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Harmonizing electricity TSO regulation to ensure financeability of massive transmission investment plan: the case of North-West EU¹

*Authors: Jean-Michel Glachant, Marcelo Saguan,
Vincent Rious and Sébastien Douguet*

Highlights

- The study of five EU regulatory regimes for electricity TSOs (Belgium, Germany, Great-Britain, France and the Netherlands) suggests that their designs encompass strong tensions and trade-offs. Four main economic properties are at stake: the capability to (a) sufficiently remunerate TSO investments, (b) reduce the risk borne by TSOs, (c) incentivise TSO cost reduction, and (d) transfer efficiency gains to final users. No regulatory regime can simultaneously reach the highest level of performance for each of these properties.
- The existing national regulatory regimes show a significant heterogeneity of intrinsic trade-offs. This can be understood as a legitimate heritage from the past, and a consequence of the previous paths of network and regulatory regimes in an “isolated country” manner giving absolute priority to a particular set of local economic properties.
- However, these isolated national contexts should no longer be valid as the European Union is pushing more than ever to prompt for wider integration and increasing interactions between power networks and power systems. In any regional EU market, the economic properties of national regulatory regimes must consequently be realigned and harmonized so as to contribute more to the EU common good.
- This harmonization of regulatory regimes should take into account the TSOs’ capability to finance the investments required for projects of pan-European significance. In our new EU paradigm, incentives for “national only” cost reduction should be ranked second in favor of “Pan EU” key issues such as reducing cost of capital, minimizing investment risk, and guaranteeing investment financeability. The “coalition of the European willing” should push the entire zone to a more favorable environment for regional TSO investments.

1. This policy brief summarizes the thinking and the results of the FSR research report: “Incentives for investments: Comparing EU electricity TSO regulatory regimes” (2014)



Background

The European Network of Transmission System Operators for Electricity (ENTSO-E) identified in the latest Ten Year Network Development Plan that €104 billion investments are required in the next ten years in projects of pan-European significance. These considerable needs for electricity infrastructure investments are grounded in the new challenges that the European Union faces to achieve the EU internal market, the decarbonization of the electricity generation mix and the massive renewal of infrastructures.

The achievement of such investment plans requires the Transmission System Operators (TSOs) to be able to finance these investments at the lowest cost of capital. All national regulatory regimes which frame the behavior of EU TSOs should be adapted. TSOs should ensure their long-term financeability, either individually or collectively. It means being able to raise a sufficient amount of equity and debt to finance their foreseen investments.

It is also needed that national regulatory frames are coordinated to some extent. This is exemplified with TSOs' new industrial structures, with TSOs operating on both sides of regulatory borders and making the national regulatory frames interact.

It then appears essential to study the potential consequences and interactions of national regulatory choices with regard to network investments for the development of the pan-European market. We consequently address five major EU regulatory frameworks in Belgium, France, Great Britain, Germany and the Netherlands. They are already connected within a common regional (North-West) market and host more than half of the EU electricity generation. We analyze and compare them through a set of theoretical and empirical principles to identify the key economic properties of these five national regulatory regimes. We then estimate the potential outcomes of the regulatory regimes when put together in the context of existing regional market integration, and open a discussion toward the need for some more coordination and key harmonization targets.

Economic properties of regulatory regimes

Joskow (2008) states that: *“the primary goal of regulation in the public interest is to stimulate the regulated firm to produce output efficiently from cost and quality (including reliability) perspectives, to price the associated services efficiently, and to achieve these goals consistent with satisfying a break-even or budget-balance constraint for the regulated firm that allows the firm to covered its costs of providing service while restraining its ability to exercise its market power to exploit consumers by charging excessive prices”*.

To achieve these goals, monopoly regulation deals with different concerns. First, incentive regulation is built on the idea that between the regulator and the operator there is an information asymmetry about the cost function and the achievable effort to reduce cost. The theory has also examined the impact of different regulatory instruments on the level of risk borne by the operator and what their consequences are in terms of investments and financeability. Finally, the regulatory regime applied to the TSO will also determine how efficiency gains/losses are shared with the grid users.

Four economic properties are key to analysing the TSO's investment behaviour in the frame of incentive regulatory regimes. They make it possible to: a) sufficiently remunerate the operators' investments and ensure their financeability, b) reduce the risk borne by the operator, c) incentivize cost reduction and d) transfer efficiency gains and redistribution to final users.

Comparing national regulatory regimes; assessing their economic properties

The economic literature covers different types of regulation, based on various regulatory instruments such as cost-plus regulation, revenue caps, menu of contracts and yardstick competition. The details of the construction of an actual regulatory regime, especially in electricity transmission, are however far more complex. A regulatory regime, such as those observed in the five countries of our report, can be described as mixing different theoretical instruments to end up in a periodic revenue cap. The simplest version of such a frame consists in fixing the allowed revenue for the regulated services provided by the network operator. To implement it, several characteristics have to be defined, such as:

1. **The scope of the revenue cap**, which represents how the different types of costs are integrated in the revenue cap, or are treated separately through other specific efficiency specifications, or are not incentivized at all (**building blocks vs. TOTEX**).
2. **Efficiency tools & targets** should be defined in order to balance incentives for cost reduction with transfer of efficiency gains to final users. This could be done using specific tools to assess relative efficiencies (**benchmarking vs. internal efficiency audit**)
3. **Capital remuneration (in particular the allowed cost of capital or WACC)** should be defined in order to balance incentives for investments and TSO financeability with the resulting tariff level for final users.



Analyzing the TSO regulatory regimes in Germany (period 2014-2018), France (period 2013-2016), Belgium (period 2012-2015), the Netherlands (period 2014-2016) and Great-Britain (period 2013-2021) with regard to these characteristics leads to a classification of these regimes into three main categories.

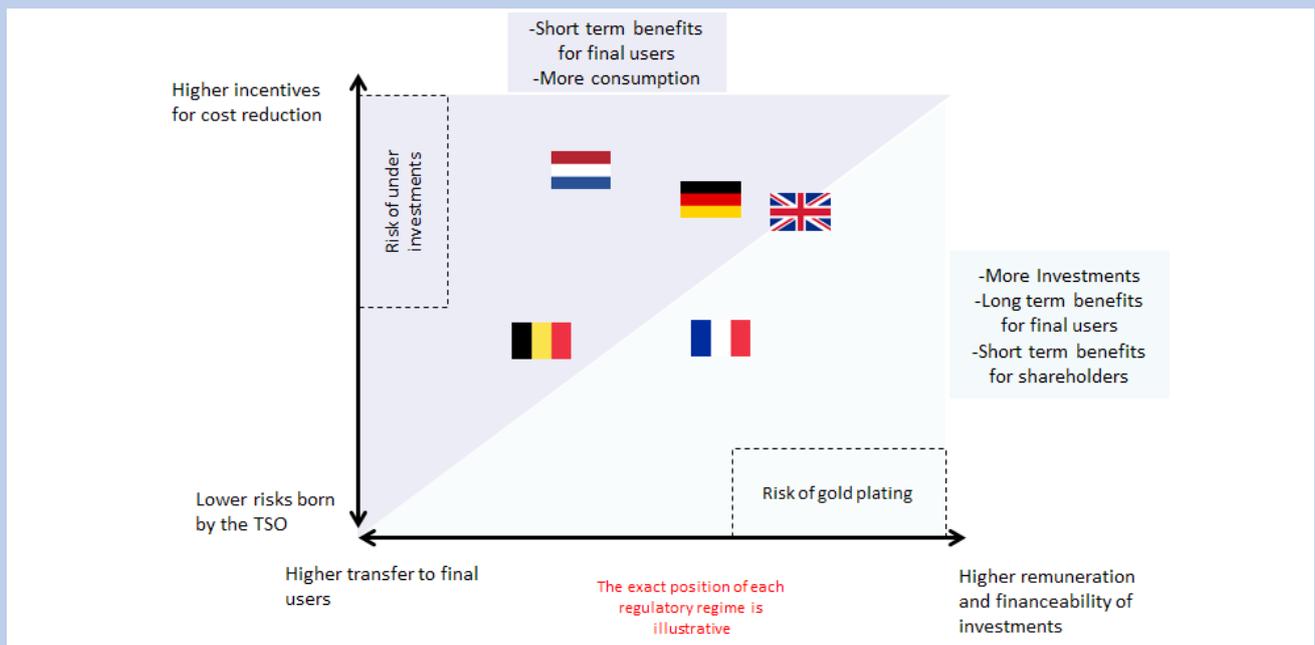
Belgium and France use a “building blocks” approach. They treat different categories of costs differently, mainly excluding investments from the revenue cap and lowering the strength of incentives regarding this type of costs. They are then mainly remunerated through a “cost-plus” (or pass-through) mechanism. The building blocks approach is complemented by efficiency audits on the investment budgets (*ex ante* approval of investments and *ex post* potential control of investments). Once the investments are made and accounted in the Regulated Asset Base, they are subject to a straight-line depreciation and

they are remunerated according to a pre-determined allowed cost of capital (WACC). This approach can be considered as bearing low-risk on the TSOs since the main part of the costs is treated as pass-through items. In contrast, this approach provides modest incentives on cost reduction because it does not optimize the trade-offs between OPEX and CAPEX, resulting there in a modest transfer of efficiency gains.

Germany and the Netherlands use a “TOTEX” approach. They include most investments in the revenue cap scope. They are by nature bringing more incentives on cost reduction than the building blocks regimes, even more so as efficiency targets also apply to old investments (in the Regulated Asset Base), whose costs are sunk and cannot be changed anymore. This regulatory regime is therefore bringing more risks for the TSO than the building blocks regime. Moreover, both Germany and

Result 1: Comparing the economic properties of five national regulatory regimes

The choice of a design option in a regulatory regime opens room to tensions or trade-offs between its basic economic properties. No regulatory regime can simultaneously reach the highest level of performance for each of these properties. Our figure below gives a simplified representation of such economic properties, with regard to the different trade-offs being observed. Some regulatory regimes are more favourable to investments and potential long term benefits for final users, hence favouring lower risks for the TSO and a higher financeability (e.g., France). However, such regimes only provide modest incentives for cost reduction and the transfer of efficiency gains to final users in the short term. In contrast, other regimes are focussing more on short term benefits for final users, using higher transfer of efficiency gains and strong incentives for cost reduction (e.g., the Netherlands). However such regimes are often conducive to TSO higher risks and lower financeability. The North-West national regulatory regimes show there a significant heterogeneity with regard to their economic trade-offs.



Comparison of economic properties and trade-offs of the North-West regulatory designs



The Netherlands favor inter-TSO benchmarking as a key tool to define the required efficiency levels. The use of inter-TSO benchmarking is based on the preliminary assumption that the

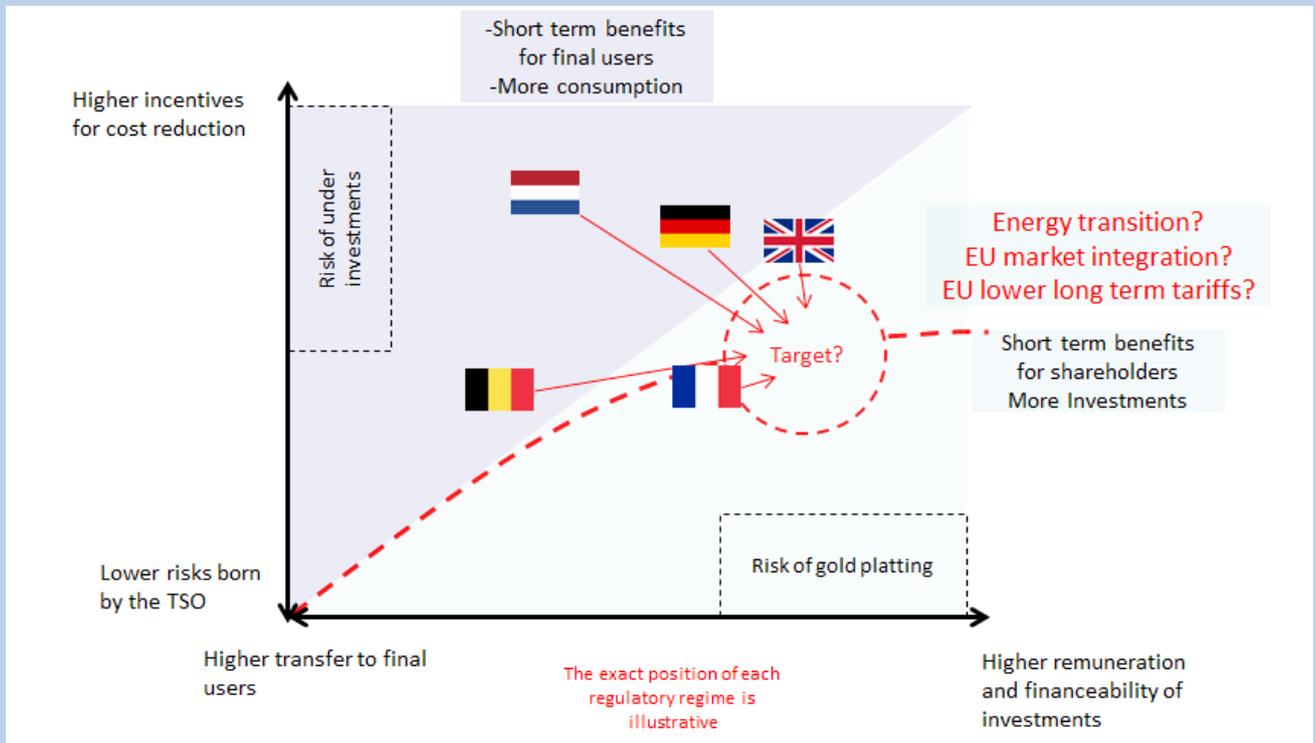
various transmission regulatory environments and “doing business” environments (rules of law, of administrative behavior, of social and industrial relationships, etc.) are sufficiently similar

Result 2: Target for a regulation harmonization at the regional level

In the new era we are in, the cost of capital and the financeability issues are key for the EU as a whole as well as individually for each TSO. If giving an absolute priority to cost reduction was an excellent idea in a period of low investment and low technology innovation (like GB did from 1990 to 2010), it is no more such a priority at times of massive investments and innovation. In Great Britain, after two decades of “lowering OPEX” and lowering tariffs, we might assume that the general level of efficiency should be quite fair today and the impact of further efficiency effort on the transmission tariff will only be smaller.

As a result, more harmonisation of regulation regimes at the North-West regional level should bring a more favourable environment for investments. A new balance between TSO investment risks and TSO efficiency incentives should be found to accommodate new targets as capital cost reduction and favourable financing structures. The existing regulatory regimes should start to decrease the risks borne by the TSOs, such as relying too much on benchmarking analysis with too limited data increases the TSO risks. Hence benchmarking might be combined with other efficiency tools and used more as an informative and a negotiation tool. More broadly incentive regulation should conceive a set of mechanisms dealing with uncertainty and a continuing process of improvement of these mechanisms. To maintain the network utilities’ financeability, a good equilibrium should also be found between short-term profit sharing and the allowed WACC. In some cases, remuneration of capital for investments should therefore be increased, efficiency targets should be moderated, and the scope or the tools of incentive regulation should be reviewed. The next figure illustrates a possible trajectory of regulatory convergence for Belgium, Germany, France, the Netherlands and Great-Britain.

If this harmonisation target cannot be reached, under-investment might be expected (lowering the future quality of network services or missing the objectives of energy transition and EU internal market building). A higher cost of capital for network investment would also occur when network operators experience too much risk. It might increase the financeability issue and lead to further increasing the future network tariffs.



A regional harmonization target



for all scored companies so as to not interfere with the scoring results. Given that this inter-TSO environment comparability is generally not ensured across countries, we can assume that an international benchmarking is likely to lead to additional regulatory risks for the TSOs. Of course German and Dutch regulatory regimes present variances as each of these regimes implements the benchmarking tool differently, and the cost scope of the efficiency targets differs from one regime to the other. Comparatively, the German approach looks more robust because the inter-TSO benchmarking is based on four national companies sharing the same German transmission regulatory and “doing business” environments, even if some kind of intra-Germany local heterogeneity can remain. As a result, the regulatory risks incurred by any targeted TSO can only be higher in the Dutch regime than in the German’s. The second difference is grounded in the scope of costs that escape temporarily from the TOTEX efficiency targets. In Germany, a system of investment budget (IB) lowers the risks born by the TSOs as the investments concerned are excluded from the efficiency targets for one or two regulatory periods.

Great Britain represents an intermediary position between those two types of regulatory regimes. First, the already long history of British regulation can only push both risks and incentives if the target is still to get further deep cost reduction. Second, the British regime finally did move to a TOTEX “approach”. This factor should also strengthen risk and incentives after more than two decades of already sustained efficiency gains. However, the British regime astutely combines different tools, where benchmarking is only a snapshot in a global evaluation and is not directly used in the calculation of efficiency targets. Moreover, these targets do not touch upon the assets already integrated in the RAB. Finally, the British regime uses a “menu of contracts” where the TSO chooses its preferred combination of incentives and risks according to its managerial business strategy trajectory. Besides, several other adjustment mechanisms are implemented in order to link the actual network revenues to defined driver changes (such as generation and load connection, network constraints, etc.).

Significantly different levels of costs of capital are allowed. The British gives the highest (nominal post-tax vanilla WACC 9.0%) while the Dutch and Belgian are the lowest (4.7% and 4.3% respectively with a hypothetical notional gearing of 60%). The allowed capital cost in France and in Germany is mid-range.

Replacing existing regulatory regimes in their genuine national foundations...

The heterogeneity between existing national regulatory regimes can mostly be understood as a consequence of the building of network and regulatory regimes at the national level. Existing reg-

ulatory regimes are the genuine results of intricate processes and interactions of various factors including political and social willingness, existing institutional and governance framework, influence of interest groups, national priorities and historical paths.

The alignment between the economic properties of a regulatory regime and the particular specificities of its national foundation can be highlighted in four key points. First, the investment financeability and the risks born by the TSO depend on the ambition of its investment plans. Of course the regulator is to make sure that necessary investments are happening. However the more ambitious and the riskier the investment plan is, the more sensitive a regulatory regime should be to its capability of ensuring financeability and minimizing the risks. Second, the cost of capital experienced by the TSO in the market for capital should influence the regulatory choices with regard to the weight of financeability and of risk. Third, the sensitivity of a regulatory regime with cost reduction should be aligned with the potential for efficiency gains. If there is only a small potential for efficiency gains on the TSO side, the incentives for cost reduction will be less relevant for the regulatory regime. Fourth and lastly, all regulatory choices are made with an eye on the impact on the electricity final bill.

... while they become more regional and integrated with each other

The national isolated foundations in which regulatory regimes have developed are no longer the only horizon. National regimes have been gradually influenced and remodeled by a European push for wider integration and increasing interactions between energy and network systems. Hence, the relative isolation of national regulations and their particular misalignments are heading toward a past state of nature. It is obvious that the Third Package and the Infrastructure Package made irreversible step toward an effective common EU regulatory frame. Furthermore, all the power transmission networks in the North-West region are now undertaken in a common regional market and are facing similar challenges regarding the need, the risks, and the financeability of investments.

Toward a higher North-West harmonization of regulatory regimes

A higher level of regulation harmonization in the North-West Europe is now needed for several reasons. First, a more common and investment-friendly scheme could minimize the cost of capital. Improving the credibility and stability of regulatory regimes could also help attract new potential investors. Second, cross-border investments could be favored by regulatory regimes with common economic properties. As the net-

work might be expanded where it would be optimal from a social welfare perspective instead of where an investor gets a more favorable “private” return.

A certain alignment of the economic properties of existing regulatory regimes is therefore needed in the context of a common regional market. This does not imply that all the regulatory design options, all parameters or revenue components should be exactly the same, but that the regulatory preferences and the economic properties influencing the network investments should be aligned to a certain extent.

Florence School of Regulation
Robert Schuman Centre
for Advanced Studies

European University Institute
Via delle Fontanelle 19
I-50014 San Domenico di Fiesole (FI)
Italy

Contact FSR coordinator:
Annika.Zorn@eui.eu

The Florence School of Regulation

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