
Fostering Electricity transmission investments to achieve Europe's energy goals: Towards a future-looking regulation

ENTSO-E Working Group Economic Framework

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Executive Summary

A strong and secure transmission network is a widely recognized prerequisite to enable European energy and climate policy goals. It is expected that the attainment of these goals would lead to a major increase of welfare for the European Economy. To meet these goals major investments in electricity transmission infrastructure are necessary. This investment challenge, however, is unprecedented in its size and pace and also means a significant financing challenge. Moreover, the challenge is not limited to Projects of Common Interest, as TSOs are also required to deliver other significant investments as part of the TYNDP and national development plans. Policy and regulatory focus should therefore not stop at PCIs, but also consider the entire (wider) investment portfolio. Initiatives linked to the promotion of PCI projects, e.g. by prioritising or fast-tracking them, are useful and important, especially when such projects are more complex and higher risk than the average investment project. However, those initiatives do not tackle the financial challenges relating to the entire investment portfolio. The focus should therefore be broadened to an optimal coordination of the electricity transmission regulatory framework determining:

- (1) An adequate overall risk-reward balance, appropriate incentives and sustainable transmission tariffs; and
- (2) good access to capital markets to enable appropriate financing; and
- (3) the incorporation of transmission investment needs which drive EU policy goals.

Today, in most EU-countries this coordination is not sufficiently enabled by the current regulatory frameworks which largely focus on cost efficiency. Without serious consideration of the important "financeability" issue, Europe may find itself in a "regret"- scenario, rather than to reach the EU-policy goals.

To foster the necessary infrastructure investments and make the associated tariff evolution sustainable, the regulatory toolkit should focus on a fair, long-term predictable and stable risk-reward balance to provide more certainty to capital markets. It should also ensure that the framework is fit-for-purpose to meet the size and pace of the investment challenge. In this policy brief, ENTSO-E proposes a toolkit of possible regulatory instruments from which policy makers can select when creating the framework for TSOs willing to provide the required transmission infrastructure. In this way ENTSO-E wishes to enable transmission investments, which in turn deliver increased welfare for the EU Community.

Introduction

It is widely recognized that a competitive European Energy Sector is a prerequisite for a stable and wealthy European Economy. To achieve this goal European Energy Policy aims for a transition to a low carbon economy maintaining secure supplies at the lowest possible cost thereby becoming the world leader in renewable energy use and development¹.

In order to meet the aforementioned European energy policy goals, massive investments in European Energy infrastructure are necessary.

"Without a proper infrastructure across Europe, comparable to the means of transport of other strategic sectors such as telecommunications or transport, the market will however never deliver on its promises (...) Most important, Europe is still lacking the grid infrastructure which will enable renewables to develop and compete on an equal footing with traditional sources," the European Commission stated in 2010².

Recognizing that the current system would not deliver the needed investments in time due to financing, regulatory and permit granting problems the European Union started reinforcing its energy infrastructure policy. In the Third Energy Package, transmission investments already received a prominent place and Commission Regulation (EC) No 347/2013 is entirely devoted to this topic.

¹ A New Start for Europe: My Agenda for Jobs Growth, Fairness and Democratic Change: Political Guidelines for the next European Commission (Jean Claude Juncker, 2014, page 6).

² Communication from the commission to the European Parliament, the council, the European economic and social committee and the committee of the regions- Energy 2020. A strategy for competitive, sustainable and secure energy (European Commission, 2010, pages 9-10).

Indeed, policy actions taken so far for trans-European energy infrastructure policy only relate to Projects of Common Interest (PCI) which represent a small subset of all necessary infrastructure investments needed in Europe. The same applies to the financial instruments developed upon this policy initiative within the Connecting Europe Facility (Commission Regulation (EC) No 1316/2013).

ENTSO-E clearly welcomes these concrete policy actions taken over the past decade and looks forward to the execution of the measures in this legislation. In that context, ACER's recommendation No 03/2014 of 27 June 2014 on incentives for PCIs and a common methodology for risk evaluation and the study on regulatory incentives for investments in electricity and gas infrastructure projects commissioned by the European Commission are important milestones. Nevertheless, the work is not yet finished.

It is the role and responsibility of ENTSO-E to continue to inform policy makers and society at large regarding shortcomings in regulatory frameworks that risk jeopardizing the attainment of EU policy goals.

Indeed, ENTSO-E foresees a struggle to build this urgently needed infrastructure due to the unprecedented capital requirements, a lack of public acceptance, and lengthy permit granting procedures.

Therefore, a clear political willingness and commitment to build the required infrastructure, at EU, regional and national level is needed to support the process. The financial needs of TSOs must be better recognised by National Regulatory Authorities (NRAs) and policy makers at different levels. Without the appropriate framework, the execution of both the size and the pace of the necessary investments are at risk.

In this regard ENTSO-E would like to emphasize that an efficient long-term regulatory framework and predictable and risk adequate remuneration, not only for PCIs, but for all investments is needed to attain the policy goals.

This paper has two aims. Firstly, to identify and explain the current issues TSOs are facing in their attempts to meet the so-called "investment challenge". Secondly, this paper provides "ready-to-use" advice for national and European policy makers and regulators to enhance regulatory frameworks.

The paper is structured as follows.

The first section highlights which benefits can be expected by implementing the current investment portfolio. Further, it provides an overview of the current size of the investment challenge.

The second section aims to identify and explain in more detail the current financial issues faced by TSOs while meeting the investment challenge. This section describes key corporate financing concepts and how they affect the financeability issue encountered by TSOs. It points out that current regulatory systems are too focused on short term cost efficiency whereas there is an urgent need for the implementation of forward looking regulatory systems adapted to take account of the huge capital requirements thus enabling the delivery of anticipated investments.

A so-called "regret"-scenario, is presented in the third section, which outlines the likely consequences for society which could arise in the event regulatory systems do not adapt to the current challenges in a timely manner. The fourth section then develops the key regulatory principles that should be followed when implementing a forward-looking regulatory system meeting the financing challenges ahead.

Based on those regulatory principles the fifth section identifies and explains the concrete solutions that would enable TSOs to meet the investment challenge.

1. The Investment Challenge

The benefits of grid investments

To meet European Energy policy goals massive investments in European infrastructure are necessary.

In order to increase European coordination and to establish a central reference point for European electricity grid development, ENTSO-E is legally obliged to publish a community-wide Ten-Year Network Development

Plan (TYNDP) according to Regulation (EC) No 714/2009³. The TYNDP is supported by stakeholders who contribute actively to its elaboration via open workshops, public consultations, discussions and meetings⁴. The TYNDP 2014 outlines that "grid development is a vital instrument in achieving European energy objectives" and entails the following significant economic and environmental benefits for the European society.

- Grid development is a necessary condition to employ more technologies based on Renewable Energy Sources (RES) in order to achieve a sustainable supply mix.
- Approximately 80% of TYNDP projects contribute to RES integration.
- The implementation of the TYNDP investment portfolio thereby entails benefits for European citizens by contributing approximately 20% of the CO₂ emissions decrease by 2013⁵.
- Transmission investment further reduces the total cost of electricity supply by increasing generation competition and allowing more trades between lower and higher priced regions. This enhanced market integration will lead to an equalisation of energy prices across Europe and is expected to reduce bulk power prices by 2 to 5 €/MWh⁶.

The above evidence demonstrates that investing in transmission grids unlocks significant welfare for society. Generally speaking and taking the overall value chain into account, the benefits of grid development lay with those that actually use the networks such as consumers and producers. The benefits materialise through policy goals being met, which outweigh the costs. It should be acknowledged and kept in mind that many benefits are not easily quantified but that ultimately the investments are there to pursue higher overall welfare. This "bigger picture" should be kept in mind when discussing regulatory frameworks.

The cost of grid investments

The TYNDP is the most visible exponent of the policy goals being reflected in transmission planning, but it contains only a fraction of the investments required to enable EU policy goals. A business-as-usual approach alone would require TSOs to invest in transmission grids. Indeed, grids are aging and assets have to be continuously replaced. Being built in the second half of the 20th century, many grid assets are approaching the end of their lifetime. At the same time, TSOs are required to connect demand and production units to their networks. Therefore, a more fundamental restructuring of the transmission grid is required to accommodate asset replacement, new connections, cross border interconnections, etc.

The TYNDP 2014 foresees an expenditure of €150 billion on electricity transmission projects until 2030.

Based on internal ENTSO-E survey results of expected future investment, Figure 1 highlights the very substantial increase in Capital Expenditure required to deliver EU energy policy ambitions. It shows that TYNDP investments are only a subset of the entire investment challenge which TSOs are facing. It is clear that TSOs thus face unprecedented capital requirements.

³ REGULATION (EC) No 714/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003.

⁴ See <https://www.entsoe.eu/major-projects/ten-year-network-development-plan/tyndp-2014/stakeholder-interaction/Pages/default.aspx>

⁵ ENTSO-E 2014, page 13

⁶ ENTSO-E 2014, page 9

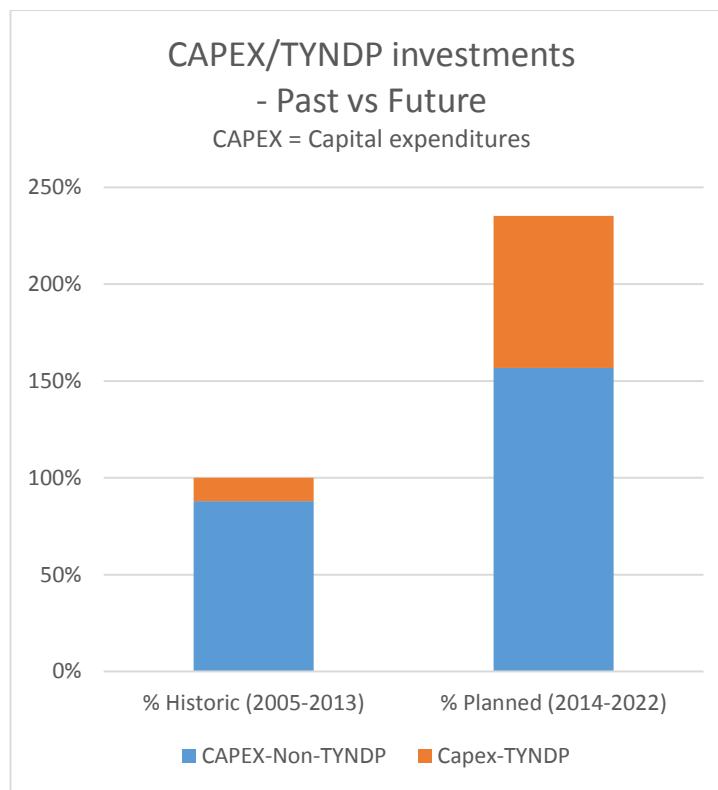


Figure 1: Transmission Investment volumes in Europe: Past versus Future

(Source: TSO survey conducted by ENTSO-E)

To cope with expected capital expenditure (CAPEX) there is an urgent need to create a stable and fit for purpose investment environment to finance the required investment at the lowest possible cost. Long-run "financeability" of TSO businesses, i.e. the ability to overcome the financing challenge underlying the investment challenge with the desired pace and scale, is a key issue for TSOs, NRAs and national and European policy makers. Each stakeholder should take the necessary actions to facilitate EU ambitions.

A political commitment to reach EU policy goals necessarily also implies a financial commitment i.e. that grid tariffs will increase to implement the needed investments. This document describes how financing costs and therefore grid tariff levels can be kept at a sustainable level.

2. Current regulatory practices and their consequences on financeability

This section aims to describe in an educational way the financing methods used by TSOs for their investments. It thus recalls some basic concepts of corporate financing applied to regulated companies. Then it shows that tariff regulation plays a prominent role in ensuring long-term sustainability of transmission networks and their affordability for consumers.

TSOs are regulated companies present on capital markets

European TSOs have been established as effectively unbundled companies owning and in most cases operating the grid, balancing the system and facilitating the market⁷. TSOs have a capital structure which is

⁷ Effective unbundling means effective separation of networks from activities of generation and supply, according to the Directive 2009/72/EC of the European parliament and of the council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

very similar to any other companies in the world. They can be state-owned or privately-owned or a mixture of both, but in any case their fixed assets are financed via debt and equity (see Figure 2). Therefore TSOs must pay debt interest to lenders and provide appropriate return on equity to remunerate equity owners.

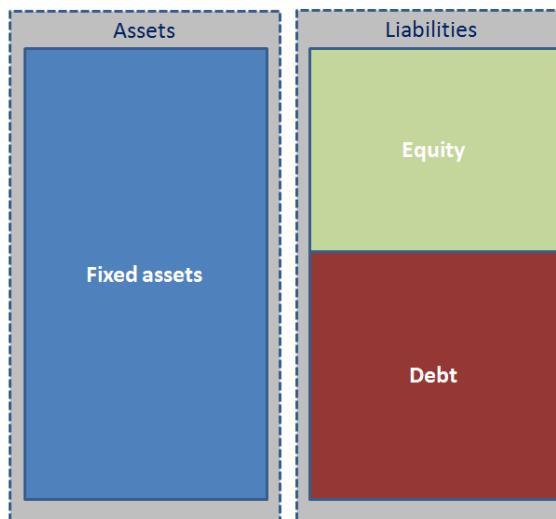


Figure 2: A TSO's simplified balance sheet

As for any company, a TSO's revenue must correspond to:

- the cost of debt,
- the cost of equity⁸, including:
 - the corporate tax,
 - the post-tax result, which is:
 - partly distributed as dividend,
 - partly allocated to equity increase, called "retained earning",
- the depreciation⁹,
- and the operational expenses (maintenance, staff... needed to operate the network), usually referred to as « OPEX ».

See Figure 3.

⁸ The Cost of Equity, also called Return on Equity, is the return a shareholder expects to collect every year from the shares he owns in the company.

⁹ Every investment must depreciate over its lifetime (e.g. 40 years, which means the TSO must recover 1/40 of its investment every year) in order to be able to renew it when it has been depreciated completely.

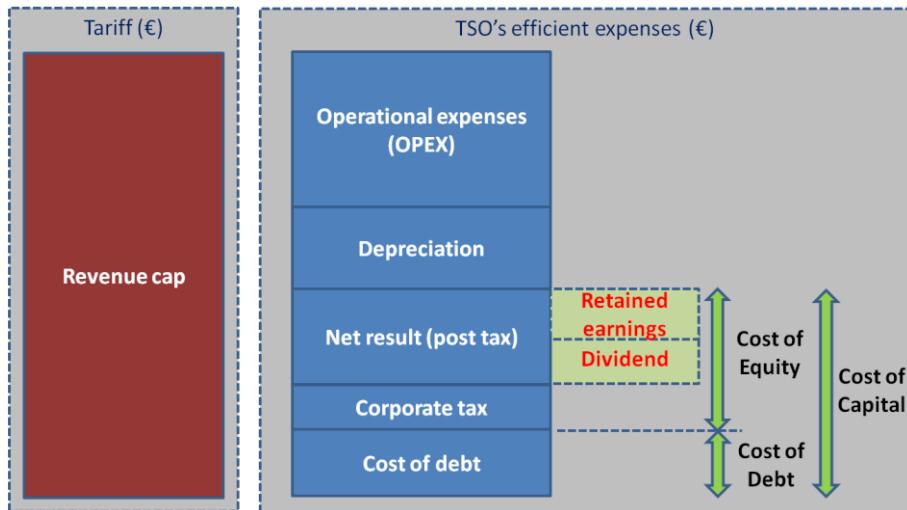


Figure 3: A TSO's simplified Profit and Loss account

For company financing, the “Cost of Capital” (expressed in percentage) is a central concept which reflects the cost of debt and the cost of equity weighted by their respective shares in the company’s capital structure:

$$\text{Cost of Capital (\%)} = \text{Cost of Debt (\%)} * \frac{\text{Debt}}{\text{Debt} + \text{Equity}} + \text{Cost of Equity (\%)} * \frac{\text{Equity}}{\text{Debt} + \text{Equity}}$$

One of the key components of a company’s financing strategy is the proportion of debt used compared to equity. The ratio Debt / Equity is generally called “gearing”, the ratio Debt / (Debt + Equity) is generally called “leverage”. Since the cost of debt is cheaper than the cost of equity¹⁰, the above formula shows that at constant cost of capital, increasing debt amount provides higher expected return on equity for shareholders (this is called “leverage effect”). However this strategy has a limit: if the amount of debt is too high, lenders will be reluctant to lend additional money to the company, or only at a higher rate, which will ultimately increase the amount of interest (i.e. “cost of debt”) paid to lenders to an unsustainable level.

Therefore the sharing between debt and equity has an optimal value that minimizes the cost of capital while providing satisfactory return to shareholders. This optimal value depends on many parameters such as the nature of the business, the risk that shareholders are willing to take by investing in the company etc. For European TSOs, the leverage is typically in the range of 60-70%¹¹.

Here comes the specificity of TSOs: since it would not be economically efficient to build several electricity networks in parallel, electricity networks are natural monopolies. While in a competitive environment, a company’s revenues are derived from the market (equilibrium of demand and supply), in a monopoly environment, TSO’s revenues are mostly¹² based on tariffs that are regulated by NRAs. The regulation aims to mimic market conditions as much as possible to allow TSOs to recover their costs and thus ensure effective and efficient operation of networks. Therefore NRAs generally define a revenue cap which is the maximum income that the TSO is allowed to recover each year from network tariffs. This revenue cap is intended to reflect capital costs, depreciation and operational costs (OPEX) of an efficient TSO (see Figure 3).

¹⁰ In case of bankruptcy, debt holders are paid first so the risk they bear is smaller than for the equity holders.

¹¹ See Roland Berger “The structuring and financing of energy infrastructure projects, financing gaps and recommendations regarding the new TEN-E financial instrument”,

http://ec.europa.eu/energy/infrastructure/studies/doc/2011_ten_e_financing_report.pdf

¹² For example, a generally small part of a TSO’s revenue can come from auctions for cross-border capacity, i.e. not from network tariff.

To estimate the TSOs' cost of capital, NRAs have to assess appropriate values of cost of debt, cost of equity and gearing. A key aspect is that the regulated return determined by NRAs has to reflect the true cost of capital of TSOs. If the regulated return is set under the actual cost of capital, TSOs will suffer from insufficient profitability which will endanger their sustainability over the long term. If the regulated value exceeds the actual one, TSOs will enjoy excessive profitability.

The financeability issue

In most traditional regulatory systems, NRAs determine the revenue cap on the basis of realised costs of past years; they generally add incentives to lower future costs through productivity and/or efficiency objectives on OPEX and sometimes even on previous CAPEX. This approach has frequently been used in the past decade and has generally provided good results over a period where investments were stable. This backward looking approach is however not suited to a world with significantly rising investments, meaning that future costs will be very different to past costs.

The financeability issue is defined as the discrepancy between the cash outflows required to deliver investments and the cash inflows from tariff income. As shown in Figure 4, when investments significantly exceed depreciation and retained earnings (as is currently the case for most TSOs considering future investment needs), TSOs must resort to alternative financing sources, generally increasing debt, to gather the necessary funds. If the period of high investment was not to last a long time, or if TSOs' debt had been particularly low before entering the continuing high investment trend, this would not constitute a real issue. However, market participants consider this a significant risk, since this situation is expected to persist during the coming years.

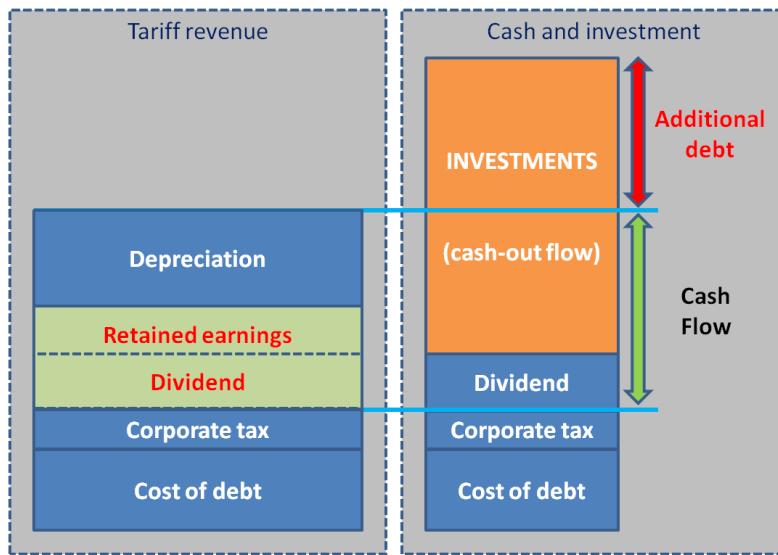


Figure 4: A TSO's simplified cash-flow statement: the financeability issue

Note that for the sake of simplification, this figure leaves out OPEX¹³.

The consequences of continuous financeability issues

If cash flows generated by the tariff are insufficient to maintain the optimal gearing while the frequency and scale of investments remain high for a period of time, TSOs will need to borrow more money every year. However, the ability of a TSO to attract funding is particularly affected by the credit rating. The credit rating evaluates the credit-worthiness (i.e. the ability to pay debt) of the TSO business as a whole. Some of the key metrics to define the credit risk are the relationships between tariff income, interest expense (i.e. cost of debt),

¹³ Indeed if NRAs set up unrealistic productivity objectives on OPEX, this tends to worsen the cash flow deficit.

investments and outstanding debt. These ratios are bound to deteriorate in a world of continuous rising investments, as debt and interest expenses increase rapidly as a result, when current tariff income, still being driven by historical investment patterns, does not rise at the same pace. Therefore the level of tariff income has strong influence on the possibility to fund investments.

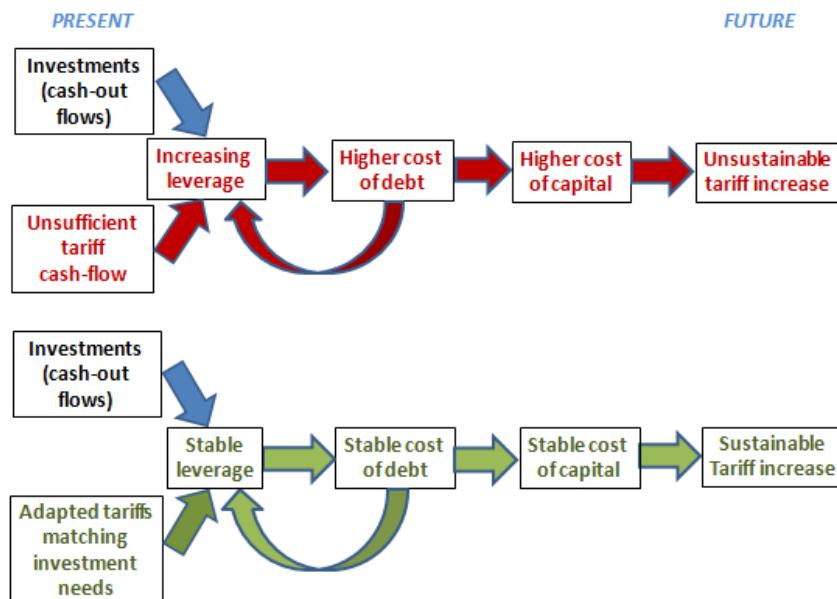
This could, if TSOs cash flows remain negative (cash out exceeds cash in) for many years, result in an unsustainable debt. TSOs will then enter a "spiralling debt", or "vicious circle".

Entering the abovementioned vicious circle will incur more risks for shareholders (who are the equity providers) since the level of debt compared to capital (leverage) could be unsustainable for the company in the long term. This perceived higher risk will logically translate in a higher cost of equity expected by shareholders. Since the actual cost of capital must be reflected by the regulated return (else, the regulation would not cover the actual TSO's costs), tariffs will inevitably increase dramatically, sooner or later, or else the TSO could go bankrupt.

In other terms, if tariff levels when entering a high investment phase are not high enough to provide TSOs sufficient cash flows to maintain good financial balances and attract investors, the over-reliance on more and more costly debt will necessitate huge and hardly sustainable tariffs increases in the future.

On the contrary, if the tariff revenue allows a sufficient cash flow stream, TSOs enter a "virtuous circle" with a stable leverage level and cost of debt.

Consequences of continuous financeability issues on TSO's leverage, cost of debt, cost of capital and on network tariffs are summarized in Figure 5.



**Figure 2: Debt vicious circle (above) - Debt virtuous circle (bottom).
Consequence of current tariffs on future tariffs**

Some common but limited ways to solve the financeability issue

Some solutions, that are often proposed to resolve the financeability issue, are not effective in the long run to address the whole issue. The section below provides a brief explanation:

- Equity injection

Instead of increasing debt TSOs could improve their financial ratios by injecting equity, which would decrease gearing. However, as opposed to debt creditors, shareholders have less certainty they will get their money back, so they require a higher return. Thus equity is more costly than debt.

If investors consider tariffs levels are not sufficient and stable over the long term to provide satisfactory returns, they might be reluctant to invest in TSOs.

Therefore, equity injection will not always be straightforward and might not be sufficient to solve the financeability issue. A study from the Florence School of Regulation¹⁴ has shown that under current trend in tariff, additional equity would only partially allow increasing the amount of investments achievable by TSOs if they are to remain attractive for investors.

- Pay-out (dividend) reduction

It is sometimes argued that TSOs could solve their cash-flow deficit by reducing pay-out ratios (i.e. the level of dividends). Nevertheless such a solution would solve only a small part of the problem as the level of dividends is not of the same order of magnitude as the cash flow deficit. Moreover, TSO investors might be for example pension funds, who take long term commitments and require a stable dividend stream to fund their continuous obligations. The stable dividend stream is usually one of the most important reasons for investing in infrastructure, which typically have a relatively low return, compared to possible other investments. Thus lowering dividends would discourage equity providers to invest in TSOs¹⁵.

- Third-party projects

New entrants into the business of transmission services, sometimes referred to as "Third Party Investors", are sometimes observed. The third party investment approach to transmission network development can be based on two mechanisms: the merchant (or market-based) mechanism, and the tendered investment mechanism. In such cases, the financing mechanism used is called "project funding" which implies that the lenders to a Third Party project have recourse (or claim) only to the project's cash flows. This is different from the "corporate funding" usually used by TSOs, where lenders rely on the overall creditworthiness of the investor.

At first sight, the advantage of third parties investments is to reduce TSO's debt burden: the idea is that if TSOs cannot borrow more money, system development could be ensured by players that don't have the same debt constraints. Therefore, third party projects may seem like a good solution to the financeability issue. However, this is not straightforward, since network tariffs will need to increase, even with third party investments since such investors obviously must receive coverage of depreciation, cost of capital and OPEX. And it is not evident that third parties' cost of capital will be lower than for TSOs: project funding is more complex, which usually implies a higher cost of capital, unless such projects are granted a more favourable regulatory framework.

Realising the required investments will not be sustainable within the required timeframe without proper instruments. The European Parliament and the Council have adopted the Regulation (EU) No 1316/2013 establishing the Connecting Europe Facility. This provides valuable financial tools, however they are limited to PCIs and are insufficient to bridge the financial gap:

- Project bonds with subordinated debt and guarantee facilities may represent a viable option in specific circumstances, but they have limited applicability to transmission investments due the fact that the majority of TSO projects cannot be ring-fenced¹⁶. More importantly, as said above, due to its complexity project financing may be more expensive when compared to traditional corporate finance options of most TSOs.
- European grants may also help to overcome difficulties of raising capital for TSOs or projects with severe financial problems. However, their volume is scant and their applicability is restricted to PCI projects being "commercially not viable", which represent a small fraction of the investment challenge.

¹⁴ See FSR/EUI paper « Financing investment in the European electricity transmission network: consequences on long-term sustainability of the TSOs financial structure », EUI Working paper RSCAS 2013/27.

¹⁵ See also FSR/EUI paper mentioned above.

¹⁶ By 'ring-fencing' a project is meant the individual treatment of a project from a financing point of view, like done in 'project financing'. This contrasts with projects being considered as part of the bigger TSO asset base and developed with the general (rather than dedicated) financing means of a TSO.

Consequently, the regulatory framework must be reconsidered

Above considerations show that there is no simple way for a TSO to solve the cash flow deficit generated by the discrepancy between investment needs and current tariffs revenues. As current instruments are not always applicable and in most cases not sufficient to bridge the financing gap, credit ratings would deteriorate, which would result in overall higher costs for society.

At the edge between regulated environment and financial capital markets, TSOs and regulators must adopt a long-term vision reconciling two (sometime conflicting) approaches:

- NRAs must develop a regulation framework fostering TSOs efficiency and a tariff that is sustainable for the community,
- TSOs need a favourable regulation framework to be able to maintain sustainably good operational and financial balance.

The boundary between these two environments must be adjusted with care to ensure adaptation of the network in the long term, covering expenses whilst ensuring investments are made at least cost for the society.

3. Without change: the “regret” scenario

As it has been discussed in section 2, the current regulatory framework of the electricity transmission industry in Europe is mainly focused on reflecting past costs supplemented with cost efficiency incentives.

The rationale for this approach dates back to the early days of the liberalisation process. In the 1980s, the idea of restructuring the electricity industry expanded across Europe. In the 1990s and 2000s, European countries started opening their national electricity industries and the liberalisation was formally pursued at EU level by means of three Energy Packages issued in 1996, 2003 and 2009. Besides opening of the electricity markets, the electricity reform in Europe also aimed at improving the efficiency of the natural monopoly segments of the electricity industry.

Two main instruments were implemented in order to achieve such efficiency target: (i) the unbundling of network operations from generation and supply business, which was intended to avoid cross-subsidies between activities and incentivize transparency; and (ii) the reform of the transmission regulatory frameworks by moving away from traditional cost-plus regulation towards incentive regulation, with the aim of improving the efficiency of transmission and system operation activities.

Thus, most of the incentive mechanisms which are applied today to TSOs were originally implemented following the liberalization process. In a context of a largely national approach to opening the electricity industry to competition, the application of incentive regulation to TSOs was seen by national regulators as a pragmatic instrument to reduce asymmetry of information, improve efficiency and foster transparency of costs.

The present situation

Over the years, incentive regulation in European countries has evolved. Today, incentives embrace quality of service indicators, environmental objectives and policy targets. Moreover, in some countries, benchmarking techniques have been applied to assess the relative performance of different transmission companies. All in all, the level of complexity of the transmission regulatory framework has increased. However, the regulatory framework for TSOs remains focused on cost efficiency despite the fact that the present energy context is far different from the one that initially motivated the application of incentive regulation tools to TSOs.

First of all, after years of incentive regulation, the room for cost efficiency gains is rather limited today. TSO inefficiencies that might be evident at the early stage of liberalisation have been subject to incentive regulation for more than a decade now, and are therefore likely to have been removed already. Cost reductions are by definition limited.

Secondly, what Europe faces today is a change of paradigm in the electricity industry. The existing power system is now preparing for a scenario which is radically different from the current situation. This new “target scenario” has been defined at a political level. It is characterized by a high share of renewable energy

resources (RES), a truly integrated EU Internal Electricity market (IEM) and a European perspective of security of supply.

Thirdly, for the “target scenario” to be achieved, a transformation of the pan-European transmission network is required. As intermittent renewable generation is often located far away from consumption centres, new corridors and offshore developments will be needed for transportation over long distances and across borders so that all the potential RES generation may be safely exploited at minimum cost. Moreover, high-capacity lines interconnecting regional markets will be essential in order not only to create an integrated European electricity market but also to foster cooperation and ensure mutual support, thus increasing security of supply at European level. Innovative, new and flexible technologies will need to be used for these developments to be accomplished. Replacement of aging networks, connection of new loads and traditional generation, meshing up the existing networks, and in some cases a fundamental restructuring of the grid will also require an investment effort by TSOs.

Europe's transmission networks are expected to change and investment decisions must be taken now. Whereas the First and Second EU Energy Packages focused on unbundling, from the Third Energy Package onwards a true EU infrastructure policy has emerged with the aim of making the “target scenario” a reality. As the European Commission highlighted in its Energy Roadmap 2050, the development of adequate infrastructure at interconnection and long-distance transmission is a matter of urgency: the EU needs to fully eliminate energy islands in the EU by 2015 and an overall increase of interconnection capacity by 40% up to 2020 will be needed, with further integration after this point. The investment challenge ahead has no possible comparison with the investment needs over the years in which TSO incentive regulation has been in place across Europe.

The unwanted future: the “regret scenario”

In the coming years TSOs are confronted with the challenge of developing the network needed for the desired future. Transmission infrastructures needed for the long-term “target scenario” must start to be developed in the short run. However, the current regulatory frameworks for TSOs are still focused on efficiency incentives, with none or little attention paid to investment incentives, as if the overall context and the expected future were “business as usual”.

If the current transmission regulatory framework remains without adaptation to the present context of huge investments required for the transformation of Europe's transmission networks, the consequences will be serious. Europe will confront a “regret scenario”:

As long as allowed revenues for TSOs do not cover the whole costs of investing and financing the new infrastructures needed (as shown in the “debt vicious circle scenario” in section 2), it will be impossible for TSOs to be financially sustainable and to invest as required to meet the new “target scenario”. As said in section 2, recourse to solutions such as project financing or third party investors would not solve the problem: the true issue is that regulated network tariffs should provide a return that is sufficient to allow the electricity transmission industry to compete on equal footing with returns in other businesses.

Without a change of the regulatory paradigm, there will be insufficient investment in comparison with the required level of investments to be attained in the period 2014-2030. The study from the Florence School of Regulation¹⁷ has shown that the level of investments achievable is much lower than needed/The consequence will be that the challenging long-term goals of a sustainable, secure, and competitive European energy system will not be achieved:

- RES deployment will not take place at the pace and level expected. Sustainability goals and policy incentives will thus be ineffective and inefficient, because the full potential of new and existing RES producers will be impossible to attain due to security constraints and network capacity limitations;
- Electricity islands will still exist and market integration will remain limited and mainly regional. Due to physical limitations in transmission capacities between areas, trade of electricity through the coupled European spot-market will be limited. As a consequence, there will be insufficient optimization of the

¹⁷ Reference quoted in footnote number 14.

generation mix on a European scale and prices will remain greatly differentiated between electricity areas, with the corresponding impact on Europe's competitiveness;

- Security of supply will be limited in comparison with the "target scenario". On the one hand, lower deployment of indigenous RES production will make Europe more dependent on energy imports of fuels from third countries. On the other hand, cross-border cooperation and mutual assistance under emergencies will be more limited in scope. Moreover, aging of the EU networks and lack of investments could also have an impact on the reliability of the power system.

In summary, the scale of the investment challenge and the need to deliver more innovative and smarter networks make the adaptation of the TSO's regulatory frameworks urgent. If the TSO regulatory framework is not adjusted to reflect the present context of required investments, Europe's electricity industry will find itself in a "regret scenario" which will be radically different from the "target scenario" that has been envisaged as the objective of EU energy policy.

The regret-scenario can be avoided if the right actions are taken by both policymakers and regulators. In the next section fundamental principles required for a sustainable solution are put forward.

4. Fundamental Principles for regulatory frameworks

ENTSO-E believes to avoid the "regret scenario" that for long-term European energy policy goals to be achieved, a new global approach in "regulating" transmission business is required. Given the present energy scenario and the investment challenge ahead, TSO's regulation should move on from the former focus on just cost efficiency towards an innovative regulatory approach focused on "global efficiency", with specific attention for investments to be done.

Global efficiency implies that the regulatory framework for the network (investment and Operation & Maintenance – O&M) and system operation activities of TSOs should serve several purposes. Thus, TSOs regulation should steer the natural monopolist towards efficient costs and outcomes both in the short and long term. TSOs regulation should also safeguard the interests of grid users. Additionally, the regulatory framework should encourage TSOs to contribute to the achievement of the agreed energy policy goals, thus serving society's ambitions. Finally, TSO's regulatory framework should pursue all the above mentioned goals while maximizing social welfare in the long run.

ENTSO-E considers that the move towards "Global Efficiency" in TSOs' regulatory frameworks is urgent if the "regret scenario" is to be avoided. When setting up or improving TSOs' regulatory frameworks in order to adapt them to the new approach, three fundamental principles should be followed:

- (i) providing a fair risk-reward balance to TSOs;
- (ii) granting long-term stability and commitment to the regulatory arrangements; and
- (iii) ensuring that the regulatory framework is fit-for-purpose, i.e. fits with the policy goals that require involvement from the TSOs and the context in which these goals must be achieved.

These three principles are further explained in this section. Although the principles are general in nature and apply for the entire "global" regulatory framework, given the scale of the investment challenge ahead they are explained and illustrated with the financeability of such investments in mind.

Principle 1: Fair risk-reward balance

Any business, including TSO businesses, faces risks of various kinds. In order to attract investors to TSOs, a fair reward should be offered to compensate for those risks. In essence, for each risk there is a choice to be made by the regulator on whether the risk is to be borne by investors, or by grid tariff payers. In fact, the latter party is representing overall society, ultimately benefitting from increased welfare, but also defining goals through policy makers. Of course, the reward should vary according to the allocation of risks. Where investors take on more risk, they should benefit from a higher reward.

As simple as the above may seem, it is a difficult balance to strike. A wrong calibration might result either in a too generous reward for investors or in investors not being rewarded sufficiently, thereby being reluctant to invest. Both situations are unfair and not sustainable.

In its recommendation on incentives for PCIs and on a common methodology for risk evaluation (No 03/2014 of 27 June 2014), ACER puts forward a risk categorisation including five categories: risk of cost overruns, risk of time overruns, risk of stranded assets, risks related to the identification of efficiently incurred costs and liquidity risk. These are indeed relevant risks, not only in the context of PCIs, but in general for all transmission investment projects. For each of the risks in the above categories, solutions in the regulatory framework can be found to either take the risk away from investors or to set a fair reward in exchange for such risks. It is, however, a very delicate exercise to determine whether a risk is taken away from the investor entirely, partially or not at all.

When defining the balance between risks and rewards, the specific characteristics of the TSO business must be thoroughly evaluated and the practical implications assessed against the relevant context. In this respect, it is crucial to recognise that financial concepts should not be bluntly applied without careful consideration of the very special nature of the TSO business.

Moreover, the effects of uniform reward structures versus uneven project risks should be evaluated. Obviously, not every specific investment project presents the same level of risk in each category. For example, due to their cross-border nature and technology innovations, some PCIs may be more risky than more traditional investment projects (e.g. several kinds of replacement investments). This circumstance should be taken into account when designing the TSO regulatory framework in order to avoid perverse incentives. Otherwise, TSOs would be tempted, as any other rational economic agent confronted with a uniform reward structure, to optimize its investment portfolio and its risk-reward balance by first selecting the less risky investments.

Therefore, if more risky investments are desired from a societal point of view, this aspect should not be overlooked and prioritization tools should be part of the regulatory framework. Such prioritization should, however, not be confused with the overall financeability issue itself. Whereas financeability is about the ability to finance all necessary investments, prioritization is about encouraging the TSO to fast-track some specific investments. From a finance and regulatory framework design perspective, the former is a company-wide issue, whereas the latter is rather a project-specific matter. The consequence is that to resolve both issues, the regulatory framework should build on a toolkit of measures aiming for integrating societal needs (which are reflected in the priority of specific projects) into the overall financing context of TSOs.

Also, following the above logic, it is clear that frameworks where TSOs' business is not fairly rewarded cannot work in the long run as they will not be able to attract investors.

A fair risk-reward balance does not prevent the regulatory framework from including incentives steering TSOs towards a desired behaviour. Indeed, incentives can be an active part of managing this balance and can play a role on both the risk and the reward side. Nevertheless, incentives should only apply on elements that are within the control of the TSOs.

Principle 2: Long-term stability and commitment

A fair risk-reward balance is fundamental for any regulatory framework. However, as TSO investments are long-term assets (with an economic life of up to several decades), it is also necessary that the regulatory framework, or at least those aspects, methods and parameters that impact on long term investment decisions and their financing, remain stable with predictable result.

Discussion should not be limited to a certain regulatory period and the risks linked to constructing, maintaining and operating transmission grids over that period. The TSO risk context is much broader. Indeed, as a result of necessary trade-offs, the length of a regulatory period is shorter than the asset life cycle.

In particular, with respect to investments, regulatory risk should be recognized as the main concern for TSOs, their investors and consequently the financeability of future networks. The risk for investors comes from the fact that after each regulatory period the fundamentals of the risk-reward balance are at stake. Previous investments made under a given set of regulatory principles may be exposed to (regulatory) changes that undermine the original business case.

Rating methodologies from rating agencies show that the regulatory risk i.e. the stability and predictability of the regulatory regime is considered as one of the biggest drivers of risk perception by creditors in the final

rating score¹⁸. A regulatory regime which is considered as unstable by creditors will therefore always contribute to a lower rating and therefore higher cost of debt, and higher costs for consumers.

The risk of instability of the risk-reward balance, summarized as regulatory risk, is something that investors explicitly take into account in their trade-off. Thus, in a context of strong competition in the globalized capital market and multiple options for investment in other industries, investors with a long term vision requiring stability (e.g. pension funds) may opt for alternative sectors if the TSO regulatory framework does not provide enough stability. Consequently, adverse future regulatory decisions negatively impacting the risk-reward balance for investors are not acceptable if the "regret scenario" is to be avoided.

Long-term stability and regulatory commitment going beyond a single regulatory period for those parameters that determine the risk-reward balance is to be fostered if a solution for sustainable financing of investments is desired.

In this context, a Eurelectric report recently stated that "Regulated rates of return should be set in a forward looking way. The market risk premium and the company specific risk premium should be based on real market trends, not estimated on the basis of historic values, and take into account the higher risk of new technology. In addition, the return must be consistent with the long lifetime of transmission assets".¹⁹

In this respect, a "grandfathering" principle should be followed. Unfair retrospective effects should be avoided. This does not imply that everything should be carved in stone and cannot be touched upon for the asset lifetime. However, conditions for changing specific parameters should be transparent and known ex ante.

Changing risk-reward conditions should be allowed only for elements that are within the control of the TSO. For instance, retrospectively changing cost evaluation methods for costs that have already been incurred is not acceptable, as this changes the risk-reward balance for investors, who cannot take any action to avoid its effects. Further, the way returns on investments are determined, i.e. its methodology, should not change for capital expenditures done in the past.

Finally, it is relevant to underline that long-term stability and commitment goes beyond the regulatory framework itself. It also relates to the effects of policy choices on the transmission business. If society by means of policy-makers believe today that certain goals have to be pursued and that transmission investments are required to attain those goals, the risks related to changing those goals and its effect on the needed infrastructure cannot be assumed to lay with the TSOs or their investors. Society itself should bear this risk and the regulatory framework for TSOs should foresee such circumstances.

Principle 3: Fit-for-purpose

A long-term stable regulatory framework determining a fair risk-reward balance is a prerequisite for any successful and sustainable development of TSO activities, with results benefitting society and investors. However, when setting up the regulatory framework it is important to ensure that it fits with TSO objectives. Such goals, usually intended to help other higher objectives expected by society and policy makers, should be considered in the design of the regulatory framework.

Bearing in mind the investment challenge and the impacts of the "regret scenario", it is clear that one goal of the regulatory framework should be to enable required transmission investments by ensuring their financeability at TSO level for the entire investment portfolio. Limiting the scope to only a subset of projects like PCIs would limit the effectiveness of the regulatory framework.

Being fit-for-purpose implies that the regulatory framework facilitates a fluently operating investment circle as illustrated in Figure 3 below. TSOs are expected to invest significantly more than during the previous decade(s). As explained in more detail in section 2, increasing investments beyond current levels requires that the cash flow generated by TSOs through the regulatory framework increases. At the same time it is important to safeguard TSOs' financial health, as otherwise financial markets will perceive TSOs as more risky and require higher rewards for their investments. Remaining within the "investment grade" in the eye of financial markets is important for the TSO business, but ultimately also for network tariff payers, as ultimately they will bear the burden of the investment circle. If the investment circle does not run fluently, either

¹⁸ Moody's Global Infrastructure Finance: Regulated Electric and Gas networks (2009).

¹⁹ A Eurelectric report: Electricity Distribution Investments: What regulatory framework do we need? (May, 2014).

investments will not take place - which will jeopardize policy goals and prevent social welfare from increasing - or tariff payers will pay higher network tariffs due to higher financing costs.

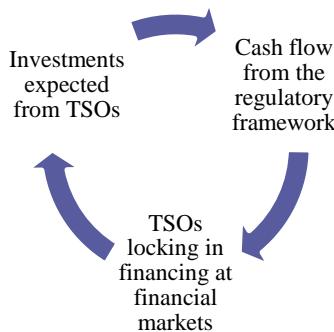


Figure 3. The investment circle: investment needs, cash flow coming from the regulatory framework and financial markets are tightly linked to each other.

Being fit-for-purpose also means that TSOs must be encouraged to carry out their activities efficiently both in the short and long term through the appropriate incentives focused on the areas where there remain efficiency gains, thereby not jeopardizing the TSO investment circle while safeguarding the interests of grid users. In summary, for the regulatory framework to be fit-for-purpose, it has to be forward-looking and take into account the investment circle and the real potential for efficiency gains in the TSO business.

In this respect, the awareness of the investment challenge ahead when designing the framework is crucial for an adequate design of the TSO's regulatory framework that includes sufficient enabling elements to allow efficient transmission development.

Three principles forming a package

The three key principles for regulatory frameworks explained above cannot be seen in isolation. It is insufficient only to reflect one or two principles. As depicted below in Figure 4, they should be considered as a package for shaping regulatory frameworks.

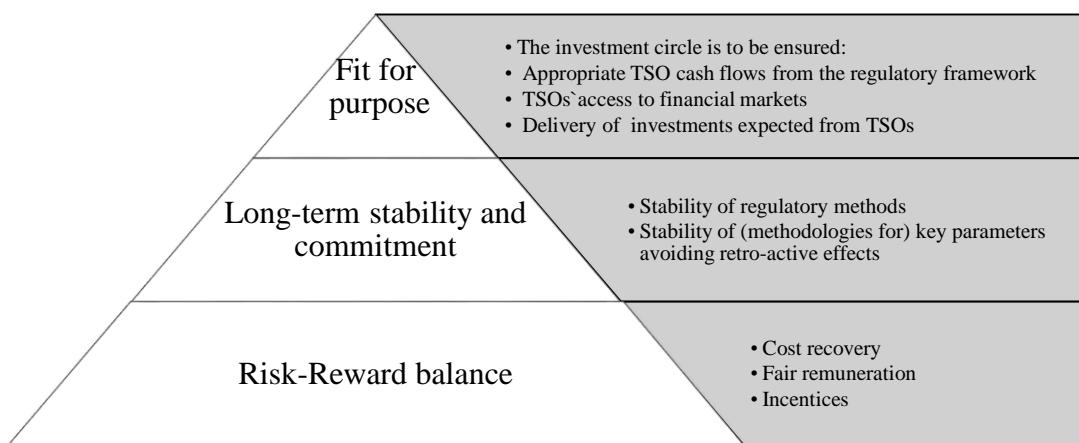


Figure 4. The package of regulatory principles

These principles should be translated into concrete solutions. It does not imply that all regulatory frameworks should become identical. The principles can be met in different ways and leave sufficient freedom to be tailored to the concrete context of national regulatory frameworks. At the same time, it does not exclude the possibility that some principles can be efficiently supported by action at the European level.

5. Towards a toolkit of regulatory solutions

In this section a number of regulatory instruments are discussed that in combination can improve the investment climate, thus ensuring that the policy goals are attainable. It must be clear that none of the suggested instruments will solve the financeability issue alone and that their application must be adapted to the specific context.

As regulatory frameworks differ widely across Europe the most appropriate measures and their implementation may vary from one country to another one. Therefore these instruments are proposed in general terms, in such a way that they can be adapted to the relevant regulatory frameworks.

Regulatory tool: Reimbursement of capital expenses during construction	Regulatory principle
<p>The construction of transmission infrastructure may take several years. During the construction period, TSOs incur capital costs (equity and debt) that are needed to fund the investment. In some regimes, such expenses are capitalised as part of the asset base and included in the TSO remuneration after commissioning of the asset. In others, capital costs are only partially recovered during the construction phase.</p> <p>An insufficient coverage of capital costs during construction may impose a cash flow problem on the TSO, thus reducing financeability of its investments.</p> <p>Financeability of TSOs may be improved by including the full cost of capital (equity and debt) of assets under construction in the tariffs as soon as expenses are incurred.</p>	<p><i>- Fit for purpose</i></p>

Regulatory tool: No time lag for remuneration	Regulatory principle
<p>Some current regulatory regimes provide a time lag between 6 months and up to 3 years between the commissioning of the asset and the start of its remuneration.</p> <p>During this time lag, the TSO does not receive compensation for either capital or O&M costs, which limits its capability to finance its activities.</p> <p>Regulatory regimes must be coherent with the actual operation of the assets by providing depreciation remuneration and operational expenditure as soon as the asset is in service.</p>	<p><i>- Fit for purpose</i></p>

Regulatory tool: Investor-attractive rate of return (general)	
<p>Investment decisions are both dependent on the ability to recover the investment and the expected rate of return of the business. If TSOs' business is not fairly rewarded, its attractiveness for investors lowers in comparison with alternative investments.</p> <p>A return set too low based on a mechanistic application of model to set the cost of capital would probably lead to lower short term tariff increase, but could endanger policy goals in the long term, as the financial health of a TSO would be endangered. This is of paramount importance while investment needs are very high for years to come. The parameters to determine the regulatory rate of return should be consistent with the average asset lifetime, based on real market trends, peer reviewed, and reflect the specific situation of the concerned country and TSO in a forward-looking way.</p> <p>The rate of return should be high enough to make current and future high investment cycle financeable and reflect the TSO's cost of capital accordingly, in order to be attractive enough for capital providers.</p>	<ul style="list-style-type: none"> - <i>Risk reward balance</i> - <i>Fit for purpose</i> - <i>Long-term stability and commitment</i>

Regulatory tool: Rate of return (priority premium)	Regulatory principle
<p>TSOs deal with project portfolios that include investments with a wide variety of risk profiles which derive from differences in technologies, relief, location, social opposition, permitting issues, cross-border nature, etc. Moreover, the achievement of European targets needs priority investments to be realized quickly.</p> <p>Without proper regulation, there may be an incentive for the TSO to undertake low-risk projects first whereas urgently needed investment could be postponed.</p> <p>A Priority Premium, i.e. an add-on or supplement on top of the regulated rate of return, may incentivize the TSO to prioritize relevant and/or urgently needed projects that bear higher risks than others.</p>	<ul style="list-style-type: none"> - <i>Fit for purpose</i>

Regulatory tool: Predictable returns	Regulatory principle
<p>Today's returns for TSOs are normally fixed for about 2-5 years, and their level and even their setting methodology is at stake every time a new regulation period starts.</p> <p>Conversely, investors in TSOs typically tend to seek predictable and stable cash flows to match their long term needs. Likewise, the long lifetime of network assets (about 20-40 years) requires long-term capital commitment from investors.</p> <p>Locking-in TSO's remuneration methodology so that it results in predictable returns may provide stability and commitment to the investors, thus improving TSO's financeability. In specific cases, the locking-in of returns for the lifetime of specific assets could foster their development.</p>	<ul style="list-style-type: none"> - <i>Long-term stability and commitment</i>

Regulatory tool: Regulatory approval of transmission investments	Regulatory principle
<p>Transmission investments are sunk directly after commissioning, because the TSO can't control the incurred expenses in subsequent periods. Similarly, transmission assets under construction may become stranded assets if the works are abandoned due to regulatory decisions (e.g. investments under construction that were deemed as necessary in previous plans but are no longer required due to change in external circumstances like the expected demand/generation balance).</p> <p>If the regulatory framework is not adequately designed, the TSO could bear the risk of stranded assets, which would hamper the financing of the TSO activities.</p> <p>The necessity of transmission assets should be certified by the relevant authority before the start of their construction. After commissioning, transmission assets should perceive their regulated remuneration irrespective of their actual use. For investments accepted by the relevant authority but cancelled before commissioning, TSOs should be remunerated for the incurred costs.</p>	<ul style="list-style-type: none"> - <i>Risk and reward balance</i> - <i>Long-term stability and commitment</i>

Regulatory tool: Stable efficiency incentives	Regulatory principle
<p>TSOs acknowledge the need for efficiency incentives in regulation in order to justify recovery of costs. While comparing efficiency levels among different TSOs can inform regulatory decisions, such decisions should be taken with due consideration to the limits and uncertainties of benchmarking, and careful adaptation to the regulatory characteristics of each country. This issue is becoming increasingly more important, as new investments are strongly influenced by "policy decisions". Many TSOs are confronted with opposition against new power lines, as a consequence of "not in my backyard issues". Therefore TSOs must often opt for more expensive solutions to be eligible to obtain the required permits. The national context should therefore be taken into account while comparing efficiency levels.</p> <p>Increased regulatory risk due to changing and sometimes unrealistic efficiency incentives could result in an increase of the cost of capital and potentially impact the level of future investments.</p> <p>In an environment where most TSOs have been subject to increasingly tough incentive regulation, ENTSO-E recommends striking a new balance between penalising alleged inefficiencies and incentivising investment.</p> <p>Assigning realistic efficiency incentives to controllable costs will foster a lower risk environment and thus improve TSOs financeability.</p>	<ul style="list-style-type: none"> - <i>Fit for purpose</i> - <i>Long-term stability and commitment</i>

Regulatory tool: Remuneration of depreciated assets	Regulatory principle
<p>The depreciation of transmission investments (i.e. the period for charging CAPEX) is frequently set by accounting rules and NRAs below the real technical life of the assets. It means that TSOs expect no CAPEX remuneration for their assets after they are fully depreciated, although they still bear risks for operating them. Absence of remuneration gives TSOs no incentive to maintain the asset until the end of its technical/useful life.</p> <p>Instead, when technical and safety standards can be achieved efficiently after the depreciation period of the asset, it seems a more resourceful approach to incentivize transmission owners to keep their assets fully operating beyond their depreciation period. Provided a transmission asset remains a useful infrastructure for the power system, the fact that the depreciation period in place at the date of its commissioning may have finally resulted to be below its efficient technical life should not preclude the asset from being treated efficiently in the long term.</p> <p>Depending on the context, TSOs should be provided with extra CAPEX remuneration beyond the end of the initial depreciation period. The size and duration of this extra remuneration could be based on the economic value of the asset at the end of its depreciation period and its expected useful life at that moment. In a context of aging European grids, this approach is likely to result in overall gain efficiencies to be passed on to final end-users.</p>	<ul style="list-style-type: none"> - <i>Fit for purpose</i>

Regulatory tool: Regulatory treatment of investments funded by grants	Regulatory principle
<p>TSOs operate networks; therefore TSOs generate income throughout the lifetime of the networks. This remuneration covers risks, but also provides TSOs with incentives to invest and operate networks efficiently.</p> <p>If the existing asset base is partly paid by public grants, there is no incentive to invest, as only investment costs are recovered.</p> <p>ENTSO-E therefore recommends that there is no discrimination in the regulatory treatment of investments, funded by grants or funded by tariffs.</p>	<ul style="list-style-type: none"> - <i>Risk reward balance</i> - <i>Fit for purpose</i>

Regulatory tool: OPEX allocation	Regulatory principle
<p>Growing of the asset base generates additional OPEX.</p> <p>If OPEX coverage is based on past costs (and sometimes affected by efficiency incentives), it might not reflect the actual expenses incurred by the TSO when the size of the grid is growing.</p> <p>Transmission investments leading to network extension should receive a corresponding OPEX allocation, e.g. based on a given percentage of the investment costs.</p>	<ul style="list-style-type: none"> - <i>Fit for purpose</i>

6. Summary and conclusions

ENTSO-E fully supports European policy goals for competitiveness, sustainability and security of supply as this will bring higher welfare to the European Community and electricity consumers in particular. It is widely acknowledged that to unlock this higher welfare electricity transmission infrastructure has to play a crucial role. The latest ENTSO-E Ten Year Network Development Plan (TYNDP) illustrates this extensively. European policy makers are aware of this dependency of transmission infrastructure and have already undertaken a number of initiatives supporting transmission development, in particular with respect to Projects of Common Interest (PCI).

Despite those already existing initiatives, ENTSO-E wants to repeat that transmission investments in the (near) future will have to increase with an unprecedented size and pace. Policy makers and national regulatory authorities should also be conscious that the required investments clearly go beyond the PCIs and even beyond the TYNDP.

Policy and regulatory focus should therefore not stop at PCIs, but should consider the entire (larger) investment portfolio. Initiatives linked to the promotion of PCI projects, e.g. by prioritising or fast-tracking them, are necessary and important, especially when such projects are more complex and riskier than the average investment project. However, those initiatives do not tackle the financial challenges relating to the entire investment portfolio. In a context of mainly balance-sheet financed TSOs, prioritization is necessary when there exist projects that exhibit higher complexity and risks compared to the average but are nevertheless highly desired by policy makers.

The investment challenge thus obviously implies a financing challenge. TSOs need to acquire the necessary capital to invest. On the one hand TSOs are regulated entities whose financial framework is governed by a regulatory framework. These regulatory rules and conditions directly determine the risk-reward balance of the TSO, its incentives, the transmission tariff income and thereby it crucially determines its ability to finance investments. On the other hand, TSOs are players on global capital markets and have to attract their financial resources according to the rules and conditions of those markets. It is clear that TSOs are in competition with other companies and industries looking for financial means. Investors go where the risk-reward balance best matches their appetite. Those two sides of the TSO business not only have to be fine-tuned to each other, i.e. the regulatory framework should allow TSOs to attract capital at a fair rate, but it should also be fine-tuned to the overall context and in particular the (policy) goals requiring TSOs to take up the investment challenge.

Indeed, without the appropriate frameworks in place, Europe will face a "regret-scenario" where policy goals are not met in time or not at all. It is expected that the attainment of those goals would imply a major increase of welfare for the European Economy. Bearing this in mind, one should refrain from looking at transmission investments in isolation and consider their overall effect when judging on transmission investments and how they are financed, including the inevitable link with the transmission tariffs charged upon grid users.

Therefore, regulatory authorities should actively set up regulatory frameworks fostering investment and thereby enabling TSOs to overcome the investment challenge. Policy makers, both at national and European level, should be aware that only by creating a fair and correct investment climate transmission infrastructure can emerge at full strength and contribute to the policy goals.

The overall framework TSOs are confronted with should be forward-looking with a clear focus on the challenges ahead. This should not be misunderstood as TSOs or their shareholders bluntly asking for higher returns or less regulatory oversight on TSOs. It should be seen as call to look at "global efficiency".

Indeed, capital providers require a fair risk-reward balance in a predictable and stable context. As everything is linked to the regulatory framework, the most important risks for investors are linked to the stability and predictability of that framework. This risk for future adverse regulatory decisions is inherent to the TSO business. Thus, regulatory authorities should recognize this risk and its relevance for investors.

In this position paper, based on the principles and needs explained above, ENTSO-E proposes a toolkit of solutions that can be implemented by regulatory authorities. The toolkit explicitly distinguishes between solutions that help in prioritising specific projects over others (e.g. priority premiums) and solutions that tackle the problem of financeability in general (e.g. locking in parameters determining returns). To meet the investment challenge (and its size and pace), regulatory tools should be "fit for purpose", entail a fair, predictable and stable risk-reward balance and ensure good access to global capital markets. The presented

toolkit mainly consists of solutions that regulatory authorities can pick up, but this does not imply that (European) policy makers cannot actively contribute to one or more of these solutions.

ENTSO-E recognizes that there is no one-size-fits-all solution and that national specificities may require national regulatory frameworks to be different and tailor-made. However, by providing a toolkit of different possible solutions, ENTSO-E wishes to contribute to the creation of a context which allows TSOs to build transmission networks that help unlocking European welfare.