<ul style="list-style-type: none"> • Mandatory AMM roll out hasn't been decided yet. • Not required by law. • The economic study is supposed to be elaborated. • Pilot projects are implemented. 	<ul style="list-style-type: none"> • NRA doesn't make difference between SG and other distribution investments. • Existing regulatory formula ensure fair economic return of new investments. • In case of OPEX increase the influence of higher assets isn't considered.
PL	<ul style="list-style-type: none"> • DSO will be responsible for Smart Meter implementation. • The corresponding legal framework is still in preparation, further details are not clear yet. • Pilots planned. 	<ul style="list-style-type: none"> • Changes in regulation considering SM - if any - are unpredictable.
SL	<ul style="list-style-type: none"> • DSO will be responsible for Smart Meter implementation. • Roll-out plans are under preparation. 	<ul style="list-style-type: none"> • Smart Meter cost are treated like other cost (full cost recovery).
SK	<ul style="list-style-type: none"> • No rollout of smart meters has been agreed yet. The government to perform a feasibility study by end of 2011 with involvement of DSO's. 	<ul style="list-style-type: none"> • Under the current regulatory framework additional CAPEX would not be recognised for regulatory purposes.

**Union of the Electricity Industry
EURELECTRIC aisbl**

Boulevard de l'Impératrice, 66 - bte 2
B - 1000 Brussels • Belgium

Tel: + 32 2 515 10 00 • Fax: + 32 2 515 10 10
VAT: BE 0462 679 112 • www.eurelectric.org

