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Twenty years to address electricity market and system
seams issues in the European Union: Why? Why not?

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Abstract

There are “seams” when TSOs (Transmission System Operators) do not perform the same tasks in the same manner on the different sides of their borders. Seams are consequential for electricity systems because power flows are strongly interactive where interconnected grids link many TSOs and countries like in the EU. Seams are very consequential in the EU because we have a common continental open market while access to the grids, congestion management, and balancing of the flows are performed by individual TSOs. It took 20 years to the EU to really address this “seams” issue: why? How did it change and how far? Will the EU new “Network Codes” finally create a seamless EU interconnected system and internal market? Or not?

Keywords

European internal electricity market; European electricity regulation; ACER; ENTSO-e; Electricity transmission system operators.

Introduction

The EU power market and system face discontinuities because of the network infrastructure architecture and the associated decision-making process. Seen from the point of view of market players and grid users – say, consumers, generators, or intermediaries as traders – this creates ‘*border issues*’ (within the infrastructure architecture) and ‘*seam issues*’ (within the decision-making process).

Of course the fact that most of the EU transmission grids have been conceived and built at national level creates borders between the various grids, systems and markets at the EU level. However one can find similar borders within countries: where islands, peninsulas, or remote poorer provinces are not, or are not very well, connected with the rest of the country. Even the state of Texas in the US is considered as a ‘*quasi*’ electrical island isolated from the rest.

The very fact that the borders of grids and systems can be internal or external to a country helps to clarify what are ‘*seams issues*’ vis-à-vis ‘*borders issues*’. Knowing that certain grids and systems face significant enough border discontinuities, how does the decision-making process work at the junction of their discontinuous architectures? Is the decision making homogeneous enough to limit the border effects to small enough consequences? Or does the decision-making process add its own ‘*seam*’ discontinuities which amplify the concrete ‘*border effects*’ stemming from the discontinuous infrastructure architecture? Hence the content of this paper: 1 The rationale for having ‘*TSOs seams*’; 2 What does EU do to erase its ‘*seams*’?; and 3 Will EU seams disappear or stay?

1. The rationale for having ‘TSOs seams’

‘*Seams*’ are discontinuities in the practice, the rules, and the decision-making processes, between two or more TSOs, when items or events are not treated the same (‘*harmonization*’), or are not treated together – where they interact (‘*coordination*’) – by the related TSOs in their related control zones. To better understand the nature of the issue we have to first identify what a TSO does and, then, what influences its practice.

In real life TSOs perform many different tasks and have responsibility for the *Hardware*, i.e. managing the connections of users, maintaining existing assets, and investing in new assets; and for the *Software*, i.e. balancing the system, managing congestions, running an information system, and interacting with other industry stakeholders (such as Market Operators, Distributions Grids, & Grid Users representatives). Each of these seven basic TSO tasks can have, in one or another TSO control zone, a significant exposure to ‘*seams effects*’.

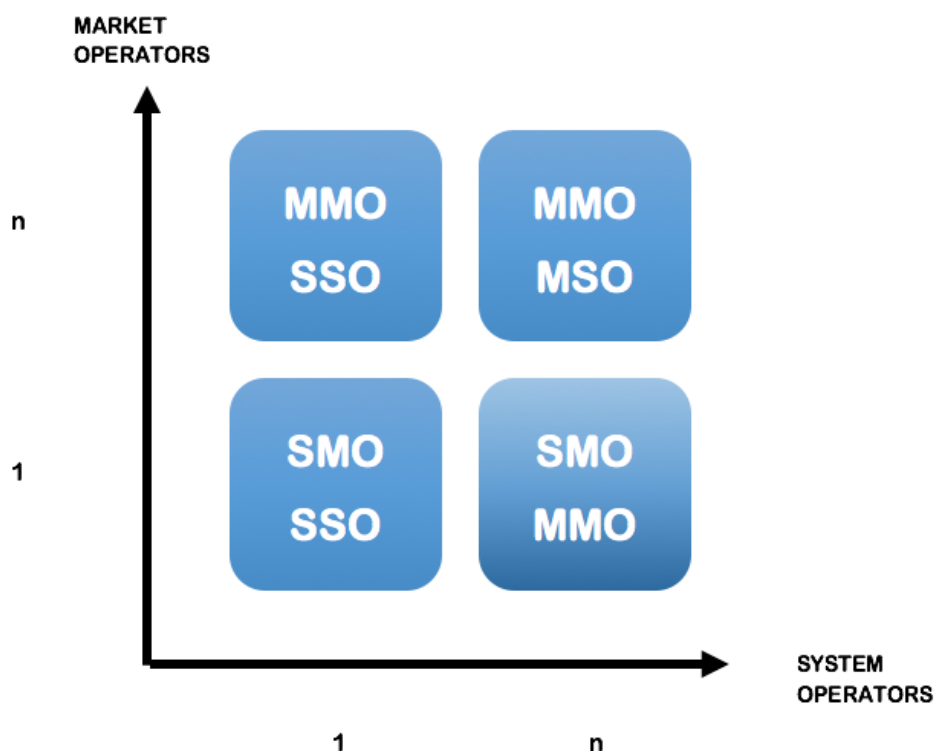
The first significant factors among the many ‘*objective factors*’ influencing how a single TSO performs its tasks are, of course, the *Grid Architecture* and the *System Characteristics*. The ‘*Grid Architecture*’ is the most crucial because the actual set of lines, devices and chosen technologies that make up the physical grid can be rather isolated from any other TSO (think electrical island) or rather interconnected, or very much interconnected (think Germany or France, each with 6 or more foreign zones connected to their grid). Any grid architecture can also be structurally weak, or really strong. Etc. The ‘*System Characteristics*’ then play another key role because the actual set of generators and generating technologies, consumers needs or behaviour, connected to the TSO grid will determine the general characteristics of the power system (such as the peaks, the shape and slope of the load, the available reserves, the plants ramping; etc.). Therefore, in a nutshell, most of the TSOs have significant differences in their grids and/or their systems and thus should not be expected to perform the same tasks in the very same way.

The next relevant factors influencing the practice of the TSOs are institutional (‘*institutional*’ as in *Institutional Economics*: Coase, Williamson, North, Paul Joskow). First, TSOs have different

‘corporate governance’. They can be state department (Sweden), or state undertaking (Denmark); state-owned listed company (France), or purely private listed company (the UK). They can have mainly national or European owners, or significant non-EU owners (think *State Grid China* in Portugal or Italy). All these TSOs cannot behave the same regarding investments into grid assets or information technology, regarding debt and equity, market or technology risks taking. The TSOs also have different national ‘regulatory frames’¹. It exists in the EU up to five alternative or complementary basic regulatory tools, that can be put into different regulatory mix regimes by existing regulatory authorities. These authorities are themselves distinguishable by the strength of their own decision rights, and independence; as well as by the size or depth of their resources and experience. Parallel to their various regulatory frames, TSOs may also have differing surrounding ‘Market Operators’ and ‘Market Designs’ covering parts or all of their control zones, or of their bordering control zones. Some TSOs even own the market operators (think NordPool). Other key market operators are structurally independent from the TSOs (think EPEX). Others are state owned (as in Italy or Spain). Jorge Vasconcelos, in the April 2017 FSR research report², showed various regimes of (Market Operation / System Operation) relations in a glance.

Fig. 1 – Possible combinations of market and system operators in any interconnected system.

(MMO: Multiple Market Operators; MSO: Multiple System Operators; SMO: Single Market Operator; SSO: Single System Operator).



Another significant diversification factor influencing the TSOs practice is their zones’ ‘Stakeholders political economy’, such as: incumbent generators and new entrants; national energy resources; peripheral territories; industry energy intensive consumers; household preferences and ‘sacred cows’. Of course all TSOs, being regulated entities, are very sensitive to hard ‘political economy’ pressures

¹ A strong proof in FSR research report, 2013: ‘Incentives for investments: comparing EU electricity investment regulatory regimes’, Jean-Michel Glachant, Vincent Rious, Marcelo Saguan, and Sébastien Douguet, Florence School of Regulation.

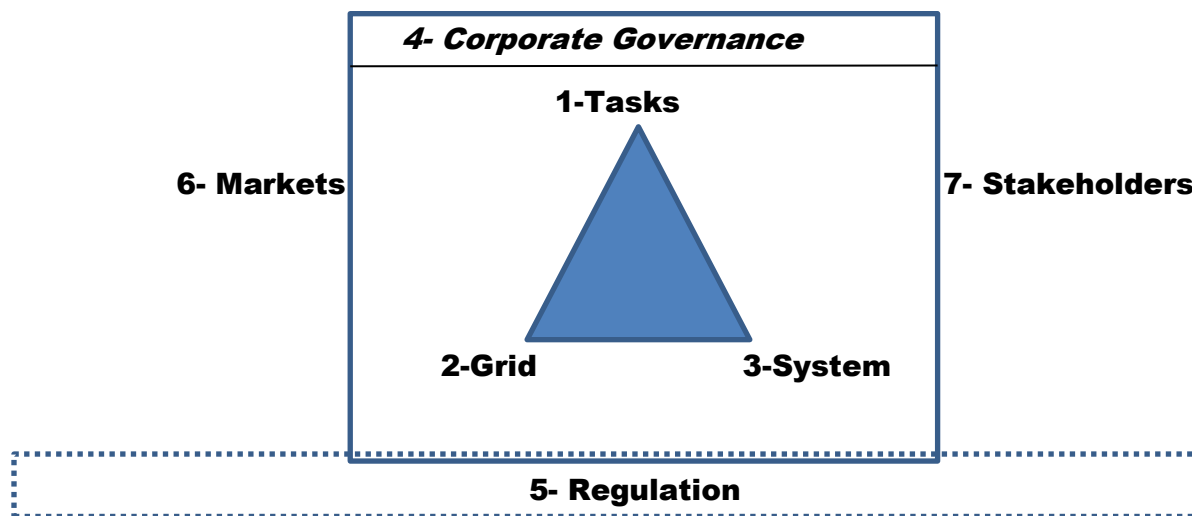
² Jean-Michel Glachant, Nicolò Rossetto, and Jorge Vasconcelos, ‘Moving the electricity transmission system towards a decarbonized and integrated Europe: missing pillars and roadblocks’, Florence School of Regulation, April 2017.

that Parliament, Government, or public law courts can, at any time, materialize in a TSO political (legislative, or executive) or legal defeat.

Coming back to the first factor already mentioned, the various TSO tasks (marked as (1-) in the figure below), the ranking among these tasks can change substantially from one TSO to another, or from one period to another. One TSO can, for these years, prioritize capacity investment to host off-shore wind farms, the other reducing balancing costs, a third testing or deploying new information technologies³.

This leaves seven components of TSOs practice differentiation, which is of course a high number, suggesting that bordering TSOs are very rarely – if ever – fully aligned.

Fig. 2 – Seven factors influencing the differentiation of TSOs practice



As a result, in this EU TSO landscape, the size and strength of ‘seam potential’ is impressive with about 45 TSOs and 30 countries involved (in 2015, before the Brexit vote); including Norway and Switzerland, which are outside the EU, but inside its market and (Norway) / or (Switzerland) its system. Thus, the erasing of ‘seams’ resulting from the Europeanization of the EU grids and systems practice is neither easy nor spontaneous. It requires effort and organization. But how?

2. What does EU do to erase its ‘seams’?;

The actual European approach to electricity TSO seams issues can be seen from its outcome (what has been put in place), or from its process (how such an issue is addressed in the EU). I will start with the process because the vast majority of us, having some understanding of one particular country case at national level (everyone has a country of reference), do expect the EU, more or less, to do something similar as a whole, at a higher level, on a more general scale. The fact is that this view is wrong: the EU level, as a proper institution, does not and cannot do more or less, at a higher level or scale, than what an EU country does at country level. EU ‘roof level’ is not a country, or a European country. It is ‘only’ a very particular ‘not a country’-institution that the EU countries specially designed and built to put above themselves. The real and actual EU ‘roof level’ is not what any sensible EU country would

³ See ‘Incentives for investments: comparing EU electricity investment regulatory regimes’, Jean-Michel Glachant, Vincent Rious, Marcelo Saguan, and Sébastien Douguet, Florence School of Regulation research report, 2013.

like to do, but at a higher level. It is what the many, various and heterogeneous countries can agree to put on their common roof, while keeping the maximum possible diversity and inconsistency between and inside each of these many countries.⁴ Therefore, understanding how the EU can approach the TSOs seams issues will reveal as much as, and sometimes even more than, knowing the actual details of the outcome.

2.1 The EU is not well equipped to address seams regulation

It takes a long time to understand what institutional Europe is made of. This is because it is a non-national construct. Even ‘*large states*’, like Canada, the USA or Brazil have a strong national core. But the EU, conversely, has no national flavour or trunk. It is instead a very particular type of construct put on top of national roofs, with the trunks and roots being the Member States. And this particular construct has only been built to be put exactly there (on the top), primarily by these Member States themselves; by these states interacting at EU level, not by ordinary citizens in their day-to-day lives. The strongest caveat is that groups of interests also act at EU level. But they do not lead much when the EU has to define its own ‘*institutional design*’ (the key rules of the EU level games). Lobbies play the games, but roughly within the rules set by the EU institutional design.

Two very big institutional steps are coming in our reasoning. *Step 1*: the EU executive power has not been equipped with any kind of federal regulatory authority or agency. There are a few large exceptions however: Competition Authority, *DG Competition*, which is a department within the leading EU executive power (*Commission*); Central Bank, *ECB*, which is an independent authority outside this EU executive power. *Step 2*: the EU executive power of Commission can, however, issue detailed regulatory rules *only if* allowed by a particular EU law and controlled by other powers (Member States as co-executive; Council of the European Union, and Parliament, as co-legislators). This is not straightforward.

Step 1: the EU executive power has not been equipped with any kind of federal regulatory authority or agency

Usually a ‘*law*’ is a constraining public rule, expressed in terms general enough to permit its further combination with the hundreds of other already existing laws. This close combination of the many laws will be reviewed *ex post* by judges and courts, while the text of each new law is an *ex ante* general definition of the new rule produced by the legislators. Similarly a ‘*regulation*’ is a public set of detailed practicalities, usually defined by an executive authority, permitting the implementation of a new law in the field of practice; before knowing what a court (private law or public law) might later say.

Unfortunately both references, while very usual at country level, are so frequently wrong at the EU level. A typical EU law is only a ‘*Directive*’. It means that it only sets ‘*objectives*’ that each Member State will have to appropriately redefine in terms nationally relevant and precise enough to be combined with the hundreds of other national laws, to nationally reach similar objectives (within a time period set by the EU directive). This necessary renationalisation of the EU law is called ‘*transposition*’ by Member States. What the EU itself calls a ‘*Regulation*’ (with a capital ‘**R**’) is another type of EU law, supposed to be precise and effective enough to directly enter all Member States’ bodies of law with no kind of ‘*transposition*’ into national laws.

What then is EU ‘*regulation*’ (with a small ‘**r**’)? Does EU executive authority produce its own sets of detailed practicalities, to launch the implementation of the EU law into the field of practice? No,

⁴ Always remember this as a reference point: the Wallonia region leading party, inside Belgium, having a strong political weakness (it will be ousted from government a year later), did block for weeks, in the name of 3 million inhabitants, a trade agreement with Canada agreed by the rest of the whole European Union (over 510 million inhabitants).

most of the time, this simply does not exist. Most of the EU laws are not federal laws implemented by federal departments and agencies (like, say, in the US), but only ‘directives’ which have to be both translated and redefined in terms of each Member State’s national body of law. Therefore there simply is no straightforward track to get European-wide unified sets of detailed practicalities to start implementing the EU law with ‘no seams’ between all Member States’ fields of practice. Jorge Vasconcelos in FSR research reports (2015, 2017)⁵ gives a comprehensive view of the regulatory gaps in the EU electricity sector, from 1996 to 2016.

Here is the difficulty. The hybrid nature of the EU (a ‘federal type of confederation’) has no fast and easy track to produce ‘EU regulation’ permitting coherent sets of detailed practicalities to implement the EU law with a guaranteed no ‘seams effect’.

Could the European Commission bypass this difficulty by enlarging and inflating ‘EU Regulation’ enough to get sufficient ‘EU regulation’ in it? It is not an absurd idea. But how is it possible to always include enough relevant ‘executive details’ in a general legislative ruling to be voted both by a Council of all Member State ministers (Council of the European Union) and the EU Parliament? There is an obvious obstacle: it is too hard to expect a pan-EU legislative agreement to produce much of all EU single detailed practicalities by law, in a single EU ‘Regulation’. And the rigidity: once voted the EU law is a EU law, and it cannot be adapted later on in light of the hundreds of novelties popping up every year in real fields of practice.

Could DG Competition take special care of the detailed practicalities and act as a sheriff getting Member States to converge towards a single market ‘level playing field’. It is not absurd but a competition authority can only punish the ones that are guilty, or get the guilty to agree to ‘voluntary commitments’. It cannot set codes of detailed practicalities constraining all other undertakings in the same relevant market. In a free market, marketers are free; and Competition Authorities stay mute – and are happy to.

It is now obvious that: 1) many factors, really objective or nationally institutional, push individual TSOs to not spontaneously converge towards ‘no seams’ behaviour in most of the particular fields of practice; and 2) that the EU institutional frame is not very well equipped to reduce this natural TSO tendency to produce many ‘seams’. What has the EU process delivered then?

Step 2: the executive power of the Commission can issue detailed EU regulatory rules only if allowed by a particular EU law and controlled by other powers

This window of opportunity is small and not easy to enter. To issue detailed regulatory rules conceived to sensibly frame the implementation of a given EU law, the Commission has to get *ex ante* a ‘green light’ put in this related particular EU law with the co-legislators agreement (Council of ministers of the European Union, and Parliament). Then the Commission has to submit its proposal of detailed regulatory rules to a ‘Committee of experts’ representing each Member State and voting with qualified majority. Even if voted by this Committee, both Council and Parliament keep a final veto right because it is ‘their’ law to be implemented in this detailed way.

Once fully adopted by all these powers, this set of practicalities becomes a ‘Commission regulation’, which is as mandatory as a ‘Council and Parliament Regulation’, but from a lower level. An EU Regulation is a full law, defining both the general objectives and their main means. A Commission regulation is only a regulation, a set of practicalities, defining detailed practical means to implement the objectives set by the law.

⁵ See Jean-Michel Glachant, Jorge Vasconcelos, and Vincent Rious, ‘A conceptual framework for the evolution of the operation and regulation of electricity transmission systems towards a decarbonized and increasingly integrated electricity system in the EU’, Florence School of Regulation, 2015, chapter 1; and Florence School op.cit 2017, chapters 1 to 3.

While this process of combining four powers (Commission, Member States experts, Council of the EU, and Parliament) is not straightforward, other key difficulties remain at stake. 1) How could the Commission find the professional skills, the human capabilities, to produce sensible detailed practicalities to implement the general objectives of a new EU law in all 28 Member States? The fact is that the Commission has no large and resourceful federal bureaucracies getting practical knowledge and experience by interacting with the day-to-day life of the many fields of practice in the many countries of the EU. 2) Furthermore, who will guarantee a fair enough (*'no seams'* enough) implementation of the new common EU regulation in the very day-to-day life of the many countries' public or private areas? Not the Commission, it has no federal apparatus to do so: all *'first line'* implementation players (business or authorities) are country based.

One of the many rational answers to these two powerful difficulties is to voluntarily feed the EU *'Commission regulation'* process with a good deal of EU level *'self-regulation'*. The Commission can build, at the EU level, particular crowds or coalitions of *'nationally interested regulatory experts and players'* and link them to: a) the building of the Commission *'regulation proposals'*; b) the *'Committee of national experts'* decision-making; c) the national processes of implementation of the new Commission's regulation. This strong *'self-regulation'* logic has been seen many times in many industries (from drugs and food to trucks and cars). Could it also be built in the electricity sector? And then support the take-off of a first wave of *'Commission regulation'*, able to sensibly reduce the room of manoeuvre for *'country or infra-country seams'*?

2.2 How EU did actually address its electricity market and system seams?

The EU process could start addressing *'seam issues'* either from the lighter EU law (*Directives*), the stronger EU law (*Regulation*), or from *ad hoc* decisions made by the Commission (as DG Energy or DG Comp), or other novelties to be seen. One of the major novelties would be entering a proper *'Commission regulation'* process.

The *First Directive* (1996) did roughly acknowledge its feebleness by doing virtually nothing for addressing country seams except abolishing the hardest countries' Chinese Walls: 1- by cancelling Member States' right to close borders (via legal monopolies of imports and exports); 2- by opening all countries' national markets for big consumers; 3- by requesting the designation of a TSO in any country transmission grid, but with an imprecise definition of its statute. TSOs could stay bundled with generation and supply, with their own special accounting. Regulatory Authorities themselves weren't mandatory. So the *Third Party Access* to the grids could be either *'regulated'*, or only *'negotiated'* with the vertically integrated transmission monopoly. No market design of any kind was set. And the *'single buyer'* option was kept as legal: the consumer buying from a new entrant was then supposed to transfer her new supply contract to the incumbent supplier for implementation. Not surprisingly, as noted by Leigh Hancher and myself⁶, the EU has as many seams as countries. And sometimes more, as the UK and Germany went for alternative wholesale market regimes and several TSOs in each country.

In response, in 1998 the Commission did create a voluntary pool of pioneers producing soft convergence through debates and a willingness to do more: the *'Florence Forum for electricity'* (where many future pillars of our *Florence School of Regulation* – created in 2004 – were involved as national regulators: Jorge Vasconcelos⁷, Pippo Ranci, and later Ignacio Perez-Arriaga, etc.). Many

⁶ Jean-Michel Glachant, 'Une quinzaine de "marché unique" de l'électricité dans l'Union européenne ?', *Flux*, 2001/2, N°44-45, pp. 8-27.

⁷ Read the very early assessment made by leading EU energy regulators, after the birth of Florence Forum: J. Vasconcelos, M. Ordonez, and P. Ranci, 'Transmission and Trade of Electricity in Europe', *Oil & Gas Law and Taxation Review*, 1999, vol 17 (2).

European associations have also been created to act as voluntary pioneers producing soft paths of better convergence (CEER for regulators, ETSO for TSOs, etc.).

At the second Directive, in 2003, it became mandatory to have a national regulator in every Member State (it was new for Germany). The regulators gathered in CEER did become a collective advisor of the Commission under the legal ‘hat’ of ERGEG. And the ‘negotiated’ Third Party Access did disappear from legality. The duties of the TSOs were better defined, while still in general and non-operational terms. However a voluntary “convergence of the willing” did increase within ETSO. Leading volunteer TSOs did create in 2006 the ‘Market Coupling’ initiative for Day-Ahead wholesale trade, which was a major step towards the reduction of ‘seams’ by running common ‘implicit capacity auctioning’ at borders for France, and the Benelux. Regulators, via ERGEG, enriched the initiative, ending up hosting Germany in 2010, with another new key step in 2014 when extending to GB, the Nordic and the Iberian countries. *Flow-base* was another step ahead for capacity calculation.

Only in 2015 did the Commission take full responsibility by issuing a ‘*Commission regulation*’ (a very special instrument, as described earlier). For the very first time, 19 years after the First Directive, the EU established a very comprehensive guideline on capacity calculation and allocation, congestion management, market coupling and ‘market operators’ (NEMOs), coordinated redispatch, allocation of costs, and bidding zones. ‘*Until then, it was mainly a non-regulated, contractual TSO relationship*’ (Jorge Vasconcelos)⁸. Being established as ‘*Guide lines*’, this Commission regulation has a lower direct content than a proper ‘*network code*’, as it still requires TSOs and NEMOs to develop the detailed methodologies, to be approved by the NRAs and being necessary to make the guidelines work. However, it is such a big change in the course of EU electricity regulation that it can be said to be the real Day 1 of ‘*EU regulation addressing TSOs seams*’.⁹ From the summer of 2017, all the methodologies needed for a pan-EU implementation should have been issued, and this EU ‘*seam eraser*’ should then be at work.

Another interesting piece of law, but smaller, was somehow announcing this EU regulatory shift. It is the ‘*EU Regulation*’ 347/2013 which totally transformed the EU policy of funding ‘*European value-adding*’ infrastructures, in relation with the newly created ‘*Connecting Europe Facility*’ (CEF): €24 billion for Transport, Energy & Communications in 2014-2020. This **Regulation** EU-law created a due process to define and choose projects contributing to new pan-EU ‘*energy corridors*’ and / or increasing interconnections of regions and countries. Being a European Regulation, then a law with no transposition process, it took the opportunity to redefine the TSO obligations at the EU level, by asking them notably to adopt ‘*common network operation tools to ensure coordination of network operation*’, and by giving to ENTSO-E two years to define the necessary specifications, to be then approved by ACER and the Commission. This 2013 case, that of grid planning coordination (also called ‘*system planning*’), deserves more attention before coming back to the wave of Commission regulations opening up in 2015.

It was the EU Regulation 714/2009, within the Third Package, that first asked ENTSO-E to produce a ‘*non-bidding Community-wide ten years development plan*’ (TYNDP), associated with a generation adequacy outlook. And to: a) build it on national investment plans; b) on system user needs and investor commitments regarding cross-border interconnections; so as to be able to c) identify EU investment gaps, ‘*notably with cross-border capacities*’. Of course, developing such a tool takes time, and TYNDP 2010 and 2012 were not yet delivering a deep and well-working analysis. TYNDP 2012 did frankly acknowledge the need for more work to produce a strong ‘*top-down*’ definition of scenarios, as a complementary approach to the dominant ‘*bottom-up*’ approach already in place. TYNDP 2014 did perform much better for ‘*top-down*’, as well as for offering some CBA (*Cost-Benefit*

⁸ Jorge Vasconcelos, a founding father of CEER, Florence Forum, and ERGEG in op.cit, FSR, April 2017, p. 35.

⁹ See it on Internet as ‘*Commission regulation 2015/1222*’ (57 pages); its nickname is ‘*CACM guidelines*’ –to be distinguished from ‘*CACM framework guidelines*’, which is an earlier and smaller provisional step from ACER.

Analysis). And, finally, TYNDP 2016 was able, for the first time in the EU, to focus on common planning studies where interconnection targets were agreed, to identify investments gaps, and to formally use a refined CBA methodology. It was a very big step forward¹⁰, but with other limits.

EU **R**egulation 347/2013 (already introduced as referring to ‘*Connecting Europe Facility*’) has been officially labelled ‘*Guidelines for trans-European energy infrastructure*’. It kept TYNDP as a reference scenario for EU-level policy thinking, and called for a more precise and accurate CBA methodology. But it did create a new governance structure to produce the EU infrastructure policy decision-making. These 2013 mandatory EU *Infrastructure Guidelines* did detach the process of evaluating, selecting and financing the European priority grid projects from the governance created by Regulation 713/2009. Instead of building on the existing governance, with ENTSO-E as a hub of TSOs, it created a new process called ‘*Projects of Common Interest*’ (PCIs), governed by a brand new governance structure made of 12 *ad hoc Regional Groups*, and gave, by law with no transposition, a clear supremacy to these new *PCIs* vis-à-vis the tools and processes designed by Regulation and Directive from 2009. It seems that an opportunity for operationally combining TSOs’ actual investments, national network development plans, EU policy priority and financing, and EU network development plan, in a converging process reducing all the related seams, has been missed there, in the first and proper EU ‘*Guidelines for energy infrastructure*’.

This smaller, but consequential, *Hardware Guidelines* (EU **R**egulation 347/2013) and the bigger *Software Guidelines* (Commission **r**egulation 2015/1222) are two related birds, but not from the same stone. The big stone supporting the first ever wave of Commission **r**egulations is still clearly based in the Third Package from 2009.

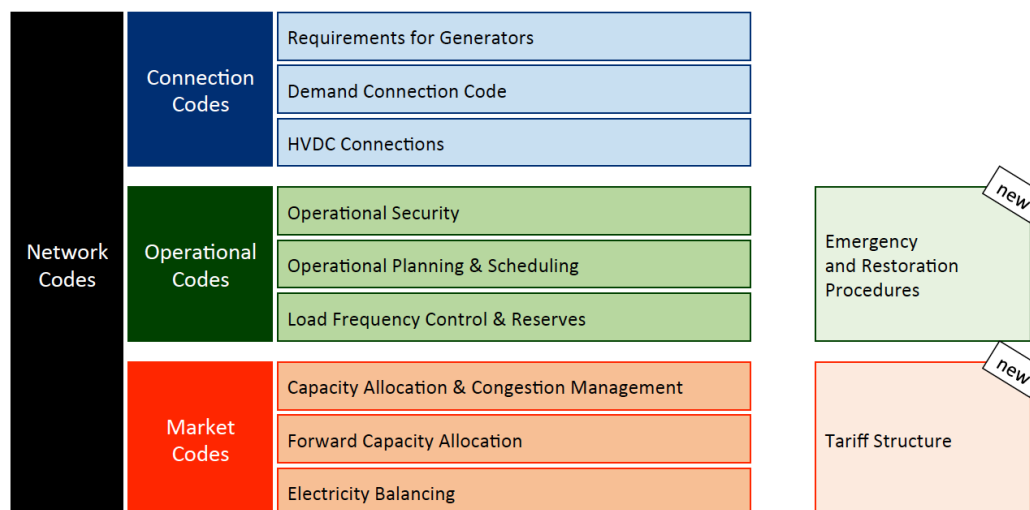
While this Package did push the definition of rights and duties of TSOs and NRAs far beyond the two older packages, it did not change the preference for staying ‘*general*’ and not addressing the operational coherence needed to erase the seams. It also did not define any ‘*market design model*’ at all. The core of this Third Package was twofold. 1) Making mandatory by law the unbundling of the TSOs (which both Germany and France were refusing to do, in the name of their national champions). 2) Mutualizing the national powers of both the TSOs and the NRAs into two new European bodies to become the ‘*European network of TSOs*’ (ENTSO-E), and ‘*Agency for the cooperation of NRAs*’ (ACER). ENTSO-E was created as a European body by a special ‘*EU Regulation*’ (714/2009). That same Regulation, an EU law with no transposition, also gave the Commission a ‘*green light*’ at proposing further ‘*Commission regulations*’ defining ‘*Grid Codes*’ and / or ‘*Guidelines*’ addressing all key practical points needed for the operation of the EU electricity system and internal market, and to be submitted to the ‘*Comitology procedure*’ (referred earlier in this chapter: Committee of Member States experts, plus final veto rights to co-legislators Council and Parliament). In the same Regulation law, obligations were given to ACER (hence the mutualized NRAs) to produce ‘*Framework Guidelines*’ to be sent to ENTSO-E (hence the mutualized TSOs) to produce ‘*Network Codes*’. After mutual checks and balances between ACER and ENTSO-E, the Commission was set free to draft the final proposal to be submitted to the *Comitology* process. Thus, the mutualized NRAs were producing the *Framework Guidelines*, while the mutualized TSOs were producing the *Grid Codes*. But the Commission was retaining its final bargaining power with TSOs, NRAs, Member States, Council and Parliament.

It took a very long time to make this totally new process, launched in 2009, work and deliver. The first big ‘*real size*’ test came in the form of the CACM *Commission Guidelines*, officially issued in July 2015. But it was more than a big test, it was a revolution. A single piece of Commission regulation was simultaneously defining the reference EU ‘*Market Design*’ (which has never, ever, been done) and the related TSO operational guidelines (except for *Balancing* and *Forward Capacity Allocation*, being two distinct pieces in the same wave of Commission regulations).

¹⁰ See J. Vasconcelos, Florence School research report 2017, op.cit, pp. 62-76.

This real EU revolution in addressing ‘seams’ is summarized by the following figure,¹¹ from 2015, showing that 11 pieces of Commission regulation were foreseen, in three baskets: ‘Market Codes’, ‘(System) Operational Codes’, and ‘(Grid) Connection Codes’. In practice, as we have already seen, the Commission did redraft its regulation proposals for CACM and FCA as ‘Guidelines’.

Fig.3 – Overview in 2015 of the EU Network Codes to become Commission regulations



Once the Commission *Market Guidelines* (or *Network Codes*) are adopted, and equipped with the relevant methodologies, who is legally responsible for their proper implementation into the fields of practice of the many EU Member States? It is the same TSOs and NRAs that have been mutualized within ENTSO-E and ACER.

It is true that this new EU regulatory frame, conceived and launched by the 3d Package, is not a ‘fast track’. Designed in 2009, it will start being operational only in 2018. But it exists and should effectively work. Except for the NEMOs (the *Market Operators* created by regulation 2015/1222), all the professional experts that have had a hand in defining the *Framework Guidelines* and have worked on the *Network Codes* drafts are the same entities that will have to implement them as a binding EU regulation: the TSOs and NRAs of the European Member States.

3. Will EU seams disappear or stay?

The EU is credibly engaged in a wave of ‘*Commission regulations*’, with enough field skills and experience in the upstream drafting (i.e. the TSOs and NRAs mutualized by ENTSO-E and ACER), and enough proven capabilities to act in the downstream implementation at individual Member State level (brought there by the very same TSOs and NRAs). And overseeing them all, the European Commission, as key EU executive power, is their general coordinator and principal. Of course getting the full benefits of this ‘*seams erasing*’ wave will take some years (for example the EU balancing code implementation has already been delayed six years). But this whole process will inevitably and considerably reduce the room for ‘*seams*’ in the EU. Will it be so deep and comprehensive that we can already assume that the ‘*seams*’ in the EU electricity sector are to disappear? In a sense we need more time to find out. In another sense no time is needed, it is already obvious. Two Florence School research reports did investigate the issue in 2015 and 2017. Jorge Vasconcelos, a founding father of EU electricity regulation (CEER, ERGEG, Florence Forum, etc.), is the main author of the ‘*regulatory*

¹¹ Florence School research report, 2015, op. cit., p.33.

gap' analysis exposed in this research. The mere fact that each Member State has a regulatory authority and at least one TSO, while the European level has none – no EU regulator and no EU TSO or ISO – creates a regulatory gap that should still be consequential, even after the full implementation of the current Commission regulations wave.

3.1 The missing EU regulatory pillars

One way of identifying the nature of this EU regulatory gap is to identify the '*missing regulatory pillars*': that is, the ones that have yet to be fully and comprehensively addressed at the EU level.

The first one is '*coordination*'. In a common and single market, all interconnected grids and their systems at Member State level are only parts of a pan-EU grid and system. Interactions between the decisions made by transmission managers and investors, systems operators, and millions of grid users and market players, have to be addressed as such, and embodied into relevant EU coordination mechanisms. This is needed from grid connection, to assets maintenance, and investment planning; from system operation, to interaction with all grid users or market players. The current wave of Commission regulations does address many parts of that, but not all of them, and not in a systematic manner (we have already seen a gap in the loop between 'TYNDP' and 'PCIs'). This will be substantiated much further in the next subsection – the EU *roadblocks*.

The second missing regulatory pillar is '*sharing the costs and the benefits*'. The pan-EU grid and system are still both (for long, or forever) fragmented into many control zones and TSO companies. Then the numerous actions needed to efficiently transform the bones or muscles of the EU grid (the *Hardware*), or to manage the blood or the brain of the EU system (the *Software*), entail costs and benefits being unevenly distributed among the many zones and many companies. If this regulatory issue is not properly addressed, the adverse incentives rooted in the transmission zones and companies' fragmentation can block the efficient pan-EU, or even regional, and sometimes simply bilateral, outcome.

The third missing pillar is '*solidarity beyond costs and benefits*'. The speed and extent to which electricity systems deteriorate in strained situations or outright crises, call for '*solidarity*' as the more rational behaviour (as a rescue in a car crash). The rationale is to first save the 'power systems' by keeping them on the safe side. Only later one might discuss what happened, and why, and what should be changed. However in any case, '*Solidarity*' has to be organized *ex ante*. If not, any crisis might easily end up in a '*Sauve-qui-peut*' scenario, which will increase the likelihood of major disasters, or the extent of the damages to be incurred. There is a typical '*seam effect*' when a crisis born here, this side of a TSO border, is not considered there, on the other side. The UK Prime Minister, Tony Blair, was simply furious when the French gas TSOs refused to promise to help Great-Britain in the name of their own French '*Public Service*' obligations... But why didn't he call for a pan-EU crisis and solidarity regulation before the emergency?

3.2 The current EU regulatory roadblocks

The accuracy of the conceptual notion of '*regulatory missing pillars*' will be easily confirmed by the list of current EU '*regulatory roadblocks*' identified by the April 2017 FSR research report. There are twelve significant roadblocks, identified by the Florence School. Eight are '*first-order*', which means they lack a proper '*coordination mechanism*' in the decision-making process. Four are '*second-order*', meaning that what is lacking is mainly the '*harmonization*' of rules and principles.

Fig.4 The EU regulatory roadblocks from Florence School research report (April 2017)

'First-order: coordination'
1- Lack of comprehensive coordination of system planning, further to the TYNDP

2- Lack of comprehensive coordination of cross-border investments
3- Lack of comprehensive coordination of system operation
4- Lack of a common redispatching approach
5- Lack of common reserve contracting and cost allocation
6- Lack of intraday cross-border allocation with auction
7- Lack of load shedding coordination
8- Lack of comprehensive coordination for solidarity
'Second-order: harmonization'
9- No harmonization of common congestion rent allocation scheme
10- No harmonization of capacity remuneration mechanisms
11- No harmonization of transmission tariffs across countries and TSO zones
12- No harmonization of 'state aid' to big energy consumers (through reduced network tariffs)

This list is long and meaningful, revealing very consistent regulatory gap and 'seams' potential in the EU electricity landscape. What is striking is that half of these 'regulatory roadblocks' involve players beyond the proper TSOs. From number (7), being 'load-shedding', to number (12), which is 'state aid', they are the regulators or directly the governments that are responsible or co-responsible for these EU regulatory gaps. As part 3.1 (*TSO seams factors*) just showed, many seams effects are coming from the public authorities, directly or indirectly.¹² As regulated entities, the TSOs are taking directly from public authorities many items that TSOs see as impossible to change, or too risky, or too costly to change.

Conclusion

If Europeans are serious about their aim of creating a seamless internal market for electricity, a goal stemming from the EU *Single Act* in 1986, and being launched since the First Directive in 1996, a consistent European approach to erasing seams is needed.¹³ In fact, but unfortunately for this, the EU institutions do not offer an easy path to electricity seams erasing. It is because such a policy requires many consistent regulations to be defined and implemented; while the EU has no 'federal' regulatory authority powers, and no pan-European system operator or transmission company.

This reality does not block the EU from going ahead. The EU has been able to create its own particular 'Third Best' path to seams erasing. The core of it, its spine, is mutualizing national TSOs within ENTSO-E, and national NRAs within ACER, and integrating both into the 'Commission regulations' creation process. It is the particular, but working way by which the EU became able to define and implement common regulations addressing seams. It is 'Third Best' only, because national players (TSOs and NRAs) will not face any EU federal regulator when implementing the common European regulations. This EU wave of common regulations will be fully deployed in 2022, ending the Balancing regulation implementation delay.

¹² On the top of Florence School research reports 2015 and 2017, do not miss to have a look at report 2013, for regulatory seams between national regulators: 'Incentives for investments: comparing EU electricity investment regulatory regimes', Jean-Michel Glachant, Vincent Rious, Marcelo Saguan, and Sébastien Douguet. And at report 2014, for regulatory seams between Member States' governments, and between... European Commission directorates: 'Regimes for granting rights to use hydropower in the EU', Jean-Michel Glachant, Vincent Rious, Marcelo Saguan, Sébastien Douguet, and Gentzoglanis Emmanuella.

¹³ Jean-Michel Glachant and Francois Lévêque, 'Electricity Internal Market in the European Union: What to do next?', CEEPR Working papers at MIT (USA), issue 05-015, September 2005; Jean-Michel Glachant and Francois Lévêque, 'Electricity Reform in Europe. Towards a Single Energy Market', Edward Elgar, 2009; Jean-Michel Glachant and Sophia Ruester, 'The EU Internal Energy Market: Done Forever?' European University Institute Working Paper, 2013/66.

Where will the EU end up? Jorge Vasconcelos is seeing a very significant but still incomplete EU seams erasing. One big ‘*seams potential*’ is even rooted in the bifurcation made by EU law between the ‘*Access to Networks*’ Regulation 714/2009 and the ‘*Infrastructure Guidelines*’ Regulation 347/2013.

Could the 4th Legislative Package process, pushed by European Commission since the autumn of 2016, reduce this seams potential? Say, by redefining the ways TSOs, NRAs, ENTSO-E, and ACER work, so as to significantly reduce the autonomy of each national player within its own EU body or within its national borders? Could country TSOs themselves lose a part of their independence with the creation of new regional entities acting as ‘*light regional system operators*’: the ROCs (*Regional Operational Centres*)? Already NRAs and TSOs are fiercely opposing any de-nationalization of their existing powers. Will then, the Member States, and the EU Parliament, follow the new Commission proposals, or their opponents, the proud ‘*countries national militias*’? For long the Florence School has repeatedly advocated that regulatory regimes and goals have to align on the actual capability of the regulator(s).¹⁴ Is this the long term feed-back loop in which the 4th Package will end or not?

Anyway, all the future of EU electricity seams is not there, in the institutional issues. Another, and gigantic, part is rooted into the transformation of the objective grid and system factors. Renewables, being massively ‘*distributed generation*’ and, because of that, having potential for ‘*self-consumption*’, redefine the EU relevant grid architecture and system characteristics. Distribution grids are becoming distribution systems, widening a new seam issue on the flanks of transmission operators. ‘*Prosumers*’ are themselves bypassing all grids (distribution & transmission) and systems. New devices, tools, software and processes (such as bitcoin-based exchange) open new spaces of transaction, agreement, and settlement to new markets, new platforms, new communities, and... new seams.

The whole global industry enters a new ‘*industrial revolution*’ led by digitalization, data processing, ‘*peer to peer*’ or ‘*crowd to crowd*’ smart interactions. In a new world of electric self-driving cars, twenty years from today, say in 2035, it would be strange to find that the centre of all electricity affairs will still be the highly centralized electricity grid and system that was supposed, a long time ago, in 1996, to favour the launching of the EU internal market paradise.

¹⁴ Khalfallah Haikel, Perez Yannick, Rious Vincent, Sagan Marcelo, Glachant Jean-Michel, ‘*Implementing Incentive Regulation and Regulatory Alignment with Resource Bounded Regulators*’, European University Institute, Working Paper, 2012; Marie Vandendriessche, Angel Saz Carranza, and Jean-Michel Glachant, ‘*The Governance of the Energy Union: Bridging the Gap?*’, Esade, Madrid, Working Paper, 2017 (forthcoming as 2017 Florence School Working paper).

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