Incentives Schemes for Regulating Distribution System Operators, including for innovation

A CEER Conclusions Paper

Ref: C17-DS-37-05

19 February 2018

INFORMATION PAGE

Abstract

This document (C17-DS-37-05) presents CEER's conclusions arising from our public consultation on the Incentives Schemes for regulating distribution system operators (DSOs), including for innovation. It also contains our reflections on the 34 consultation responses and helpful input received at the CEER Distribution Systems Workshop held on 19 April 2017.

The CEER position on the main goals of DSO regulation following the public consultation concerns the following key areas:

- Regulatory principles, goals and tools;
- Changing needs – how expected changes in the electricity sector raise new challenges for NRAs in designing effective regulatory models; and
- Changing aims in regulation, which are driven by the energy transition, and approaches of good practice on the balancing of regulatory choices, innovation and steps to reach an optimal outcome for the whole system.

Target Audience

European Commission, energy suppliers, distribution system operators, other network operators, traders, electricity/gas customers, electricity/gas industry, consumer representative groups, Member States, academics and other interested parties.

Keywords

Distribution networks, Regulation, Goals, Aims, Electricity, Gas, Incentives, Income, Costs, Innovation.

If you have any queries relating to this paper please contact:
CEER Secretariat
Tel. +32 (0)2 788 73 30
Email: brussels@ceer.eu

Related Documents

CEER documents

- "The Future Role of the DSO", A CEER Conclusions Paper, July 2015. https://www.ceer.eu/1306
- "CEER Work Programme 2016", January 2016. https://www.ceer.eu/eer_publications/work_programmes
- "CEER Position Paper on the Future DSO and TSO Relationship", September 2016. https://www.ceer.eu/1305
- CEER Work Programme 2017, January 2017. https://www.ceer.eu/eer_publications/work_programmes
- "CEER Guidelines of Good Practice on Electricity Distribution Network Tariffs, January 2017. https://www.ceer.eu/1271
- CEER Consultation paper on "Incentives Schemes for regulating DSOs, including for Innovation", January 2017. https://www.ceer.eu/eer_consult/open_public_consultations/pc_on_incentives_schemes_for_regulating_dsos
- CEER Consultation paper on "Guidelines of Good Practice for Flexibility Use at Distribution Level", March 2017. https://www.ceer.eu/flexibility-use-at-distribution-level
- "Distribution and Transmission Network Tariffs and Incentives", CEER White Paper series on the European Commission's Clean Energy Proposals, paper # I, May 2017. https://www.ceer.eu/white-papers
- "Renewable Self-Consumers and Energy Communities", CEER White Paper series on the European Commission's Clean Energy Proposals, paper # VIII), July 2017. https://www.ceer.eu/white-papers
- "CEER Report on Power Losses", October 2017. https://www.ceer.eu/1271

ACER documents

- "Energy Regulation: A Bridge to 2025, Conclusions Paper", September 2014. https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/SD052005/Supporting%20document%20to%20ACER%20Recommendation%2005-2014%20-%20%20Energy%20Regulation%20A%20Bridge%20to%202025%20Conclusions%20Paper.pdf

European Union documents:

- 3rd Energy Package: https://ec.europa.eu/energy/en/topics/markets-and-consumers/market-legislation
- Clean Energy for All Europeans Package: https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans

Table of Contents

EXECUTIVE SUMMARY **6**

1 INTRODUCTION **9**

2 CURRENT GOALS AND REGULATORY APPROACHES **10**

2.1 Main goals of DSO regulation 10

2.1.1 Background on main goals of DSO regulation 10

2.1.2 Outcome of the public consultation on the main goals of DSO regulation 11

2.1.3 CEER position on the main goals of DSO regulation following public consultation 12

2.2 Regulatory tools 13

2.2.1 Background on regulatory tools 13

2.2.2 Outcome of the public consultation on regulatory tools 15

2.2.3 CEER position on regulatory tools following public consultation 15

3 CHANGING NEEDS **18**

3.1 Background of changing needs 18

3.2 Outcome of public consultation on changing needs 18

3.3 CEER position on changing needs following public consultation 19

4 CHANGING AIMS AND EXAMPLES OF GOOD PRACTICE **20**

4.1 Changing Aims 20

4.1.1 Background on changing aims 20

4.1.2 Outcome of public consultation on changing aims 20

4.1.3 CEER position on changing aims following the public consultation 21

4.2 Balancing of Choices 23

4.2.1 Background on balancing of choices 23

4.2.2 Outcome of public consultation on balancing of choices 24

4.2.3 CEER position on balancing of choices following public consultation 25

4.3 Innovation 26

4.3.1 Background on innovation 26

4.3.2 Outcome of public consultation on innovation 26

4.3.3 CEER position on innovation following public consultation 27

4.4 Whole System Approach 28

4.4.1 Background on the whole system approach 28

4.4.2 Outcome of public consultation on the whole system approach 28

4.4.3 CEER position on whole system approach following public consultation 29

5 CONCLUSIONS 32

ANNEX 1 – LIST OF ABBREVIATIONS 35

ANNEX 2 – GLOSSARY 36

ANNEX 3 – MAIN REGULATORY TOOLS BY GOALS 37

ANNEX 4 – EVALUATION OF RESPONSES TO THE CEER PUBLIC CONSULTATION ON INCENTIVES SCHEMES FOR REGULATING DSOS, INCLUDING INNOVATION 38

ANNEX 5 – ABOUT CEER 55

EXECUTIVE SUMMARY

Brief summary of the conclusions

The "Bridge to 2025 Conclusions Paper[1]" acknowledged that energy systems are being impacted by "s*ignificant structural and market developments which have altered the characteristics of electricity and natural gas distribution activities".* In its Clean Energy for All Europeans package[2], the European Commission also recognises the changing role of DSOs in a context of structural changes in the market, which may raise the need for new regulatory solutions. Against this background, European energy regulators have committed themselves to developing guidelines of good practice for incentive schemes that are used to regulate distribution system operators (DSOs). This includes, in particular, tools that encourage efficient innovation by energy DSOs in such areas where competition is absent. The present conclusions document describes European regulators' thinking on these important issues, following a public consultation held in the spring of 2017. This document contributes to enabling NRAs to identify regulatory models with incentive schemes that best fit the challenges of the new context in the European energy sector, and does it in a way that also takes account of the specific context that in each country.

Regulators have listed common goals in DSO regulation (see below). CEER considers that there should not be an a priori hierarchy in these goals. Rather, regulators should assess country-specific needs taking into account characteristics of national context to weigh regulatory principles (no 'one size fits all' approach), within the boundaries of European legislation and CEER principles.

Following the public consultation process, the previous list presented in CEER's "Consultation document on Incentives Schemes for regulating DSOs, including for Innovation" has been enriched, taking into account stakeholder perspectives on the current and future challenges of DSOs.

[1] "Energy Regulation: A Bridge to 2025, Conclusions Paper", September 2014.

[2] https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition

Main common goals of DSO regulation
Ensuring a level-playing field: acting in a non-discriminatory manner to all parties, including non-discriminatory network access, and acting as neutral market facilitators, for example in buying flexibility services from the market.
Promoting cost efficiency: promoting cost efficiency in the absence of competitive pressure. DSOs perform their core tasks in a way which meets the reasonable expectations of network users and other stakeholders in the most efficient and economical way.
Ensuring financial viability: ensuring that DSOs have sufficient financial means to operate efficiently based on a cost of capital which reflects national circumstances and their regulated status.
Improving quality of service: ensuring that DSOs offer the right services, including secure and timely data management when applicable, with a service quality level that is satisfactory for network users and contributes to security of supply for the whole system.
Facilitating innovation: promoting a regulatory environment that removes barriers to the pursuit of innovative approaches by DSOs and which have the potential to bring savings or benefits to consumers, without foreclosing competition in new activities.
Ensuring security of supply: promoting security of supply (including resilience of networks to extreme climatic events) and safety in service operations.
Facilitating the improvement of sustainability, including the promotion of energy efficiency: regulation should facilitate the improvement of sustainability across the energy system and promote the reduction of energy losses along the grid.
Introducing a holistic view: ensuring a coordinated whole system approach.
Ensuring that DSOs safeguard customer privacy, ensuring secure data management and non-discriminatory access to data, considering the growing need for higher levels of cybersecurity.

Given the goals of regulation, different regulatory tools allow or incentivise DSOs to reach those goals. As is the case with regulatory goals themselves, for the application of regulatory tools there is not a 'one-size-fits-all' recipe. Incentives for cost efficiency – in combination with other input prescriptions or output targets – provide the means to achieve the outcome that customers receive in exchange of tariff paid (i.e. 'value for money'). As regards output targets, CEER recognises the advantage of output-based regulation, as it considers what is important for customers while providing freedom to DSOs to find efficient solutions. Also setting a fair rate of return (key in the financial breadth of regulation for the DSO) is an important aspect in regulation. Regulators should aim to create stability and predictability with the regulatory framework, while at the same time making it sufficiently flexibility in order to take into account market developments.

In a changing energy market, CEER sees technical, economic and organisational challenges – but also opportunities. These exist, for example, regarding grid planning and the interaction of energy sources, smart grid investments, possibilities to buy flexibility from the market, coordination between DSOs and TSOs and data sharing. CEER emphasises that the availability of the data should not impede competition or customer rights. It remains important that the DSOs act as a neutral market facilitator.

Within this conclusions document, CEER focuses on four aspects in regulation. These are: 1.) changing aims in regulation that are driven by the energy transition; 2.) approaches of good practice on the balancing of regulatory choices; 3.) innovation and; 4.) steps to reach an optimal outcome for the whole system. Based on the public consultation and CEER's consideration of the many responses, **CEER recommends that NRAs:**

1. account for various goals in DSO regulation, striving in particular to balance incentives with different, but complementary purposes, such as cost-efficiency, quality of service, energy efficiency or innovation;
2. assess country-specific needs and priorities in the various goals, taking into account national characteristics, external factors (e.g. topography), renewables penetration and other relevant features, as there is no 'one-size-fits-all' solution;
3. provide, as far as possible in light of relevant developments in the energy sector, a stable, transparent and predictable regulatory framework, ensuring incentives for efficiency in the short and long run;
4. ensure a technology-neutral approach towards innovative solutions, that may be hindered, inter alia, by different treatment of costs;
5. consider, where feasible, an output-based approach for setting incentives, because this approach has the advantage of considering what is important to customers letting DSOs free to find optimal solutions;
6. adopt a whole system approach: considering the societal net benefit for the entire system and encouraging DSOs to consider consequences of their decisions on other actors of the value chain (to the extent those decisions are within the scope of NRA's responsibilities in each country);
7. stimulate coordination between transmission and distribution system operator and ensure that funding flows in the right direction when the most efficient solution is the TSO taking action to address a problem at distribution level or the DSO taking action to address a problem at transmission level;
8. lead DSOs to demonstrate meaningful engagement with stakeholders;
9. promote a role for DSOs as neutral market facilitators regarding regulation for the market of flexibility services; ensuring no discrimination among network users and appropriate transparency in data management; and
10. continue pursuing an interactive regulatory process, which facilitates the involvement and contributions by all stakeholders from the early stage of regulatory decisions to the implementation stage, with the development of monitoring instruments to evaluate and, if necessary, adapt those decisions.

1 Introduction

The "Bridge to 2025 Conclusions Paper[3]" acknowledges that energy systems are being impacted by *"…significant structural and market developments which have altered the characteristics of electricity and natural gas distribution activities".* In its Clean Energy for All Europeans Package[4], the European Commission also recognises the changing role of DSOs in a context of structural changes in the market, which may raise the need for new regulatory solutions. Against this background, European energy regulators have committed themselves to developing guidelines of good practice for incentive schemes that are used to regulate distribution system operators (DSOs). This includes, in particular, tools that encourage efficient innovation by energy DSOs in such areas where competition is absent. The present conclusions document describes European regulators' thinking on this important issue following a public consultation held in the spring of 2017. This document contributes to enabling NRAs to identify regulatory models with incentive schemes that best fit the challenges of the new context in the European energy sector in a way that also takes account of the specific context that each NRA is facing within its own country.

CEER addresses the current goals and regulatory approaches in Chapter 2. Chapter 3 elaborates on changing needs, given ongoing market developments. In Chapter 4, CEER goes into the changing aims in regulation, which are driven by the energy transition, and good practice approaches on the balancing of regulatory choices, innovation and steps to reach an optimal outcome for the system. For all sections in this document, CEER summarises the initial thinking as it was expressed in the public consultation document. Subsequently, CEER summarises the outcome of the responses from the public consultation, where a more detailed summary is given in Annex 4. Finally, for each section the CEER position is presented following the public consultation responses. CEER concludes the document in Chapter 5.

[3] "Energy Regulation: A Bridge to 2025, Conclusions Paper", September 2014.

[4] https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition

2 Current goals and regulatory approaches

This chapter discusses current considerations and practices for setting regulatory schemes for revenue controls for DSOs. This encompasses both the regulatory goals and the regulatory tools which can be used to achieve those goals. It begins by summarising CEER's main findings in the consultation document and enriches it with the responses received from stakeholders. Subsequently, it presents CEER's positions and main conclusions following the consultation process.

2.1 Main goals of DSO regulation

2.1.1 Background on main goals of DSO regulation

As mentioned in the consultation document, DSOs must run their businesses in a way which takes both the network users and other potential stakeholders into account. Natural gas and electricity distribution activities display important differences in terms of their legal, economic and technical features. However, both the management and operation of the physical networks constitute natural monopolies. According to standard economic theory, regulation of energy distribution activities is thus required to ensure that DSOs do not overcharge for network access or discriminate between network users. The regulation should be designed so that it maintains incentives for cost-efficiency, quality of service and supply, and guarantees financial viability for efficient DSOs.

Given the fundamental importance of energy for society and the economy as a whole, European legislation (3rd Package[5]) establishes a legal framework for distribution network activities, including public service obligations. Within that framework, European energy regulators share objectives to encourage delivery of high standards of public service, to promote economic efficiency, and to encourage security of supply and energy efficiency, among others.

Promoting these goals is related closely with the definition of allowed revenues to be recovered in the network tariffs. These goals are broad in scope and include several factors that were presented in the public consultation to ensure a common level playing field between NRAs and between NRA and stakeholders in general. The goals presented in the public consultation are focused not only on the traditional goals of access to the grid, cost efficiency and quality of service or security of supply, but also on more forward-looking approaches, such as facilitating innovation, promoting an environment where DSOs are as proactive in adopting the most efficient solutions as they would be if they were companies acting in a competitive environment and not natural monopolies and adopting a broader perspective on DSO regulation which takes a whole-system approach further along. These approaches are discussed more in-depth later in this document.

Another important point, which was raised throughout the consultation process, is that the relative importance of regulatory goals may differ according to the characteristics and energy context of each country. Thus, NRAs may rank the regulatory goals referred to above according to the different circumstances in their own countries. In addition, other regulatory goals could be added to this list to the extent they are necessary to enable regulators to achieve all their current objectives.

[5] https://ec.europa.eu/energy/en/topics/markets-and-consumers/market-legislation

The main regulatory goals discussed in the consultation document are presented in the table below.

Main common goals of DSO regulation (as presented in the Consultation document)
Ensuring a level-playing field: ensuring non-discriminatory network access.
Promoting cost efficiency: promoting cost efficiency in the absence of competitive pressure. DSOs perform their core tasks in a way which meets the reasonable expectations of network users and other stakeholders in the most efficient and economical way
Ensuring financial viability: ensuring that DSOs have sufficient financial means to operate efficiently based on a cost of capital which reflects national circumstances and their regulated status
Improving quality of service: ensuring that DSOs offer the right services, with a service quality level that is satisfactory for network users, and contributes to security of supply for the whole network system
Facilitating innovation: applying regulatory mechanisms which facilitate the pursuit of innovative approaches by DSOs, which have the potential to bring savings or benefits to consumers
Ensuring security of supply: promoting security of supply (including resilience of networks to extreme climatic events and cyber-attacks)
Introducing a holistic view: ensuring a coordinated “whole system approach”

2.1.2 Outcome of the public consultation on the main goals of DSO regulation

Regarding current regulatory goals, in general, respondents recognised the goals that CEER presented in the consultation document (which are detailed above in the background section) as the most relevant ones for DSO regulation. Several respondents shared CEER’s views that a single goal should not prevail over others or that the diversity and specific characteristics of each country or region should be taken into account. In fact, the assumption that there should not be a ‘one size fits all’ approach in terms of regulatory goals is almost consensual. Respondents also agreed with the goal of ensuring a level playing field.

A few respondents also stressed the importance of innovation and of having a stable and predictable regulatory framework.

Finally, some respondents addressed new goals, which are discussed in Chapter 4. Namely, flexibility and data management were mentioned by DSOs, while data management and promotion of energy efficiency were listed by some other stakeholders.

2.1.3 CEER position on the main goals of DSO regulation following public consultation

CEER is pleased to observe that its perspectives are shared by most of the stakeholders consulted. Therefore, in general, its views on the main, common regulatory goals remain the ones that were included in the consultation document, as detailed above. After the consultation, CEER is further convinced that there should be no a priori hierarchy in goals, and that instead regulators should assess country-specific needs taking into account characteristics of national context to weigh regulatory principles (hereinafter: "no 'one size fits all' approach").

CEER agrees that sustainability and energy efficiency could be promoted by regulation. In practice, in most countries this is the case, for example through incentives to reduce energy losses of networks (see also section 2.2.3).[6] On innovation, a topic mentioned by many respondents, CEER recognises the considerable importance of innovation and emphasises that incentives for innovation should be adequate. However, CEER's view remains that innovation is not a goal in itself in the short to medium term, but a means to reach other goals, i.e., it is envisaged as the main tool that DSOs may use to tackle new challenges. CEER considers that regulators should aim for a regulatory environment that facilitates the pursuit of innovative solutions which can improve DSOs' productive efficiency, quality for network users and other outputs, and thus lead to benefits for the system and for customers.

It is important to note that there have been significant structural and market developments which have altered the characteristics of electricity and natural gas distribution activities. Most of these changes have been triggered by technological progress and innovation, with impacts on, for instance, information processing or energy storage capabilities. These developments, such as smart grids, may enable total costs to decrease, investments to be better-targeted or avoided, and lead to an improvement in the quality of service. Innovation also allows new challenges to be tackled, for instance, the network-wide integration of distributed energy resources. Hence, regarding innovation, regulation should ensure neutrality among all the options available for DSOs, including the most innovative ones, such that DSOs can decide which is the most efficient means for pursuing their goals and bringing value added to the system. This topic is further developed in Chapter 4.

These changes, which are developed in Chapter 3, have brought about new responsibilities for distribution activities and, consequently, new goals for regulators. This may explain why, in addition to their comments on innovation, public consultation respondents also mentioned several new goals related with these new challenges, such as flexibility and new services for DSOs. These goals are further developed in Chapter 4.

Effective data management, which is expected to become increasingly relevant in the energy transition, should also be a key consideration in DSO regulation, as explained in Chapter 4. Depending on the market design (i.e. which entity or entities are responsible for data management in the different segments of data collection and treatment), in the cases where the DSO is allocated with the task of data management, such a task should be done in a neutral and transparent manner, ensuring that all stakeholders have access to the data, and guaranteeing data security. The same should apply if data management is carried out by other entities (a TSO or data hub, for example).

[6] See also the "CEER Report on Power Losses", October 2017.

As a final note on CEER's views regarding the most relevant regulatory goals, as distribution activities in Europe are characterised by different contexts, these recommendations must be viewed in perspective. For instance, a new goal for a regulator in a certain country could be a current goal for another regulator in a different country, and vice-versa.

2.2 Regulatory tools

2.2.1 Background on regulatory tools

Given the principles and goals of regulation, this section goes into the subsequent step of how a regulatory system can be designed to allow or to incentivise DSOs to reach those goals. A goal may be reached via different regulatory tools, where in turn these tools can affect goals in various ways. The regulator will have to keep this in mind and strike a balance between the tools, considering the desired outcomes. Every tool has certain advantages and disadvantages. In the consultation document, CEER emphasises that for the design of the regulatory system there is not a 'one size fits all' approach across Europe.

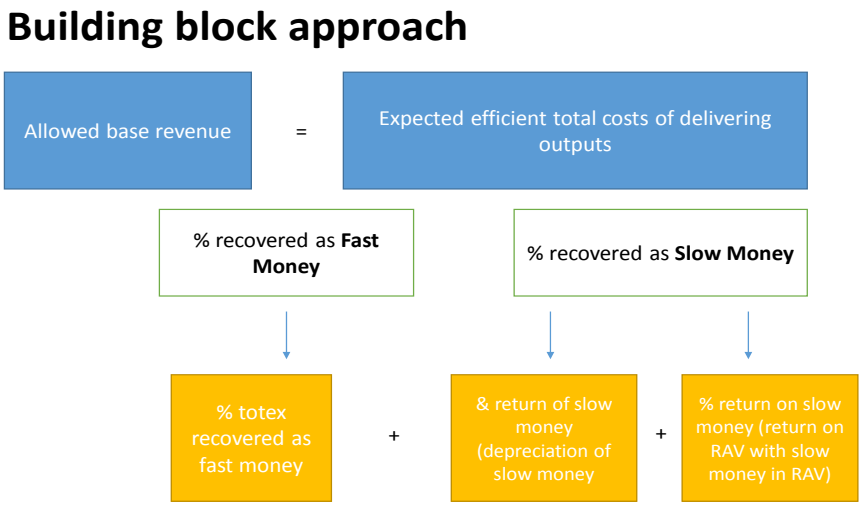
One important aspect of regulation is the degree of incentivisation. Different regulatory systems perform differently in providing incentives for cost reduction and exposing the DSO to financial risk. Typical examples are 'cost-plus regulation' (lower incentives, lower risk) or 'price-cap regulation' (higher incentives, higher risk). Also important is the financial breadth of regulation for a DSO.[7] In general, regulators use a certain reasonable return. Regulatory tools can decrease or increase the financial breadth. It should be noted that there is an interaction between incentives and the financial breadth. The upward and downward deviation of financial breadth would in general be larger in highly-incentivised regulation than in little-incentivised regulation.

In the regulatory design it matters whether the allowed revenues are based on a separate and different treatment of capital and operational costs or on a similar treatment or on a total cost level ('TOTEX regulation'). The main advantage of the last approach is that the DSO is not biased by regulation on the use of either operational and capital costs in operating the network. This is particularly relevant in an environment of transition towards smart grids, use of flexibility and increased connection of distributed energy resources. A TOTEX approach incentivises companies to choose the most efficient combination of resources to achieve several regulatory aims, which could be less capital-intensive innovative expenses (higher OPEX in the short term) instead of network investments. Such innovative solutions may enable the company to operate more efficiently in the medium term, thus decreasing overall costs over time. In this context, a TOTEX approach is a tool that contributes towards the goal of facilitating innovation. Some examples of TOTEX are shown in the following boxes.

[7] The breadth of regulation is the extent to which DSOs receive a remuneration which is in line with their efficient costs, including a reasonable return. The greater the breadth for the DSO, the higher the costs will be for the customers, and vice-versa.

TOTEX approach – an example from the UK

Figure 1 illustrates a 'TOTEX approach' from the UK. This aims to overcome the traditional bias of network companies to favour infrastructure investment and a rate of return over time when added to the Regulatory Asset Base (RAB). In this example, a DSO's costs are recovered either in the year of spending, i.e., 'fast money', or over a longer period of time, i.e., 'slow money', by being added to the RAB. The RAB is structured to represent the present value of future net cash flows that a company has a right to under the RIIO framework (subject always to incentive performance). The RAB is depreciated according to regulatory policy, which is only loosely informed by conventional accounting policies. If outputs are delivered for less than the expected efficient cost, the benefit is shared between the DSO and consumers.



TOTEX-benchmarking and efficiency bonus – an example from Germany

Another example for a TOTEX approach is a TOTEX-benchmarking combined with an efficiency bonus, a new instrument that is part of the reformed incentive regulation ordinance in Germany. Basically, the TOTEX-benchmarking compares the relative efficiency of an individual network operator with its peers based on statistical methods (Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis). As a result, an individual efficiency factor is assigned to each network operator and indicates the individual efficiency target ("x-factor" – i.e., the inefficiency which has to be reduced by the end of the regulatory period).

The reformed ordinance includes the possibility for an eligible DSO to obtain an efficiency bonus based on the TOTEX-benchmarking. However, DSOs are eligible only if they are determined to be fully efficient as a result of the benchmarking process. If this is the case, Bundesnetzagentur (BNetzA) determines the bonus based on a super-efficiency analysis that is part of the DEA outlier analysis. In essence, the calculated individual super-efficiency value (capped at 5%) is multiplied by the temporarily non-controllable costs and split evenly over the duration (years) of the regulatory period.

The bonus is designed to enhance innovation in a technologically neutral way as the TOTEX-benchmarking takes both OPEX and CAPEX into account. DSOs now have an incentive not only to be fully efficient, but to constantly try to exceed 100% (relative) efficiency. Thus, it also rewards longer-term innovations which ensure that DSOs reach super-efficiency status in future regulatory periods.

Regulation can be classified as providing input-based or output-based incentives. Setting specific obligatory requirements is the extreme case for input-based incentives. Another form of input incentives is to provide additional remuneration, e.g. through an add-on to the weighted average cost of capital (WACC), for specific kinds of investments. In general, an output-based approach, where outputs are priced at their right economic value and incentives are symmetrical (i.e. rewards and penalties), is considered the most effective approach because this ensures that these aims are given the right level of attention by the DSO. An output-based way of dealing with different or multiple goals – such as quality of service or quality of supply – could be to include those in the existing efficiency targets, i.e. in the general income level of the DSO. This output-based approach is increasingly seen as an effective approach for tackling multiple aims besides cost reduction.

2.2.2 Outcome of the public consultation on regulatory tools

Many of the stakeholders supported the proposition that for the application of regulatory tools there is not a 'one size fits all' approach. Overall, stakeholders that provided responses generally preferred TOTEX regulation. Stakeholders in general supported the idea of having an output-based approach. Some DSOs favour input-based regulation or a mix of input- and output-based regulation.

Suppliers, users and other respondents found benchmarking beneficial in setting best practices and raising efficiency. Also, they responded that NRA should decide on the rate of return. DSOs responded that the regulation should provide achievable targets. Some of the DSOs assert that the NRA should set the regulatory rate of return (in practice either the WACC or the Return on Equity).

DSOs think that NRAs should provide a stable, transparent and predictable regulatory framework. More specifically, some DSOs responded that regulation should be investment-friendly, e.g., providing sufficient regulatory financial breadth and avoiding financial delays on investments. During the public hearing, the argument was put forward that investments are done for a lengthy period, while incentives (both in general and for innovation) and returns are provided only for the length of the regulatory period, implying that these should be more-aligned.

Many stakeholders provided examples of regulatory tools which they regard as important. Examples include: tools to provide incentives on quality of supply, quality of service, quality of information, using flexibility to avoid grid investment, direct or indirect incentives for innovation and reducing energy losses.

2.2.3 CEER position on regulatory tools following public consultation

CEER is pleased to see that there appears to be broad recognition that for the application of regulatory tools in which there is not a 'one size fits all' approach. The responses in the consultation confirm that different regulatory designs could lead to different effects, of which the NRA should be aware.

Incentives for efficiency and efficiency benchmarking – in combination with other input prescriptions or targets for output parameters – provide means to achieve that customers receive value for money. CEER recognises the advantage of output-based regulation, as it considers what is important to customers while it provides freedom to DSOs to find optimal solutions. It is also an important tool in reaching the goal of facilitating innovation. However, some drawbacks should also be noted, including the high level of information required to calibrate parameters effectively and the high level of potential regulatory presumption when defining relevant output indicators.

CEER emphasises that there should be a balance between being investment-friendly on the one hand and affordability on the other. CEER considers that regulators can decrease uncertainties (and therefore related costs) by providing a stable, transparent and predictable regulatory framework whenever possible. At the same time, the regulatory framework should not be overly predictable, as, for example, it would create a risk that it is not flexible enough to deal with relevant developments in the energy sector. As mentioned previously, CEER notices that very often the regulatory system of a second regulatory period builds upon the previous period, thereby bringing considerable stability and predictability. CEER recognises that setting a fair rate of return (key in the financial breadth of regulation for the DSO) is an important aspect in regulation.

CEER sees that several of the mentioned regulatory tools are already in place in the regulation of several NRAs. As an example, CEER favours the aim of energy efficiency where possible. Within the regulation of DSOs, this would encompass energy losses on the grid. As a regulatory tool for this aim, many NRAs have energy losses included in the regulatory costs and income, where incentives for cost reduction also would lead to reductions in energy losses. One example from the regulation in the Netherlands is displayed in the following box. CEER will continue sharing experiences between NRAs, for example through its recent report on power losses.[8]

[8] "CEER Report on Power Losses", October 2017.

Efficiency incentives, including energy efficiency – example from the Netherlands

In the Netherlands, a regulatory system of yardstick competition is applied for gas and electricity DSOs. In this regulatory system, the yardstick is based on the average total costs in the sector. More specific, for electricity DSOs the costs of energy losses are included in the regulatory costs. Through ex ante setting of income based on these costs, the DSOs are incentivised to reduce their energy losses (both volume and price). With this approach, the DSO, for example, will take into account the lowering of energy losses when replacing a transformer in the grid. The following table presents the development of sector costs of energy losses for Dutch electricity DSOs over the period from 2009-2016:

Table 1: Costs of energy losses for Dutch electricity DSOs

Year	Costs of energy losses (EUR)
2009	348,034,978 EUR
2010	285,922,824 EUR
2011	277,278,796 EUR
2012	268,445,232 EUR
2013	217,123,614 EUR
2014	218,483,408 EUR
2015	181,349,105 EUR
2016	162,156,562 EUR

3 Changing needs

The documents “Bridge to 2025” and “The future role of DSOs” provide descriptions of the expected changes in the electricity and gas sectors in the future.

Throughout Europe there is a change in the traditional energy mix. The electricity sector can no longer be considered as being vertically-oriented, with financial and physical flows moving downstream from production to consumers through the transmission and distribution grids. Consumers should no longer be regarded by distributors as passive energy ‘takers’. They can produce energy and inject it into the grid. They may sell services to the market, and may even be able to adapt their consumption on an hourly basis in order to lower their energy bills. Similarly, the changing energy mix also has consequences for the way the gas grids are used.

3.1 Background of changing needs

CEER divides the changes, which bring both opportunities and challenges, into three categories: technical, economic and organisational.

- Technical opportunities and challenges for DSOs may come from technological changes that affect the DSOs’ tasks, or the technical changes that the DSOs themselves can actively use in performing their tasks.
- Economic opportunities and challenges for DSOs come from the increased operation and maintenance needs/costs following technical changes and investments. These also come with the advantage of the opportunities provided by new technology, for example, through possibilities that smart grids provide. In addition, in many countries there is a demand for a higher quality of supply that may require additional investment to meet, while at the same time also reducing operational costs.
- Organisational challenges arise from new responsibilities for consumers, suppliers, prosumers and equipment providers. In addition, the expanded tasks of DSOs as a more active system operator require more coordination between DSOs and TSOs. The DSO will have to find its role as a neutral market facilitator, and act accordingly.

The challenge for the regulator is to ensure clear obligations and authorisations for the different roles, and to enable a good coordination and communication between the different actors. The regulator has to ensure neutrality and a level playing field for all parties involved. In developing models, one challenge for the regulator is to provide incentives that are as technology-neutral as possible. In general, the aim is to allow the market to decide on the best solutions or technologies, and to have no intervention from the regulator on deciding on the best solutions or technologies for the DSOs.

3.2 Outcome of public consultation on changing needs

The vast majority of respondents mentioned Distributed Generation (DG) and Renewable Energy Sources (RES) and the related increase of “prosumers”, and the technological advancements that surround DSOs’ activities (e.g. electric vehicles, storage) as the most important technical challenges. Some gas companies are concerned with addressing decarbonisation, the distribution of other gas substitutes and the use of gas in transport. Also, some respondents mentioned that the amount of information available, for example on critical grid elements and on consumers/prosumers, will increase.

As for economic challenges, many respondents underlined the need for a long-term vision, clear and achievable targets and consistency between national and EU regulatory framework. Some DSOs emphasised the importance of the tariff design and revenue, e.g., cost reflective tariffs, predictability of incomes and having sufficient financial means to carry out their obligations. In addition, some DSOs mentioned that flexibility could be used and the involved costs should be included in regulation as operational costs. Several Gas DSOs state that incentives should increase the development of the gas network to achieve decarbonisation targets.

Among organisational challenges, most respondents indicated the involvement of new market players, such as local energy communities, active customers and microgrids. This increases the importance for DSOs to act as a neutral market facilitator. In addition, some stakeholders mentioned the importance of coordination between TSOs and DSOs.

3.3 CEER position on changing needs following public consultation

Considering the responses in the public consultation, CEER concludes that there is consensus among stakeholders on the main technical, economic and organisational challenges. In broad strokes, the responses describe developments, challenges and opportunities that are similar to the ones described in the consultation document.

On grid planning and interaction of energy sources, CEER recognises that there are new challenges ahead. In the electricity system, the grid is becoming less vertically-oriented. For example, the increasing amount of distributed generation leads to evolving ways for DSOs to design and operate their grids. Also, there is a changing interaction between the electricity, gas and heating grids. This requires more coordination between grid operators, not only between TSOs and DSOs, but also between different energy systems. Sharing data could be required in this process, however, the availability of the data should not impede competition or customer rights.

Both smart grid investments and buying flexibility from the market provide an opportunity for an efficient approach in order to (temporarily) avoid more traditional grid investments. DSOs state that the costs related to smart grids and flexibility procurement should be included in the regulatory cost trajectory. CEER agrees that efficient costs should be included when setting the allowed income. However, it should be done in a manner whereby regulation does not create a bias for either operational- or capital-cost-based solutions, or for traditional or innovative approaches. NRAs would need to take into account all relevant changes when setting the regulatory income and tariffs.

CEER would like to emphasise again that the neutral market facilitator role of the DSO is important. For example, in the process of procuring flexibility services from the market, the DSO must act in a non-discriminatory manner and provide sufficient information to the market actors in order not to constrain competition. In effect, a DSO should provide information to market actors on the (future) need of flexibility services at specific locations in their grid. Vice versa, market actors should provide the information required for DSOs to efficiently manage their congestion.

4 Changing aims and examples of good practice

4.1 Changing Aims

4.1.1 Background on changing aims

As described in Chapter 2, the more-traditional goals focus on the classical regulatory objectives of cost efficiency, and network quality and reliability, whilst allowing an efficient level of profit for the network operator. Meeting these aims is likely to involve a trade-off and a sensible combination of regulatory parameters is required to ensure an operational balance of regulatory goals. For example, cost efficiency targets may conflict with investments in quality of supply, or inefficient overinvestments may arise from a disproportionately high rate-of-return.

The original aim of regulatory intervention in grid-bound energy supply was to ensure that natural monopolies would provide service with adequate quality levels and not overcharge customers. This meant both a decrease in inefficiencies in natural monopolies and making sure that the consumer benefits from efficiency gains. While those goals will remain relevant in the future, the overall transformation of the energy system in general, and the significant changes on the distribution level in particular (some of which are discussed in greater detail in the previous chapter), require a critical reflection as to whether a realignment of regulatory aims is necessary and if so, in which direction. The public consultation process was a key part of that reflection, which ultimately seeks to identify which should be the new main regulatory goals.

4.1.2 Outcome of public consultation on changing aims

Most respondents agreed that traditional regulatory goals, such as equal access to the grid, cost-efficiency, security of supply, quality of service and financial viability should remain at the forefront of regulators' concerns and objectives. However, due to changes occurring and expected to take place in the energy sector, the importance of certain goals (some of which are new) is growing. A brief description of the most relevant future regulatory goals is presented in this sub-section.

Many respondents mentioned the need to incentivise investments in innovative assets and services through a forward-looking regulatory framework, as an important future goal. Participants believe that regulation will need to focus on optimising future network investment needs against an uncertain background. DSOs need to be encouraged through core regulation to objectively consider operational or service-based solutions to network requirements.

As regards promoting flexibility, respondents considered it as one of the main new goals of regulation, since in their view the DSO should be able to make use of new flexibility tools, like storage, flexible (non-firm) connections and time-of-use tariffs. Regulators should take into account the potential flexibility development challenge, since lack of liquidity or interest by market providers might become an issue. When this is the case, DSOs responding held that regulation should allow them to develop some flexibility assets, such as storage, by themselves, when feasible flexibility market-based options are not readily available and such flexibility services are necessary for an efficient and secure grid operation.

The consultation showed that participants (both in the public hearing and in the public consultation) view the need to ensure that DSOs fulfill their role as “neutral market facilitators” as a key new goal. According to some participants, regulators should design adequate remuneration mechanisms and incentives that take into account the widening scope of DSOs’ new roles.

Based on the responses, other important new goals are ensuring effective data management and non-discriminatory access to data, considering the growing need for better cybersecurity, and adopting a holistic “whole system approach”, not just within the electricity sector, but also considering gas and heat.

References to the need for simplicity, stability, predictability and transparency of the regulatory environment, while at the same time remaining adaptable to changing needs, were frequent across the answers.

Finally, the need to review the traditional approach for the regulation of DSO’s natural gas regulation has been raised. The need to consider the economic and environmental sustainability of the activity and its contribution to the decarbonisation has been highlighted.

4.1.3 CEER position on changing aims following the public consultation

CEER notes that the new regulatory goals proposed in the consultation report were also mentioned in many consultation answers.

Changing regulatory aims mutually interact with the changing role of the DSO. As elaborated in the CEER Conclusions Paper (2015) on The Future Role of the DSO, the areas in which DSOs are active may involve *smart* solutions, becoming increasingly important the management of data and information flows, coordination with TSOs and managing access to the grid by new players and activities.

In this perspective, regulatory intervention may put a stronger emphasis on data and transparency issues. The increasing ‘smartening’ of distribution systems and the rollout and implementation of smart meters go hand in hand with increasing amounts of data. Smart meters generate data on consumer consumption behaviour with a high degree of granularity. This brings transparency and data protection issues into play. In this context, regulatory intervention will, to an extent, focus on the assignment of roles and responsibilities to the DSO or third parties. This includes questions such as: who is the responsible party for data collection and processing, and who should be allowed to use the data for further commercialisation. Here, unbundling rules play a pivotal role. The aim would be, at least, to safeguard customer privacy, and to create a level playing field in the (fair) use of the available data. Thus, ensuring secure data management and non-discriminatory access to data, considering the growing need for higher levels of cybersecurity, will be a key regulatory goal in the coming years.

A further topic of importance, in the light of the energy transition, is flexibility. From a network perspective, access to and appropriate use of flexibility services can potentially reduce network costs, by allowing for the deferral and/or avoidance of network reinforcement. There is a particular rationale for this in the context of the changing nature of the whole energy system due, inter alia, to facilitating increasing volumes of variable renewable generation. CEER recognises the increasing importance of innovation and the use of services to provide necessary flexibility. Flexibility use by the DSO can support the efficient operation of the energy system. It is important, however, to ensure that flexibility is used in a way that strikes an appropriate balance between the (capital) costs of grid reinforcement and the (operational) cost of procuring flexibility services. In that regard, the regulatory framework should support optimal system outcomes for the ultimate benefit of consumers. CEER's consultation paper on *Flexibility Use at Distribution Level*[9] discusses this topic in greater detail. CEER maintains its position that DSOs should act only as buyers of flexibility services (including storage) from third parties. They should not own or operate them. The regulators should ensure that DSOs act as neutral facilitators with regard to flexibility services.

Regulators should also ensure that DSOs act as neutral market facilitators to guarantee participation in the energy transition by all stakeholders and activities and to improve sustainability across the energy system.

Adopting a "whole system approach", considering the impact of regulatory decisions, which takes into account a wider vision of the network system, will continue to be an important regulatory goal for the future. Details regarding the implementation of such an approach are discussed in the following sections.

As for transparency, CEER agrees that it should also be considered a relevant new goal, which can be addressed by balancing several choices – before NRAs go ahead with any regulatory changes they need to hear stakeholders and to make impact assessments. Such an approach is detailed in the next section of this paper.

As distribution systems, by their very nature, are natural monopolies, regulatory oversight determines the extent to which the regulated DSOs are encouraged or required to adapt their technological, economical and organisational strategy. New developments in energy markets also require investments in infrastructure and innovation. CEER recognises the importance of innovation in the energy transition, and, considers that regulatory schemes should not hamper innovative and efficient solutions.

The challenges for NRAs consist in integrating the new aims into the existing aims, and to operationalise them by introducing appropriate incentives in order to make network operators strive towards these aims. As a consequence, the patterns of interaction between the traditional regulatory goals may change, and new approaches and best practices may be required.

In the next section, CEER addresses several approaches or practices, which, in CEER's view, may support regulators in reaching both traditional and new regulatory goals, such as the balancing of choices and the whole system approach. CEER also explores areas in which good practices can improve the long-term optimisation of innovation.

[9] CEER Consultation paper on "Guidelines of Good Practice for Flexibility Use at Distribution Level", March 2017. The conclusion document on *Flexibility Use at Distribution Level* is scheduled for publication during 2018.

4.2 Balancing of Choices

4.2.1 Background on balancing of choices

Regulatory decisions create a wide range of effects. As mentioned in the consultation document, some aims can work against each other, but others can be complementary. Strong incentives for cost efficiency may be achieved at the cost of the quality of service provided. Combining cost efficiency with quality of service targets may foster innovation. Neither path chosen to achieve those aims, i.e. regulatory tools, is fully neutral.

Therefore, in the consultation document, CEER discussed how some traditional regulatory tools may be ineffective to achieve most of the aims raised by the current challenges, particularly because such challenges require innovative approaches that may not be incentivised by traditional input-based tools. NRAs must therefore understand the effects of their choices, the circumstances they operate in and which stakeholders are involved in order to be able to balance different goals and incentives in a complementary manner. Regulators also need to balance aims and tools in advance, and to legitimise their options vis-à-vis the stakeholders, ensuring that the chosen options bring value for money for the stakeholders in the short term, but also in the long term, thereby contributing to the removal of obstacles for innovative approaches.

In a clear and transparent process, in order to ensure a stable and predictable regulatory framework, NRAs should firstly define the main regulatory goals, following an interactive process with stakeholders. Monitoring instruments and indicators should be developed afterwards and presented to stakeholders in order to evaluate the regulatory tools and adapt them, if necessary.

Such interactions with stakeholders can be seen as a continuous process that provides NRAs with valuable information regarding key performance indicators, which will in turn improve the process of balancing choices regarding policy measures and desired outcomes.

The Portuguese regulatory process (described in the box below) represents one example of a transparent regulatory framework, which involves and considers the views of a wide range of stakeholders.

Transparent processes in regulation – an example from Portugal

In order to enable the definition of effective incentive schemes, which balance different perspectives, the Portuguese NRA (ERSE) has implemented a set of regulatory policies which are based on several rules, such as transparency, collaboration with stakeholders, and monitoring, under a stable and predictable regulatory framework. These rules have consistently aided ERSE in defining its main regulatory goals and in evaluating, or adapting if necessary, the regulatory tools it applies, based on the feedback from stakeholders.

Main stakeholders are represented by councils (the tariff council and the consultant council), where they are heard before any decision which will frame the DSO's activity is made. For instance, in the process of setting network access tariffs, regulatory financial reporting rules were established following several discussions with regulated companies. Each year, ERSE's network access tariffs proposal undergoes a public consultation process, during which all of ERSE's tariffs documentation is shared with the public, and representatives of all

stakeholders are invited to provide their views and comments before the final tariffs proposal is approved and published. The publication of regulatory codes that imply changes to the regulatory framework, and other statutory responsibilities such as providing a non-mandatory opinion on companies' network investment plans are also carried out through a process that includes a consultation period, where all relevant information is transparently shared. In this case, even though ERSE's opinion is not binding, it can have a significant influence in the process because it considers stakeholder perspectives.

Preparing regulation methods – an example from Finland

The Finnish Energy Authority's responsibility is to develop regulation methods between regulatory periods. According to the legislative history of the *Act of the Electricity and Natural Gas Market Regulation (The Government's Bill 20/2013 vp, detailed justification of section 10 of the Act of the Electricity and Natural Gas Market Regulation)*, the Energy Authority must prepare a new confirmation decision for each regulatory period. The methods of the decision will have been developed based on regulatory experience as necessary. According to the Act of the Electricity and Natural Gas Market Regulation, the Energy Authority must also ensure in preparatory stage that the confirmation decision will be subject to sufficient public debate at the draft stage.

When developing regulation, the Energy Authority must consider the targets and principles of natural monopoly regulation expressed in electricity market legislation and in relevant case law. The Authority must also take these into consideration the application of the appropriate regulation method. The regulation methods for DSO's include five different incentives set out to support the targets and principles of regulation.

When developing regulation methods for regulatory periods for the years 2016-2019 and 2020-2023, the Energy Authority arranged more than 60 consultation hearings with stakeholders and published two draft versions of the regulation methods. More than 80 statements were issued by stakeholders on the draft versions. The Energy Authority strives for procedural fairness through considering these views as part of the discretionary decision-making of the regulation method confirmation decisions and by giving extensive justifications on decision-criteria, data and reports with the final respective confirmation decisions.

4.2.2 Outcome of public consultation on balancing of choices

CEER is pleased to observe that participants in the public consultation overwhelmingly agreed that the regulatory process should be interactive and involve all stakeholders. A few answers specifically stated that they agree with the process detailed in the section "Balancing of choices" in CEER's consultation document. Several interesting and more specific ideas and comments are detailed in Annex 2 to this report.

However, despite agreeing with the general view that regulation should be an interactive process, certain respondents pointed out several concerns that should be addressed by regulators: (1) the need to avoid conflicts of interest between various stakeholders; (2) unnecessary and lengthy procedures and approval processes, as these can result in a long period of uncertainty for stakeholders; and (3) regulators should avoid entering into details (i.e., beyond principles and aims), because it could jeopardise the efficiency of the whole process.

When asked what should be done to allow a more-active participation by stakeholders, participants presented a set of helpful suggestions. At a European level, participants suggested CEER consultations and GGPs. At national level, they suggested consultations, workshops to facilitate exchange of ideas, hearings, working groups and setting up permanent consultation committees, among others. In general, it was emphasised that for participation by stakeholders to increase, NRAs must lead and be actively involved in this process. Furthermore, NRAs need to be transparent about the regulatory process, frequently publishing relevant information in a timely manner.

4.2.3 CEER position on balancing of choices following public consultation

The general consensus that was evident through the public consultation reinforces CEER's view that an interactive process with stakeholders will become an increasingly vital tool to achieve key regulatory goals in the future.

Although involving all stakeholders at the early stages of the regulatory process can be time consuming and difficult to implement, when properly managed, such interactive processes generate benefits in the longer term, in terms of transparency and effectiveness of regulation.

It is important that a wide range of stakeholders is actively involved in consultations, both at the European (CEER) and at a national level (NRAs). Stakeholders should include not only grid operators, but also (new) market players, consumer associations, local governing bodies and elected representatives, non-specialist prosumers, technology providers, academics and scientists and standardisation bodies. However, it is important to ensure the effectiveness of the whole process and adapt this list to the issue's relevance or specificities.

CEER should continue to promote periodic CEER consultations, targeted workshops and questionnaires, while at the national level, NRAs should aim to put into practice the following measures:

- involve all stakeholders from the early stage of regulatory decisions;
- develop transparent consultation processes;
- develop effective procedure to collect and to convey information and perspectives (targeted workshops, questionnaires);
- promote better communication between consumer representatives and DSOs and NRAs;
- encourage DSOs to demonstrate meaningful engagement with stakeholders, particularly in developing network plans;
- develop instruments to monitor the performance of new regulatory tools and convey results to relevant stakeholders.

4.3 Innovation

4.3.1 Background on innovation

From the viewpoint of economic theory, regulatory intervention is required to induce network operators as natural monopolies to invest efficiently, to provide a good level of customer service and provide an adequate level of quality of supply. Technological progress, i.e. innovation, is considered as a means to achieve these overarching regulatory goals and the regulator should remove any undue barrier that may hinder a DSO in adopting an innovative solution.

Technological progress requires a dynamic consideration of associated costs. This implies that welfare reaches a maximum over time. This allows for temporary allocative inefficiencies assuming that innovative measures are not always cost-efficient from a short-term perspective. Expected benefits from innovation only unfold within a certain time lag and measures to encourage innovation should take into consideration proper discounting of expected future vs. present benefits.

With this properly considered, NRAs need to set incentives that deliver efficient long-term outcomes for consumers. In pursuing this regulatory objective, CEER highlights in the consultation document its support for innovative solutions where they are in the energy consumer's interest, they avoid regulatory overburdening and allow only efficient implementation costs for innovative solutions from DSOs. However, these incentives should be technology neutral and not prescribe specific technologies or solutions.

4.3.2 Outcome of public consultation on innovation

The consultation underpins that CEER and stakeholders have a positive attitude towards technological change and underlines that the regulatory framework shall enable innovation as one of the new regulatory goals. CEER notes that a number of consultation responses (mainly from DSOs) stated that DSOs should decide on suitable solutions whilst the NRA should refrain from any prescription of an appropriate fulfilment of the DSO's business.

As regards to the calibration of incentives, some stakeholders were in favour of technologically-neutral incentives, and others emphasised the importance of output-based approaches. Also, it was evident from the responses that it may be important to apply different incentives according to the maturity of the innovation. For new solutions with unsecure outcomes, a reimbursement of costs regardless the outcome was seen as appropriate whilst for mature technologies technologically-neutral, indirect incentives such as TOTEX and benchmarking would be a suitable approach.

Regarding the achievement of an outcome of innovative solutions, the consultation document mentioned that, independent from the respective approach towards innovation, innovation should be seen by DSOs from a customer perspective. The DSO should not spend money on something that users do not benefit from. The consultation showed that this position is shared by the stakeholders, as respondents acknowledged that customers are the centre of the energy system. The consultation further showed that stakeholders see a broader perspective as more desirable, as customers benefit from innovation, even if they are not directly involved. Some respondents noted that the customer´s perspective is not necessary for innovations which are invisible for customers.

4.3.3 CEER position on innovation following public consultation

CEER's view on innovation became more expansive by taking into account the statements from the public consultation. CEER believes that NRAs should not decide on appropriate technologies/solutions in order to carry out the DSO's distribution task but rather that it is up to the DSO to decide on suitable solutions according to the incentives set by each NRA. Suitable solutions may vary according to the individual situation of DSOs, e.g. in terms of a distribution activity being either in rural or urban areas, the extent to which DSOs are affected by RES integration or e-mobility, their development in terms of network automation and "smartness" (including telecom connectivity of network users), etc. Incentives should be technologically neutral in order to be able to suit the wide variety of situations. Also, incentives are inherently connected to regulatory aims, such as efficiency or reliability. Not all of the aims are purely economic.

As already stated initially, CEER confirms that innovation is not an aim in itself. Notwithstanding that position, in order to facilitate an innovative environment where innovation is on a level playing field with other regulatory tools, in certain circumstances, e.g. subsequent to a previous cost benefit analysis, certain specifically pro-innovation regulatory measures might be justified. This might include, amongst others, providing incentives or mechanisms for innovative pilot projects. Funding initiatives can also be beyond the scope of the NRA. Generally, approaches may vary among NRAs.

CEER has the view that regulation on innovation should be related to the whole system, but with a view on benefits for the welfare of consumers in general. Even if consumers are not directly affected by innovations, they should benefit from the overall improvement of the system (in terms of security of supply, decarbonisation or other main goals).

CEER is aware that incentives for innovation may also be anchored outside the regulatory system and therewith beyond the scope of the NRA. Related measures may include public innovation funds for R&D and demonstration projects, national funding programmes in the context of smart grids or European Framework Programmes for Research and Innovation such as Horizon 2020.

To conclude, CEER emphasises its appreciation for the richness and variety of examples and considerations provided during the consultation. Each Member State has different characteristics, and each NRA must determine its goals and activities based on the circumstances that they operate in. There is no "one model that fits all". The examples provided can be seen as good practices to incentivise innovation among DSOs as long as they fulfil the obligations stated above.

4.4 Whole System Approach

4.4.1 Background on the whole system approach

In the public consultation document, CEER considered that an innovative solution on distribution activity (both for management and investment) can produce broader benefits across the energy system as a whole. Therefore, CEER expressed the view that NRAs should keep a wide and forward-looking perspective and have a good understanding of the whole system. This approach is named "*Whole System Approach*" (WSA) and focuses on the "system" concept, trying to identify the net benefit for consumers that regulatory decisions may bring for the whole system and avoiding inefficient fragmented decisions.

4.4.2 Outcome of public consultation on the whole system approach

Through public consultation, CEER stimulated stakeholders to provide their views on the WSA. Almost unanimously, respondents to the consultation responded positively to CEER's considerations on the WSA. Most of contributions received were accompanied with cases of best practices (see Annex 4). The analysis of the stakeholders' views on the WSA proved to be extremely useful for better outlining the concept that this approach entails.

Although WSA has clear advantages for modern regulation, the discussion also puts on the table relevant problems for real-world application of this approach.

First, stakeholders highlighted the complexity of the WSA and its relationship with the perimeter of "energy systems". In order to have a full vision and not miss the opportunity of efficiency gains, they propose that the NRAs could consider not only different electricity issues but also gas and heating issues, as in almost all EU member states the same regulatory authority has jurisdiction over both electricity and gas sectors and in many cases also over district heating. Similar approaches have been done by means of "sector coupling" between sectors that normally are under the jurisdiction of different regulators (for instance, energy and transport). CEER believes that the WSA can be fruitfully used in the electricity and gas sectors as a first step.

Second, unbundling issues are relevant in a fully-liberalised market. One respondent cited the case of a demonstration project where old electric vehicle batteries are used to provide storage for solar panels, which allows energy production, energy distribution and mobility to be considered all together; but unbundling constraints make such a solution not applicable for DSOs on large scale. Other respondents cite the issue of local energy communities.[10]

Third, but not less important, the WSA also raises the question of who ultimately makes the decision about what is optimal and who is carrying the financial and volume risks. As DSOs are regulated actors, their risk profile ultimately depends upon the choices of NRAs that have the duty to evaluate and allocate risks among customers, market players and grid operators.

[10] On local energy communities, also see the CEER white paper (# VIII) on *Renewable Self-Consumers and Energy Communities*.

4.4.3 CEER position on whole system approach following public consultation

The WSA requires the DSO to look at net benefits on a wider basis than their own grid. It, for example, would involve coordination and interaction with other DSOs and TSOs. A true whole system approach would embrace electricity, gas and heat with the aim of achieving the best overall approach for consumers. The realisation of this concept needs much more thinking and development to move beyond the concept and will involve TSOs and others as well as DSOs. CEER will continue to develop its thinking in this area. This will affect TSOs as well as DSOs as the regulatory scope of NRAs is focused on energy networks.

In conclusion, CEER considers the discussion of the consultation on the WSA extremely helpful and wants to continue promoting best practices in applying the WSA, while, at the same time, carefully considering the complexities and potential problems of this broad and forward-looking regulatory approach.

For now, CEER's current views on the WSA are to be framed within the fundamental pillars of DSO regulation. First, the main focus for DSOs is to behave as a neutral market facilitator, therefore, applying the WSA must not in any case foreclose competition currently or in the future. In order to not unduly distort markets, the DSO's role must remain limited to activities that are not, and cannot be, performed by market players. Second, the WSA is an overall concept that NRAs support. How it is applied in practice depends on the specific circumstances, including the jurisdiction of regulatory authorities. Last but not least, customers pay for activities carried out by DSOs through regulated network tariffs. Distribution and, in most cases, metering are, therefore, activities whose risk is assessed by regulators and reflected in the remuneration granted through the tariff mechanisms. As a consequence, the WSA must be framed within the overall balancing of interests that is typical of the regulation of network monopolies, as stated above in section 4.2.

Making use of contributions from the consultation, CEER is able to highlight several features of the WSA that a DSO should consider. For regulation, such approach can be implemented to the extent the DSO's decisions are within the scope of the NRA's responsibilities in each country.

- **The WSA is based on a wider vision of the network system as part of the entire value chain**. In order to implement the WSA, DSOs are to consider consequences of their decisions on other actors in the value chain, and seek an efficient solution. Generally, consequences of the DSOs' decisions will be priced at the right network level, and therefore, incentivising cost-efficiency will guarantee the best economic outcome at system levels. But in some situations, externalities not fully priced in must be considered by regulators. For instance, DSOs and TSOs should optimise the network system as a whole rather than focusing on minimising the DSO's and TSO's costs separately from each other. This could mean the TSO taking action to address a problem at distribution level or the DSO taking action to address a problem at transmission level if one or the other is the most efficient approach. NRAs should ensure that in these cases funding flows in the right direction. A further example is metering (in most countries this activity is carried out by DSOs): the interaction between DSOs as meter operators and other actors on the energy market is of great importance. Therefore, the benefits of smart metering should not be viewed only in light of DSOs' activities (for instance, valuable information for grid operation and investments), but also in terms of positive effects on all parties that use data on energy consumption and production (e.g. on distributed generation) to enhance their operations.

- **Societal net benefit is the main criteria of the WSA**. According to stakeholders, regulatory decisions must consider the societal net benefits. If externalities are not fully priced in, the decisions of one single DSO may, from its own cost-benefit point of view, appear disadvantageous for the DSO or its direct grid users but may be beneficial for the system as a whole. In such a case, the DSO could receive some form of incentive to carry out an activity beneficial for the system that they would otherwise drop if they were regulated only on their endogenous benefits and costs.
- **The WSA supports an efficient "system transformation" due to distributed resources.** As suggested by some respondents, the growing dynamic and interactions between TSOs, DSOs, market parties and prosumers at both low voltage and higher levels makes the coordination at these different systems more and more necessary. In a scenario of large diffusion of distributed resources, a more holistic approach based on wider cost/benefit analysis may lead regulators to provide the right incentives to DSOs for improving network system performance to the benefit of consumers. One example suggested by respondents is for NRAs to consider allowing DSOs to share the benefits for the system of the reduction of dispatching costs generated by DSOs' investments, as is already in place for TSOs in some EU member states.[11]
- **The WSA requires NRAs to take into consideration life-cycle costs**. If NRAs want to use the WSA, they may want to take costs into account not only in the regulatory period framework, but in a longer-term perspective related to the total cost over the whole life cycle of the asset, provided that this approach does not generate misleading price signals or biased investment decisions, promoting, for instance, hardware investment over software investments.[12] A respondent used the case of High Efficiency Transformers to show the missed opportunities (in terms of both economic efficiency and sustainability) of innovative solutions when costs are not considered over the whole life-cycle time. Some respondents also noted that using the TOTEX regulation (i.e. superseding CAPEX regulation separate from OPEX regulation) will bring the necessary added value to the whole system approach.
- **The WSA helps in minimising inefficiencies**. The WSA approach is considered valuable because it can improve efficiencies in the energy system, as long the objectives of all stakeholders are aligned. Regulators who adopt the WSA can (incentivise the) search for the most efficient solution for the whole system. This means, *in primis*, to clarify the TSOs' and DSOs' roles, and avoid inefficiencies, especially in network planning and investment, integration of demand side response and distributed generation. As already stated in the CEER Consultation Paper, from a WSA perspective, cooperation between DSOs and TSOs in finding the best design of the integrated transmission and distribution networks could reduce the total system costs and avoid duplication of investments.

[11] Considering cost and benefits over the whole system is the underlying rationale of CBA in Regulation EU 347/2013, to be used in Cross-Border Cost Allocation procedures) and in a few cases already for DSOs (e.g. "smart distribution system" regulation)

[12] NRAs using TOTEX approach (see 2.2.1) and/or taking into account the evolvement of regulation over regulatory periods avoid this risk.

WSA-based regulation – examples from Italy

For several years, the Italian energy regulator has adopted incentive mechanisms to ensure that money flows in the right direction when DSOs manage themselves according to the WSA. The first of these mechanisms is known in Italy as “mitigation service” and it is evidenced by a DSO contributing to the reduction of the impact for final customers of interruptions that originated in the transmission grid. Mitigation is possible thanks to the MV networks that allow for back-feeding with a change in MV network configuration. This change to distribution network configuration can be operated remotely by each DSO.

Since 2010, the “mitigation” service is remunerated to DSOs within the output-based regulation of the Italian TSO (Terna), which is aimed at reducing energy not supplied (ENS). Incentive regulation for Terna recognises such an effort made by DSOs to reduce problems that occurred in the Transmission networks, and compels Terna to pay DSOs for their contribution when DSOs actually reduce ENS of interruptions that originated in the transmission grid. The remuneration for DSOs in case of "ENS mitigation" is paid directly by the TSO to DSOs, under given conditions set by the regulator, in effect reducing TSO rewards (or increasing penalties for TSO) due to continuity of transmission service.

The rationale of this regulation is the Whole System Approach: DSOs are rewarded because they behave in a way that helps to solve a problem that originated on the transmission grid, even though DSOs bear a supplemental risk in providing mitigation service to the TSO (due to temporary out-of-the-ordinary topology of the distribution network). If DSOs were not rewarded for the higher risk, and transmission-originated interruptions were not mitigated by DSOs, the ENS for final customers would be higher.

A further example of a regulation based on the Whole System Approach is the incentive for innovative functionality known as “observability of MV networks”. When DSOs provide a TSO with real-time data (every 20 sec) on the state of MV networks (considering load and injections from distributed generation), a reward is paid to the DSO because of the benefit that this information provides for the system operator (thereby allowing the TSO to avoid procuring too much or too expensive reserves). This innovative functionality was first tested on a small scale in pilot projects promoted by the regulators (and incentivised through an extra-WACC premium), and then confirmed on large scale (subject to RES penetration) with an output-based mechanism. For further information, please refer to Annex 4.

5 Conclusions

Central to the work of regulators on distribution networks is the regulatory system where the revenues of DSOs are allocated according to a framework that corresponds to fulfilment of a DSO's required tasks. CEER aims to exchange experiences between regulators and to set guidelines of good practice. With this document CEER publishes guidelines of good practice on incentives schemes for DSOs, including innovation, after consultation with stakeholders.

Regulators have listed common goals in DSO regulation. CEER has the view that there should be no a priori hierarchy in these goals. Regulators should assess country-specific needs taking into account characteristics of national contexts to weigh regulatory principles (no 'one size fits all' approach). The table below summarises the main goals that regulators may pursue in their regulation of DSOs, and reflects CEER's final position, following the public consultation process.

Main common goals of DSO regulation
Ensuring a level-playing field: acting in a non-discriminatory manner to all parties, including non-discriminatory network access, and acting as neutral market facilitators, for example in buying flexibility services from the market.
Promoting cost efficiency: promoting cost efficiency in the absence of competitive pressure. DSOs perform their core tasks in a way which meets the reasonable expectations of network users and other stakeholders in the most efficient and economical way.
Ensuring financial viability: ensuring that DSOs have sufficient financial means to operate efficiently based on a cost of capital which reflects national circumstances and their regulated status.
Improving quality of service: ensuring that DSOs offer the right services, including secure and timely data management when applicable, with a service quality level that is satisfactory for network users and contributes to security of supply for the whole system.
Facilitating innovation: promoting a regulatory environment that removes barriers to the pursuit of innovative approaches by DSOs and which have the potential to bring savings or benefits to consumers, without foreclosing competition in new activities.
Ensuring security of supply: promoting security of supply (including resilience of networks to extreme climatic events) and safety in service operations.
Facilitating the improvement of sustainability, including the promotion of energy efficiency: regulation should facilitate the improvement of sustainability across the energy system and promote the reduction of energy losses along the grid.
Introducing a holistic view: ensuring a coordinated whole system approach.
Ensuring that DSOs safeguard customer privacy, ensuring secure data management and non-discriminatory access to data, considering the growing need for higher levels of cybersecurity.

Given the goals of regulation, different regulatory tools allow or, going further, incentivise DSOs to reach those goals. As is the case with regulatory goals themselves, the application of regulatory tools is not a 'one size fits all'. Incentives for efficiency and efficiency benchmarking – in combination with other input prescriptions or output targets – provide the means to achieve the outcome that customers receive value for money. CEER recognises the advantage of output-based regulation, as it considers what is important to customers while it provides freedom to DSOs to find optimal solutions. Also setting a fair rate of return (key in the financial breadth of regulation for the DSO) is an important aspect in regulation. Regulators should be attentive to creating stability and predictability with the regulatory framework, while at the same time not making the framework too stringent, for example, the framework must allow sufficient agility to match market developments.

In a changing energy market, CEER sees technical, economic and organisational challenges – but also opportunities. These exist, for example, on grid planning and the interaction of energy sources, smart grid investments, possibilities to buy flexibility from the market, coordination between DSOs and TSOs and data sharing. CEER emphasises that the availability of the data should not impede competition or customer rights. It remains important that the DSOs act as a neutral market facilitator.

CEER has paid special attention to four areas: changing aims, the balancing of choices, innovation and a whole system approach. The main conclusions on these areas are the following:

- It is important for NRAs to be cognisant of changing aims in regulation. Some pertinent examples are regulation of metering, data and transparency issues, as well as possibilities to buy flexibility from the market to manage congestion and to better exploit the infrastructure.
- On the balancing of choices, NRAs should aim to put into practice obtaining the involvement of all stakeholders from the early stage of regulatory decisions. This encompasses having transparent consultation processes and developing instruments to monitor the performance of regulatory tools.
- On innovation, CEER believes that it is up to the DSO to decide on suitable solutions according to the incentives set by each NRA. The NRA facilitates innovation and should in general be technologically neutral.
- With the whole system approach, CEER advocates that DSOs should have a wider vision of the value chain and extend it to the overall network level – where societal net benefit is the main criteria – rather than limiting this to only the perspective of the DSO's own grid. At the same time, this approach should not in any case foreclose competition.

Based on the public consultation, CEER recommends that NRAs:

1. account for various goals in DSO regulation, striving in particular to balance incentives with different, but complementary purposes, such as cost-efficiency, quality of service, energy efficiency or innovation;
2. assess country-specific needs and priorities in the various goals, taking into account national characteristics, such as DSO structure, renewables penetration and other relevant features, as there is no "one size fits all" solution;
3. provide, as far as possible in light of relevant developments in the energy sector, a stable, transparent and predictable regulatory framework, ensuring incentives for efficiency in the short and long run;
4. ensure a technology-neutral approach towards innovative solutions, that may be hindered, inter alia, by different treatment of costs;

5. consider, where feasible, an output-based approach for setting incentives, because this approach has the advantage of considering what is important to customers letting DSOs free to find optimal solutions;
6. adopt a whole system approach: considering the societal net benefit for the entire system and encouraging DSOs to consider consequences of their decisions on other actors of the value chain (to the extent those decisions are within the scope of NRA's responsibilities in each country);
7. stimulate coordination between transmission and distribution system operator and ensure that funding flows in the right direction when the most efficient solution is the TSO taking action to address a problem at distribution level or the DSO taking action to address a problem at transmission level;
8. lead DSOs to demonstrate meaningful engagement with stakeholders;
9. promote a role for DSOs as neutral market facilitators regarding regulation for the market of flexibility services; ensuring no discrimination among network users and appropriate transparency in data management; and
10. continue pursuing an interactive regulatory process, which facilitates the involvement and contributions by all stakeholders from the early stage of regulatory decisions to the implementation stage, with the development of monitoring instruments to evaluate and, if necessary, adapt those decisions.

Annex 1 – List of abbreviations

Abbreviation	Definition
ACER	Agency for Cooperation of Energy Regulators
CAPEX	Capital Expenditure
CEER	Council of European Energy Regulators
DSO	Distribution System Operator
EC	European Commission
GGP	Guidelines of Good Practice
MS	Member States
NRA	National Regulatory Authority
OPEX	Operational Expenditure
RAV	Regulatory Asset Value
RES	Renewable Energy Source
RIIO	Revenue = Incentives + Innovation + Outputs
SAIDI	System Average Interruption Duration Index
TOTEX	Total Expenditure
ToU	Time of Use
TSO	Transmission System Operator
WACC	Weighted Average Cost of Capital

Annex 2 – Glossary

Term	Definition
Cost plus regulation	Cost plus based regulatory approach focuses on the realised costs, which are passed through into the allowed regulatory income or tariffs.
Direct incentives	The NRA explicitly incentivises specific behaviour or technology, e.g. by granting a higher rate of return for certain assets or technologies.
Financial Breadth	The breadth of regulation is the extent to which DSOs receive a remuneration which is in line with their efficient costs, including a reasonable return. The greater the breadth for the DSO, the higher the costs will be for the customers, and vice-versa.
Indirect incentives	The NRA implicitly incentivizes a certain behaviour by incentivising overarching regulatory goals, e.g. efficiency incentives may lead to more innovation together with cost reductions.
Input-based regulation	Input-based regulatory approach focusses on costs or processes, where the NRA may prescribe how certain investments are done or projects conducted.
Output-based regulation	Output-based regulatory approach focuses on parameters that describe the distribution task of the DSO or focuses on the performance of the DSO for achieving any regulatory aim. The NRA may set thresholds for relevant parameters to incentivise the DSO in a certain direction.
Price-/revenue cap regulation	The NRA ex-ante determines a regulatory allowance (price or revenue cap) for the DSO which forms the basis for the DSO's allowed revenues recovered through the tariffs charged on third parties for using its network infrastructure. The regulatory allowance is based on the DSOs individual cost structure, considering cost efficiency targets. With the calibration of the cap regulation, regulatory objectives (e.g. in terms of efficiency, quality of supply or innovation) may be calibrated.
Standardised cost regulation	Efficient costs are defined through engineering experience. This could for example be done by calculating the involved (efficient) costs of the existing of required grid.
Technologically neutral regulation	Regulatory incentives do not create any bias towards a certain technology or cost category (e.g. CAPEX vs. OPEX).
TOTEX regulation	Allowed revenues are based on the total costs and are not differentiated between CAPEX and OPEX, but ensures that the incentive is technologically neutral between "make" or "buy" options.
Whole System Approach	Approach that focuses on the "system" concept, trying to identify the net benefit that regulatory decisions may bring for the whole electricity system
Yardstick competition	See cap regulation. Here, the regulatory allowance is based in parts or in total on exogenous (efficient) cost structures, for example of other DSOs.

Annex 3 – Main regulatory tools by goals

Cost efficiency
Focused on OPEX
1. Price cap/revenue cap
2. Standardised cost
3. Yardstick competition
4. Cost plus
Focused on Capex
5. Price cap/revenue cap
6. Standardised cost
7. Yardstick competition
8. Cost plus
Focused on TOTEX
9. Price cap/revenue cap
10. Standardised cost
11. Yardstick competition
12. Cost plus
Promote quality of service
Output-based regulation (penalties/rewards)
Quality of service obligation, i.e., with penalties/rewards
Ensure that the level of profits is close to cost of capital
Monitor and review after each regulatory period
Any automatic mechanism (ex.: cap or floor defined in the rate of return)
Promote innovation
Output-based regulation
Input based regulation (ex: higher WACC for specific investments)
Obligation for users (i.e. connection minimum requirements)
Obligation for DSOs (i.e. minimum smart functionalities)
Promote energy efficiency
Output-based regulation
Input based regulation (ex: higher WACC for specific investments)
Tariff mechanisms
Obligation (i.e. low losses transformers)

Annex 4 – Evaluation of responses to the CEER Public Consultation on Incentives Schemes for Regulating DSOs, including for innovation

Public consultation question	Summary of responses	CEER Position
Question 1: Is there any regulatory aim that should prevail over other aims?	In general respondents recognise the aims that CEER presented in the consultation document. Several respondents think there is not a single aim that should prevail over others. Many respondents emphasise that the diversity and specific characteristics should be taken into account and regulations is not a 'one size fits all'. Also, many of the respondents agree with the level playing field principle. Below the main responses are specified by respondent groups. **Responses by DSO-related respondents:** • There is not a 'one size fits all' for regulation • Part of the DSOs regards all principles and aims to be equally important, where another part thinks financial viability, quality of service and security of supply prevail • Part of the DSOs thinks there should be a shift from cost efficiencies to other aims • Some DSOs do not regard cost efficiency as an aim by itself • Some DSOs think incentives for investments are needed • Some DSOs think incentives for innovation are needed, where some think innovation is a means to reach other goals • Long-term predictability and stability of regulation should be added • The services DSOs have to deliver must be clearly identified • Data management and delivering flexibility options should be added as goals • Sustainability and Energy efficiency should be added as goals, e.g. renewable energy and development/source integration • Gas utilities/DSOs mention the benefits of natural gas in decarbonisation • Several respondents mention that the whole system approach should be electricity/gas/heat	- In general, CEER maintains its regulatory aims as presented in the consultation document - CEER considers that there is no hierarchy in aims, but regulators should assess country-specific needs taking into account characteristics of national context (no 'one size fits all' approach). - On innovation, respondents in general mention either direct or indirect incentives that CEER described. CEER recognises the importance of innovation and emphasises that incentives for innovation should be right. Depending on the characteristics of national context, this could be achieved either by direct or indirect incentives. Innovation is however not a goal on itself, but a means to reach other goals in the short to mid-term. - CEER emphasises that regulation is quite predictable, as in practice regulatory decisions do not differ extremely from one period to another but rather build upon previous decisions. Also, regulatory decisions should be flexible enough to anticipate and take into account developments. - DSO services: CEER agrees, but this is part of a different deliverable. See the CEER conclusion paper on the Future Role of DSOs. CEER aims to publish a follow up on this conclusion document in 2018. - Depending on the market design, when the

	Responses by Suppliers, users and other respondents: • There is no hierarchy in the regulatory aims • There can be space for innovation by DSOs, but it should be monitored • Innovation incentives should be outcome based • Sustainability and Energy efficiency should be added as goals, e.g. reducing energy losses at the grid	DSO is allocated with the task of data management, that should be done in a neutral and transparent manner. The same shall apply if data management is carried out by other entities (TSO, data hub etc.). - On delivering flexibility options, CEER considers DSOs being buyers from flexibility and facilitators for the market. - CEER agrees that sustainability and energy efficiency could be promoted with regulation. In practice, in most countries this is the case, for example in incentives to reduce energy losses.
Public consultation question	**Summary of responses**	**CEER Position**
Question 2: What regulatory tools are the most effective to achieve regulatory aims?	Many respondents state that the effectiveness of tools differ according to the regulatory framework in place and specific characteristic per country. There is not a 'one size fits all' in regulatory tools. Below the main responses are specified by respondent groups. **Responses by DSO-related respondents:** • TOTEX is a good approach. • Part of the DSOs advocate output-based regulation, where some DSOs advocate (a mix with) input based regulation. • When output regulation or benchmarking is used, targets should be achievable. • Provide a stable, transparent and predictable regulatory framework. • Part of the DSOs state that regulators should set a fair rate of return. Some DSOs describe in detail what the average return should be, with an addition for certain challenges. • Regulation should be investment friendly, e.g. sufficient financial breadth and avoiding financial delays of investments. • Gas DSOs state that incentives should increase the development of the gas	- CEER agrees that there is no 'one-size-fits-all' solution for the regulatory system design and recommends that NRAs consider different tools and targets when designing the regulatory system - CEER recognises that setting a fair rate of return is an important aspect in regulation, which forms one of the goals. - There is a balance between being investment friendly on the one hand and the affordability on the other. CEER considers that regulators can decrease uncertainties (and therefore related costs), for example by providing a stable, transparent and predictable regulatory framework where possible. - CEER thinks it would be a suitable approach to take the customer valuation into account when determining quality of service incentives. See also *Guidelines of Good Practice on Estimation of Costs due to Electricity Interruptions and Voltage Disturbances - C10-*

	network to achieve decarbonisation targets • DSOs can promote energy efficiency to their customers, NRAs should be aware that tariffs will increase when billable volumes decrease • Quality of service targets should include a cost benefit analysis and assessment of willingness to pay by customers. Quality of service promotion is difficult to meet under productivity objectives. • Some DSOs mention possible tools being: - For innovation and R&D: separate funding, cost plus rather than price cap regulation, separate innovation incentive schemes. - There should be a mix of different regulatory tools to achieve the goals. - Revenue cap regulation is appropriate to achieve regulatory aims, as investments are adequate and efficiency incentives given. - Incentives for the DSO performing as a neutral market facilitator - Setting up guarantees for stranded assets or risky investments - Knowledge sharing for best practices, to avoid duplication of efforts - EU R&D frameworks and PCIs to promote smart grids implementation across Europe **Responses by Suppliers, users and other respondents:** • A combination of tools will be required. • TOTEX is a good approach. • Output-based incentives can increase the performance in areas that users value. • Benchmarking is beneficial in setting best practices and raising efficiency. • The government or NRA should decide on the Return on Capital. • The NRA should set targets on social economical parameters, service time and energy/power costs.	*EQS-41-03*. - CEER favours energy efficiency where possible. Within the regulation of DSOs, this would encompass energy losses on the grid. - CEER believes that DSO should not be active beyond the meter for energy efficiency services in order not to foreclose market of those services. See the CEER conclusion paper on the Future Role of the DSO. CEER aims to publish a follow up on this conclusion document in the future.
Public consultation question	**Summary of responses**	**CEER Position**

Question 3: Do you have examples of additional important tools in regulation?	Respondents mention several different additional tools or ways to specify the tools. **Responses by DSO-related respondents:** • Direct incentives or subsidies for innovation/R&D/experiments, possible with certain obligations (e.g. ringfenced, reviews), or reducing regulation and/or administrative costs. • Output or performance-based incentives • Provide incentives to use smart solutions to avoid building new infrastructure (e.g. using distributed generation) • Financial breadth for asset replacement/reinvestment. • Using a general productivity factor, of which some DSOs state it should converge to zero • Appropriate benchmarking system (e.g. different benchmarking models, modest efficiency factor and outlier analysis) • Information Quality Incentive (IQI) mechanism, i.e. to incentivise the DSO to signal the right information to the NRA in setting the appropriate allowed level of income. • Incentives on reducing energy losses/fraud. • Quality of supply • Quality of service • Yardstick regulation works in a good way, but has difficulties to measure new tasks • Tools should take into account country/grid characteristics. • Differences between gas and electricity should be taken into account, where gas is more flexible **Responses by Suppliers, users and other respondents:** • Third parties should be able to offer asset or service-based solutions to the network. Tendering can provide a cost-effective solution. • Incentives should be given to make use of the potential of controllable use and generation, to make optimal use of the grid. • Setting of specific parameters or targets within regulation.	- CEER recognises the potential benefits for grid cost optimisation when buying flexibility, both from demand and generation. Although reinforcing the grids might often remain the best outcome, DSOs should seek more efficient solutions where possible. See the Consultation document on Guidelines of Good Practice for Flexibility Use at Distribution Level. A conclusion document is planned to be published in 2018. - Some NRAs apply productivity factors to estimate the development of productivity. CEER aims to share those experiences between NRAs. - CEER recognises that there are many tools in regulation and agrees that tendering is one of them. Tendering is an approach that could lead to an efficient outcome in specific circumstances.

Public consultation question	**Summary of responses**	**CEER Position**
Question 4: Considering the national and the European regulatory frameworks, what are the main challenges for DSO regulation?	The vast majority of respondents quote Distributed Generation (DG) and Renewable Energy Sources (RES) and the related increase of "prosumers", as well as innovation in many aspects (electric vehicles, storage, etc) as the most important technical challenges. As for economic challenges, many respondents underline the need for a long-term vision, clear and achievable targets and consistency between national and EU regulatory framework. Among organisational challenges, most respondent indicate the new market players involvement such as local energy communities, active customers and microgrids. Further, some respondents highlight also different challenges and priorities. Here is a synthesis of the important issues that have arisen, divided between DSOs and other respondents. **Responses by DSO-related respondents:** Tariff design and revenue: • Long term and cost reflective tariffs, predictability of incomes, reduce volatility related to decreasing electricity consumption (from the grid) and energy-based tariffs. • Ensure that DSOs have sufficient financial means to carry out all their obligations • Specific regulation for reinvestment (asset replacement). • Set up a cost recovery guarantee for DSOs (reduce risks of stranded and insufficient allowances) Flexibility: • Opex costs related to smart grid and use of flexibility included in the cost trajectory (if CBA > 1). • Long-term programs regarding electricity price differentials, enabling gas to substitute for electricity at peak hours. Data sharing:	- There is consensus on the main technical, economical and organisational challenges. - CEER aims to ensure a long-term predictable and stable regulatory framework, that can create adequate conditions for enabling innovation in a cost-effective way that is needed in response to technical challenges of distribution, on which there is large consensus. - As for tariff design, CEER has published its Guidelines with recommendations for NRAs, among which cost reflectiveness, cost recovery, transparency and predictability. See the CEER Guidelines of Good Practice on Electricity Distribution Network Tariffs. - CEER considers that only NRAs at national level may assess the real need for some specific solutions suggested in the consultation, like revenue guarantee for DSO or specific regulation for asset replacement. These questions should be analysed against the larger background of the regulatory framework set by each NRA. - As for flexibility, CEER considers that TOTEX approach (or similar solutions) may provide the right equalisation between capital expenditure and operational expenditure, being the relative structure CAPEX vs OPEX modified by innovative solutions. - As for data sharing, CEER is in favour of a wider and more intense relationship between

	• Increase amount of information, having more details on critical grid elements and on consumers/prosumers. • Coordination TSO/DSO. **Responses by Suppliers, users and other respondents:** • Require DSO to be neutral market facilitator, integration of new uses relative to energy transition, increasing flexibility in the energy system. • Improve benchmarking systems, comply with the big changes in the function of the distribution grids. • Reduce losses. • Trigger innovation for energy transition at least costs for users, supporting the changing role of DSOs. Different incentive schemes for demonstration and mass adoption phases. • Making investments that will provide the basis and infrastructure for other market actors which bring benefits to the final consumer. • Need of a forward-looking regulation, reducing depreciation time. • Whole system approach and holistic view, with different energy carriers and infrastructures. • Call a fit for purpose approach within each Member State. • Remunerate self-consumer properly and maintain grid stability. • Encouraging DSOs to consider operational or service-based solutions as an alternative to, or delaying the need for, asset-based solutions will be helpful in managing uncertainty (avoid stranded assets).	TSOs and DSOs for data exchange; see the CEER Position Paper on the Future DSO and TSO Relationship. - As for the role of DSO, CEER supports the role of neutral market facilitator in order not to foreclose competition for procurement of flexibility services. See the Consultation document on Guidelines of Good Practice for Flexibility Use at Distribution Level. A conclusion document is planned to be published in 2018. - CEER agrees that different incentive schemes may be conceived for demonstration and mass adoption phases in innovation.
Public consultation question	**Summary of responses**	**CEER Position**
Question 5: What are the most relevant new issues for DSO regulation?	Almost all respondents agree with the relevant new issues regarding DSO regulation as presented in CEER's consultation document. They identify new issues/challenges along the following vectors: the rise in decentralised power production and injection of small generators into distribution grids; the increasing number of parties using the distribution grid in different ways than before: customers becoming prosumers; and new appliances such as e-mobility using the distribution grid intensely. The combination of these effects results in new challenges for grid operation, management of data and cooperation with TSO. As such, regulators should adopt a "whole system approach" and should promote innovation. Such challenges are associated with other new issues that surfaced quite frequently throughout the consultation answers: data management (ensuring effective data	- CEER recognises that issues related with access to and effective management of data should be considered as relevant new issues for DSO regulation, particularly in terms of defining roles and responsibilities. - CEER also agrees that issues related with how to properly incentivise much needed investments should be at the forefront of regulators concerns, provided that economic efficiency is not jeopardised - However, CEER considers that only NRAs at

	handling and non-discriminatory access to data), the need for new investments, particularly innovative ones, and issues related with flexibility (some respondents suggest that DSOs should be allowed to own storage in order to tackle flexibility challenges). Another topic that was mentioned a few times was the need for regulators to move from a "reduce costs" mindset to one of "facilitate the future energy system". Certain differences can be detected between electricity and gas operators: electricity companies are more focused on innovation challenges. However, compared to the DSO role questionnaire circulated about 2 years ago, gas companies now seem more concerned with dealing with decarbonisation (and the distribution of other gas substitutes/renewables) and the use of gas in transport. In more detail, some of the views expressed provided the following specific input. Below the main responses are specified by respondent groups. **Responses by DSO-related respondents:** • Role of flexibility and the challenges associated with designing flexibility incentives; • Some answers touched upon the regulatory challenges related with defining what tools the DSOs are allowed to use to fulfil their obligations, suggesting that certain restrictions on DSO's activities (such as storage and other flexibility measures) would lead to an increased cost for the customers and for society. • Ageing assets reaching the end of their investment cycles and heavy investments that are likely to be required due to decarbonisation call for an increased need for network reinforcements in a smart and an efficient way. • Security of supply and loss reduction are also likely to require new investments in the near future, especially in a sector where many new players will contribute energy to the grid. Improving reliability and optimisation of the system, by maintaining the required quality of supply and service will grow in importance. • Treatment of R&D costs in a context where innovation is required - rate-of-return of innovative investments should be increased to take into account the higher risks in the activity; assets regulatory lives should be reduced since technical life of assets in a more digitized environment are shorter.	national level may assess the appropriateness of some specific innovation incentives suggested in the consultation, like higher rate of return or specific regulation for assets regulatory lives. - CEER considers that regulators should contribute to "facilitate the future energy system". However, that should be done in a cost-effective way that does not compromise consumers interests. Therefore, CEER disagrees with certain positions expressed in the answers where companies' interests conflict with consumers' interests (e.g.: ensuring a positive return for companies in any situation) or with competition development (e.g.: storage ownership by DSOs, or softer unbundling requirements). - CEER agrees that it is important to see how the relationship and regulatory arrangements between DSOs and TSOs can evolve; see the CEER Position Paper on the Future DSO and TSO Relationship.

	• Regional differences must be considered by regulators, even within the same country. Example of the difference in renewable energy technologies in northern and southern Germany: in the north, relatively large wind parks are connected to the medium- or high-voltage network, while in the south small-scale photovoltaic plants connected to the low-voltage network prevail. These different developments result in different investment and operational needs for DSOs. • A few answers stated that the DSO has to be given the financial and organisational means to adapt to the new challenges, e.g. by taking adequate investment decisions, while respecting the cost-efficiency aim (preventing inefficient investments). • There are also a few references to the need for regulators to adopt a “whole system approach”. • Regulators need to incentivise coordination between DSO and TSO. • The creation of "data hubs", combining consumption data at the main nodes of transport and distribution networks, is an essential condition for the success of the Clean Energy package. • A few respondents mentioned that the more traditional regulatory focus on efficiency might have run its course - potentials to lower costs are diminishing as monopoly rents have already decreased to a large extent. • How to design effective output-based regulation was mentioned as another new issue: how to create fair and targeted norm values for the indicators of the output-based incentive regulation. • DSOs acting as neutral market facilitators in an environment where new stakeholders are entering the market. • Many respondents refer that they are against harmonisation of tariffs. **Responses by Suppliers, users and other respondents:** • Incentives for loss reduction and for investment in efficient equipment • Heavy investments required due to decarbonisation, combined with ageing assets; financial viability of DSO in the face of such investment requirements; • Regional differences must be considered by regulators; • Regulators should incentivise DSO to be market facilitator, without imposing more unbundling requirements. • Efficient tariff design to ensure cost recovery and efficient signals to consumers to enable investments. • Data management.	

	• Flexibility.	
Public consultation question	**Summary of responses**	**CEER Position**
Question 6: What should be the main regulatory goals in the near future?	Most respondents agree that certain traditional regulatory goals, such as security of supply, quality of service and financial viability should remain at the forefront of regulators' concerns and objectives. However, due to changes occurring and expected to take place in the energy sector, the importance of the following goals (some of them new) is growing (main responses are specified by respondent groups): **Responses by DSO-related respondents:** • Incentivising investments in innovative assets and services, through forward looking regulatory framework. Regulation will need to focus on optimising future network investment needs against an uncertain background. DSOs need to be encouraged through core regulation to objectively consider operational or service-based solutions to network requirements. Additionally, special care should be paid to investments in low voltage networks, due to their adaptation to the smart grids new scenario. • Promote flexibility - The DSO should be able to make use of new flexibility tools, like storage and flexible tariffs. Flexibility development challenge - lack of liquidity or interest by market providers might become an issue. When this is the case, regulation should allow DSOs to develop some flexibility assets, such as storage by themselves, when feasible flexibility market-based options are not readily available and such flexibility services are necessary for an efficient and secure grid operation. • Ensuring DSOs fulfil their role as neutral market facilitators. • Ensuring effective data management and non-discriminatory access to data, considering the growing need for better cybersecurity. • Adopting a holistic "whole system approach", not just within the electricity sector, but also considering gas and heating. • Design adequate remuneration mechanisms and incentives that take into account the widening scope of DSOs' new roles – this goal was mentioned by several respondents. • Simplicity, stability and predictability of the regulatory environment, while at the same time remaining adaptable to changing needs.	- CEER notes that most of the future regulatory goals mentioned in the consultation answers are in line with the new goals covered in the consultation report. - CEER agrees that adopting a "whole system approach", considering the impact of regulatory decisions beyond the network system, is an important regulatory goal for the near future. See also Question 12. - CEER recognises the importance of innovation in the energy transition, however, the promotion of innovation is not a goal in itself, but as a means to reach other goals (such as security of supply and quality of service). - On promoting flexibility, CEER maintains its position that DSOs should act as buyers of flexibility and neutral facilitators for the market of flexibility services. - CEER agrees that ensuring effective data management and non-discriminatory access to data, considering the growing need for better cybersecurity, is a relevant new goal, as detailed in the consultation document - CEER recognises that the long-term predictability of regulation is a relevant issue. It should be emphasised that in practice regulatory decisions should not differ extremely from one period to another, and decisions should be flexible to anticipate and take into account developments. See also

	• Transparency was a word that was mentioned frequently to describe the regulatory process. • Adopt output-based regulation – define consistent and measurable outputs, and apply proportional and just rewards and penalties. Output-based regulation may encourage companies to achieve regulatory aims in an efficient manner. Main outputs that regulators could focus on may include: safety, reliability, customer service, social obligations, connections and environment. For example, EDSO for smart grids advocates output-based regulation, stating that regulators should encourage innovative investments by giving DSOs enough space to adopt the most efficient solution and level of incentive needed. • A few respondents advocate that in light of new challenges regulators should be less concerned with cost efficiency, which ties in with some answers to Question 5 that mention that the focus on cost efficiency might have run its course. • Effective management of network losses in a context of massive contribution of energy from unmanaged distributed generation sources. **Responses by Suppliers, users and other respondents:** • Promote innovation and new technologies. • Neutrality and simplification. • Ensuring consumer engagement and participation (particularly in the smart meter roll out). • Integration of renewables. • Providing a level-playing field for all kinds of flexibility sources. • Incentivise DSOs to procure efficient equipment. • DSOs need to be encouraged through core regulation to objectively consider operational or service-based solutions to network requirements.	Question 1. - As for transparency, CEER agrees that it should also be considered a relevant goal, and the new approach highlighted in our report – balance of choices – addresses it. - Nonetheless, despite all the new challenges NRAs need to address, CEER believes that cost efficiency will remain one of the main regulatory goals in the near future.
Public consultation question	**Summary of responses**	**CEER Position**
7. Do you agree that the regulatory process shall be an interactive process between regulators and stakeholders?	All respondents agreed that the regulatory process should be interactive and involve all stakeholders. A few answers state that they agree with the process detailed in CEER's consultation document (in chapter 3, section 2: "Balancing of choices"). Several interesting and more specific ideas and comments are detailed below: • Such a process should be taken in several steps – first between NRA and DSO (to establish main parameters, incentives, etc), followed by an interactive process with the rest of stakeholders.	- CEER welcomes the opinions expressed in the public consultation, which reinforce CEER's view that an interactive process with stakeholders will become increasingly relevant based on the overall agreement that was evident through the public consultation.

	• It could be a complex process that requires a clear governance in order to define and pursue the parameters and the goals at a regulatory level. When it is first being applied implementation should be done gradually. • Stakeholders should include local elected representatives as well. • The new Clean Energy package already establishes a more-participatory approach, with Network Development Plans to be presented by DSOs to the NRA and subject to consultation. • Technology providers should also participate in this process, as well as neutral parties, such as scientists, in certain cases. • Taking into account the opinions of local and regional authorities and consumer associations ensures local ownership of decision-making. • Portugal and Finland can be mentioned as examples of best practices. The system in place allows for an integrated vision of the electricity system and increases the level of transparency of the Regulator's activity. • Particularly if regulators are to develop meaningful output-based objectives and incentives for DSOs, they will need to understand what stakeholders really value. However, despite agreeing with the general view that regulation should be an interactive process, certain respondents pointed out the following concerns: • Risk of conflicts of interest between various stakeholders should be addressed. • This process should avoid unnecessary and lengthy procedures and approval processes (particularly in issues that require rapid positioning) as this would result in a long time of uncertainty for stakeholders. • Some answers mentioned that decisions about regulatory details should be out of scope of such a stakeholder process – details should be worked out among NRA and DSO. If stakeholder involvement goes beyond principles and aims, the efficiency of the whole process (in terms of time and resources) is endangered. • Stakeholder involvement should take place to the extent that the stakeholder(s) is (are) capable and knowledgeable enough, to provide a meaningful contribution and added value to the regulatory process. • Properly implementing this scenario requires weighing correctly the visions and proposals of different stakeholders. Adoption of disruptive measures impacting regulatory goals must be carefully analysed. Special attention to the impacts on financial viability should be paid.	- CEER recognises that involving all stakeholders at the early stages of the regulatory process can be time consuming and difficult to implement. However, when properly managed, such interactive processes generate benefits in the longer term, in terms of transparency and effectiveness of regulation. - CEER believes that a diversified range of stakeholders should participate from the early stages of the process, not just NRAs and DSOs.

	• Not all stakeholders will have the same role. The discussion should be held from the perspectives of the future system and not from the present interests. • Taking decisions which may discriminate against one or several stakeholder groups, neither positively nor negatively, should be avoided.	
Public consultation question	**Summary of responses**	**CEER Position**
8. What can be done to allow a more active participation from the stakeholders?	In summary, the answers provide several main recommendations, such as CEER consultations and GGPs at European level, and at national level consultations, workshops (to facilitate exchange of ideas), questionnaires, hearings, working groups and setting up permanent consultation committees, among others. In general, for participation by stakeholders to increase, NRAs must lead and be actively involved in this process, and need to be transparent about the regulatory process, regularly publishing relevant information in a timely manner. Some of the specific suggestions include: • Periodic consultations like the present one conducted by CEER. • Consultations should be conducted at an early stage of the regulatory decision process in order to enable stakeholders to express their opinion before any restricting provisions are set. DSOs and other stakeholders should be involved early in the process of developing regulatory frameworks. • Consultation process needs to be regular, well-designed, participative and transparent – information should be made public. • When organising public consultations, it has to be guaranteed that all stakeholders, big and small, can participate and contribute. The process must ensure a clear governance and the commitment of every stakeholder, including NRA. • The Portuguese example, which has consultative bodies within the regulation process, composed by all stakeholders, is a good example of active participation of all stakeholders. • Targeted workshops where stakeholders can openly express and share their views can be a useful way for encouraging participation. • Questionnaires were also mentioned throughout the responses as a useful tool. However, while some respondents advocate a more restricted and targeted number of questions (to avoid a time-consuming process), backed by data requests when relevant, others suggest a more open-ended style of questions, that allow stakeholders to express new ideas. • Focus groups should be encouraged as a way for stakeholders to publicly	- CEER considers that these suggestions are in part relevant for NRAs in their regulatory process and in part for CEER itself. - For NRAs CEER believes the most relevant are: ○ Involving all stakeholders from the early stage of regulatory decisions; ○ Transparent consultation processes; ○ Targeted workshops and questionnaires; ○ Better communication between consumer representatives and DSOs and NRAs; ○ DSOs to demonstrate meaningful engagement with stakeholders, namely in in developing network plans; ○ Information sessions on developments in the Energy Transition process. - CEER finds it important that a wide range of stakeholders is actively involved in periodic CEER consultations. This would include not only grid operators, but also consumer associations, local governing bodies and elected representatives, non-specialist prosumers, technology providers, academic and scientists, standardisation bodies.

	express opinions. • Involve non-specialist prosumers. Regulators should make an effort to bridge the gap between their highly specialised fields and citizen concerns. • Participation should be promoted especially at aggregated level (associations, institutions, NGOs, etc). • Consumer representative bodies should have better communication with DSOs and energy NRAs and exchange with them their knowledge on consumer behaviour. • Requiring DSOs to demonstrate meaningful engagement with stakeholders in developing network plans. • Regulators should hold information sessions on developments in the Energy Transition process.	
Public consultation question	**Summary of responses**	**CEER Position**
Question 9: Do you agree that technologically neutral indirect approaches are the most efficient way to promote innovation?	Generally, respondents have a positive attitude towards technological change and underline that the regulatory framework shall enable innovation. The majority of respondents rather has a preference for technologically neutral, indirect incentives. However, answers vary in the details and cover several aspects. The summary of statements is as follows: • Regulation is not an aim by itself (associations/other) • DSO shall decide on suitable solutions, not the NRA (DSOs/associations) • Some respondents are in favour of technologically neutral, input-oriented incentives whilst others emphasize the importance of output-based approaches (DSOs/associations and other) • Some respondents disagree with indirect incentives (DSOs/utilities) • Some respondents see an increased risk due to technological progress which shall be adequately reflected (DSOs) • Several respondents emphasise the importance of applying different incentives in respect of the maternity of the innovation: 1) for new solutions with unsecure outcome: reimbursement of costs regardless the outcome (interpreted as direct incentives) 2) for mature technologies: technologically neutral, indirect incentives such as TOTEX benchmarking (DSOs/associations)	- CEER has the view that regulation is not an aim by itself and incentives shall be technologically neutral. CEER believes that NRAs should not decide on appropriate technologies/solutions to realize the DSOs distribution task but rather that it is up to the DSO to decide on suitable solutions according to the incentives set by each NRA.
Public consultation question	**Summary of responses**	**CEER Position**
Question 10: Do you	Generally, respondents acknowledge that customers are the centre of the energy	- CEER has the view that regulation on

agree that innovation should be seen from the customer´s perspective?	system. Therefore, they welcome that innovation should be seen from a customer´s perspective. But they see a broader perspective more desirable. So, an overall approach would be necessary. Some respondents go further and say that the customer´s perspective is not necessary for innovations which are invisible for customers. Many respondents also think that customers benefit from innovation, even if they are not directly involved. Responses by respondents: • Most of the respondents agree that innovation should be seen from the customer´s perspective • Even though many respondents say that innovation should be seen from all perspectives (an overall welfare perspective) rather than only from a customer´s perspective • Some respondents say that the best solution for the whole system will be the best solution for the customers • Customers benefit from innovation • The customer´s view is relevant where they are directly impacted by the innovation • Closer collaboration between gas and electricity may deliver better system outcomes for customers in the mid-to-long-term • One respondent writes that regulators should be able to undertake R&D programs with independent research organisations for the benefit of stakeholders and consumers which must be decided upon by DSOs after consultation with stakeholders. Further response by DSO-related respondent • If innovation does not bring the expected benefit, DSOs should still be remunerated for that innovation in regulation.	innovation should be related to the whole system, but with a view on benefits for customers´ welfare.
Public consultation question	**Summary of responses**	**CEER Position**
Question 11: Could you provide examples of indirect or direct incentives for innovation which you consider	Several respondents say a special regulatory treatment of R&D costs is good practice (e.g. approaches in Nordic countries, France). This includes treatment of R&D costs as non-controllable/exempt from benchmarking or to allows DSOs to invest a special budget or share of its asset base/turnover in R&D and handle associated costs as pass through. Furthermore, the respondents name different examples, which are rather	- CEER appreciates the richness and variety of examples and considerations provided by respondents.

	heterogeneous. These are in summary: • WACC depending on DSOs efficiency (associations/DSOs) • The UK RIIO approach/Low Carbon Network Fund (associations/utilities) • Combination of direct and indirect approaches (Italy) (DSOs, utilities, associations) • Adder on WACC for specific investments (associations/DSOs) • Ex-ante and output based approaches (other) • TOTEX-Benchmarking (utilities/associations) • Effective quality regulation and appropriate indicators (e.g. SAIDI, SAIFI) (DSOs)	
Public consultation question	**Summary of responses**	**CEER Position**
12. What do you think about the CEER position on the whole system approach?	All respondents welcome the CEER position on the whole system approach, some of them even enthusiastically ("excellent approach", "keeping a holistic approach is crucial", "we whole-heartedly agree", "we fully support CEER's position on whole system approach", etc.). In particular, respondents highlight the following aspects: • With reference to benefit falling out of the perimeter of one grid operator, it is important not to financially punish grid operators when they produce benefits for the whole system which are not or only few perceptible directly in its own grid; • With reference to the dimension of the holistic approach, look at the whole value chain, in both breadth and time; holistic time approach takes into consideration life cycle costs (length of regulatory periods and the incentive parameters); • With reference to which system is considered, there should be reference to integrated system perspective (long term, security and quality of supply, allocation of cost) and customer perspective (short term, services, price); • With reference to transmission vs distribution system integration, increase TSO/DSO coordination will be necessary as distribution connected customers, large and small, become involved in the market and in providing services; • With reference to the use of all resources of the system, compare innovative with conventional system operation, coping with changes and uncertainties in the energy transition and using flexibility when market-based options are not readily available and such flexibility services are necessary for an efficient	- CEER is pleased to see that the need for whole system approach is almost unanimously shared by stakeholders and appreciates the constructive positions expressed by respondents. - CEER is aware that whole system approach entails many difficulties – some of them have been pointed by respondents, first of all the perimeter of this approach – and is in favour of a stepwise implementation. - The first step is see how the relationship and regulatory arrangements between DSOs and TSOs can evolve; see the CEER Position Paper on the Future DSO and TSO Relationship. - A following step can be the integrated valuation of benefits and costs over the whole value chain of each sector; in this case, the DSO incentive based on whole system approach shall not distort competition in liberalised activities; some advanced example of this are already in place. - An even more advanced step can be an

	and secure grid operation; • With reference to service and energy vs. infrastructure development, an integrated approach to regulation should incorporate energy and infrastructure, as well as the need for different products and technologies; • With reference to the whole "energy" system approach, Authorities should take into account all available option, including coordination between gas and electric, to choose the most effective and affordable energetic solution. Further, one respondent highlighted the importance of avoiding time consuming regulatory processes and another highlight that no 'one size fits all' approach should be applied.	integrated valuation of benefits and costs for electricity and gas sectors (and district heating where this is regulated by energy NRA), although this may imply resource transferrals from one sector to other that can be beyond the administrative capacity of the NRA.
Public consultation question	**Summary of responses**	**CEER Position**
13. Could you provide examples of the whole system approach that bring added value?	Possible added values highlighted by the respondents: • There will be new stakeholders, like local energy communities, prosumers and operator of storage systems, with specific business models as well as new market roles operating in the whole energy economy • Need for increasing coordination between stakeholders • Imitation of innovative solutions incentivised by the whole system approach can increase the overall welfare effect • Allow a proper development of both smart grid and traditional investments • Foster competition and transfer (economic and service) benefits for costumers • Enhancing grid stability, reducing peak load, more optimum allocation of services, also through dynamic network charges, for example to avoid the use of services for balancing purposes in locations or situations that could cause local network difficulties • Reducing total system cost, i.e. optimising network expansion • Improve detection and fight against energy theft, with more communication of the DSO with the user of energy • A level-playing-field between electricity, gas, oil and other applied resources, useful for decarbonisation of the heating and traffic sector; • Added value on environment, considering that high efficient transformers help energy efficiency (save power in the new fossil free society) • Considers the externalities among the electric chain and the climate policies A method to evaluate added value could be the Total Resource Cost test used in the United States; it is useful to understand the impact of a spending decision. This test	- CEER appreciates the richness and variety of examples and considerations provided by respondents and will make use of the regulation-related suggestions for next steps.

	counts all of the costs and benefits including benefits to the transmission system through, for example, avoided capacity investment.	

Annex 5 – About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national regulators of electricity and gas at EU and international level. CEER's members and observers (from 36 European countries) are the statutory bodies responsible for energy regulation at national level.

One of CEER's key objectives is to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market that works in the public interest. CEER actively promotes an investment-friendly and harmonised regulatory environment, and consistent application of existing EU legislation. Moreover, CEER champions consumer issues in our belief that a competitive and secure EU single energy market is not a goal in itself, but should deliver benefits for energy consumers.

CEER, based in Brussels, deals with a broad range of energy issues including retail markets and consumers; distribution networks; smart grids; flexibility; sustainability; and international cooperation. European energy regulators are committed to a holistic approach to energy regulation in Europe. Through CEER, NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

The work of CEER is structured according to a number of working groups and task forces, composed of staff members of the national energy regulatory authorities, and supported by the CEER Secretariat. This report was prepared by CEER's Distribution System Working Group.

CEER wishes to thank in particular the following regulatory experts for their work in preparing this report: Daniel Bongart, Inês Chaves, Luca Lo Schiavo, Vítor Marques, Christine Müller and Luuk Spee.

More information at www.ceer.eu.