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Abstract

The European Union took more than 20 years to start defining a common market design for its internal electricity market: a European Power Target Model. And, a further 10 years to fully implement it. Meanwhile, the reference generation set of that model has shifted from CCGT burning gas to RES units transforming intermittent natural resources. Could the existing EU target model continue to work well for the short- term operation and long-term investment? If not, can the existing EU institutions easily produce an "RES resilient" new power target model?

Keywords

Market Design; Power Market; EU Internal Market; EU Target Model; Energy Union.

Highlights

The European Union has a “continent scale” power target model; while the USA and Canada have no such model.

But, it took decades (since the first “internal market” directive in 1996) to produce it, and it largely relies on the former concept of EU- wide “cross-border CCGT competition”.

The corresponding market pricing is zonal and mainly Day-Ahead; the power system operation is also zonal, both intra-day or “real-time”. Will this Target Model resist the integration of massive renewables?

Would the EU easily produce a new Target Model to integrate massive renewables? Or, would it prefer to keep the existing one and upgrade it with a few “add-ons”?

I do not yet foresee if the EU will succeed in undertaking all of the challenging but necessary “target model” upgrades to enter soon a 2030 forward- looking strategy.

Introduction[*]

There is no doubt that the European Union has a power target model (Glachant & Ruester 2014). This, in itself, is remarkable as it is not easy to establish in large "continent scale" societies and power systems (as evident with the USA and Canada). However, it is not a complete surprise, because what the EU calls the "achievement of an internal market" has been a key European policy goal since… 1986. It is nevertheless significant that it took so long to reach this point, and it is questionable whether the 30 year journey has culminated in a fundamentally robust (Oggioni & Smeers 2013) 'catch-all power system changes' target model.

I will examine the issue in this paper and argue: 1° that the current EU power target model calls for many changes largely unforeseen when it first started to take shape in 2004-2009; and 2° that we cannot yet know if the EU will succeed in undertaking all of the necessary and challenging 'Target Model' upgrades. My paper will take stock of the EU power target model as it is: on its own sliding scale. I will do it in three stages.

In the first part, I will recall how the EU opened its many national power markets without a 'Target Model' of any kind (and then without a common 'Market Design') and remained as such for 13 years (1996-2009). A 'Target Model' finally emerged, but it had never been defined in any European single regulation or Green Paper. It has been produced by qualified European actors through an institutional process originated in the 3d European Energy Package. This 'Target Model' has at least three key characteristics. 1° It brings a large "merit order" at a European scale from a reference pricing mechanism, that of energy traded in Power Exchanges on Day-Ahead. 2° It simplifies TSO cross-border trading by "zoning" the grids, as if each EU TSO grid was some type of "national copper plate"; and, by "coupling" the allocation of grid access between these "zoned area copper plate" grids with the merit order built into the PXs in Day-Ahead trading. This is done only after having chosen a guaranteed inter-zonal capacity calculated ex ante (on the same Day-Ahead horizon) by the grid transmission operators (the TSOs). 3° This 'Target Model' has its own "last mile" hard task of opening a similar "zones cross-border" process for the shortest time frames (Intraday & Balancing), so as to "Europeanise" the last step toward power reserve and energy balancing procurement between the TSO grid zones.

Secondly, I will question the existing 'Target Model' and ask, "what if…" several key characteristics of this model should have to change because the EU power system is itself in transition, notably under massive renewables integration. In different system conditions, would the same target model allow for further European integration with enough economic efficiency and network reliability (Neuhoff & al, 2015)? Finally, I will consider if the 'Energy Union' policy currently being heavily debated at EU level is committing to a much-needed upgrade of the EU power target model, or only aiming to improve it.

[I] The long march toward an EU 'Power Target Model' (1996-2014)

To assess the current terms of the EU power target model and its ability to change and adapt, it is useful to consider the founding motivations of the European "single market" toward the end of the last century (Glachant & Lévêque, 2009). In 1986, the European leaders pushed forward the European dream of a "Single Act" whereby all industry and commercial trade within and between the Member States would have to become fully "European", as if only a single market existed at European level. It was a Single Act for a Single Market. This journey had a target for implementation: 1992. It took all

[*] I do thank Andres Delgadillo and Anne-Marie Kehoe (both research assistants at Florence School of Regulation) for the help provided in searching documents or proofing the drafts.

of six years to simply open a new way of "power wheeling" at EU level ([]France was more or less allowed to send power to Portugal by injecting it into Spain); and an organised collection of MS power prices to clearly define, for Europeans, who was paying what, when consuming electricity. Finally, in 1996, 10 years after the Single Act, and 6 years after the opening of the "Electricity Pool of England and Wales" in the UK (where both Scotland and France were welcomed as "external parties"), the EU got its very first Power Directive (usually called "the 1st Energy Package").

This package gave a right to big consumers (such as the "electro- intensives" and the railways etc.) to shop around; and a duty to existing suppliers to include any new supply contract contracted with a Third Party in their portfolio of supply, if they wished to be referred to as a 'Single Buyer' in their MS. Accordingly, the transmission grids had to implement the corresponding flows (injections and withdrawals) and became 'Transmission System Operators' with a duty to treat all suppliers more or less the same in a "Third Party Access" scheme. With no regulatory office being set up at MS level and no obligation of "regulated TPA", it was accepted that the grids could offer only 'negotiated TPA". Germany, for example, made it very simple by creating a "de facto" cartel of grids, suppliers, traders and big industrial consumers which defined and enforced the rules of "national negotiated TPA" (under the benevolent ex post monitoring of the national Competition Authority: the BundesKartellAMT). The EU market began in this way. As Leigh Hancher rightly commented; each MS had its own single market; and trading from one European single market to another one was quite a journey. No EU market design was provided or even discussed. It was simply the opposite to the process of opening the market in the UK or California, where market rules were issued just before the opening (whether these rules were right or wrong is another issue).

It took six more years to develop the Commission, with MS and the Parliament convinced that a 2nd Package (which came about in 2002) was necessary for a truly single market. To sweeten the prospect, it was promoted as giving "shopping rights" (called "eligibility") to all consumers (Sencar & al, 2014). Regulatory bodies in each MS were made mandatory, as "regulated TPA" itself was also made mandatory. The rights and duties of the TSOs were accordingly enhanced and upgraded and, step by step, the key elements of a European common market design were identified and named. A whole set of questions and principles were being discussed to make cross-border trade between MS appear as "seamless" as possible, as in a truly single "single market". Up until 2006, the Commission was thinking (or was, at least, saying that it was thinking) that this new set of market arrangements would come from a dialogue among stakeholders (the Florence Forum process etc.) in addition to initiatives taken at regional level by MS or industry players (such as TSOs, or PXs). However, parallel to this open horizontal process, the Commission opened a rough "sector competition enquiry" led by DG Comp, which aimed at showing where the national barriers to EU-wide trade would need to be overcome. This enquiry also found a few "smoking guns", which forced several utilities (such as the German ones) to face the Commission on what they fiercely refused to even discuss at the MS political level. Just after this, in 2007, under the German Presidency of Europe, the EU MS adopted the so-called "20-20-20" policy, which opened a very "rosy" period for the improvement of the European power market, as it created the first and the largest ever common energy policy at EU level. However, no new market design was incorporated in the resulting 3d Energy Package (adopted in 2009), but an institutional framework was set up, which would later become instrumental in determining the European design. With the unbundling of the TSOs, the creation of a European body of TSOs with rights and duties named the "ENTSO-E" (no longer a purely private association, as was its predecessor ETSOE), and the establishment of a European agency for the cooperation of national energy regulators (ACER); the way forward with design was open institutionally. As a result, a European market design grew out of the drafting of the very first EU grid codes co-developed by the ENTSO-E, ACER and the Commission with a final backing by MS in the very special "EU detailed regulation" formal approval, named the "Comitology Process".

Three characteristics of this consensus design are key. Firstly, the emerging EU target model assumes that the crucial step in achieving a power market equilibrium is to get a merit order and an

energy price equilibrium on Day -1 (one day ahead) from bids made in organised power exchanges. This process mimics what was made at times of vertical integration when each utility had to arrange the merit order of its power units for the next day's generation (according to load estimates from a dispatch center). This particular process ensured that beneficial efficiency properties were retained in an open market because the technologies used to generate power were similar to the previous ones (river hydro or nuclear providing a base; coal a base or mid-merit; and gas, the "baby", depending on relative fuel prices, providing a full range of base, mid-merit and most of the marginal offer). If the amount of different technologies in the generation set is adequate for the real annual load curve, and the price formation is not capped, each technology can cover its costs and make a profit. With European market arrangements, chosen by consensus among the many stakeholders, being welcome in the EU open regulatory process (such as the Florence Forum, to make it simple), no "centralised PX" has emerged as an anchor of the target model (as E.P E&W was in Great Britain, or PJM is in the US). A very basic rule in the EU is the "self-dispatch" of the generating units: all producers look at the Day- Ahead pricing process and the resulting merit order, and decide voluntarily whether or not to generate and with which unit. A similar basic rule is the freedom of establishment for the Power Exchanges, with competing PXs (as formerly in Germany) or parallel PXs (like in the Netherlands, Belgium and France). However, MS can also individually opt for "regulated public" exchanges (as in Spain and Italy). The second key characteristic has been to simplify the interactions between the "grid control zones" for the power traders. Instead of having to deal separately with the "grid capacity" in one auction and with "energy trade" in another deal (as in an "explicit auctioning" scheme), energy traders are given the right to "implicitly" bid for grid capacity through their energy offers in the Power Exchanges. The actual architecture of the grids and the actual graph of power flows within the grids disappear from market bargaining and trading in exchanges as long as no "structural" congestion appears. Coupled with the self-dispatch freedom for generators as seen above, the "coupling" of market places, bypassing or forgetting the grids, is a fundamental feature of our EU target model (Neuhoff et al, 2013). The third key characteristic is largely the child of the first two. As the emphasis of the market process is placed on day- ahead energy trading without an explicit representation of the power system (its actual grids and actual flows), a significant reconciliation has to follow at the end of the day: in real time, at the balancing stage. As this reconciliation has to be made by the TSOs, the resources which they call upon at this late stage become key in the actual economics of the whole EU system. But for each emerging TSO, whether national or sub-national (see Germany or Great Britain), the TSOs' loops, which limit the EU target model process end up, themselves, becoming national or sub-national. To Europeanise these remaining market loops as a single EU market would do, one needs to open all existing "balancing resources" to all TSOs; at least to all neighbouring TSOs, by creating a cross-border pooling of "balancing resources" (Vandezande et al, 2010). Of course, this also assumes that actions being taken intra-day by the various players have also been properly cross-border coupled. This final step toward an EU target model proved difficult and painful to implement because the EU has no regulatory power to develop a regulation of intraday trade for existing power exchanges or a regulation of sharing the balancing resources. The existing institutions created by the 3d Package (notably the ENTSO-E and ACER) can discuss and draft codes and recommendations, but cannot enact them. To have a reasonable chance of achieving the necessary "green light" from the final "Member States Comitology process", a certain consensus has to be reached beforehand. Hence, many veto powers empower this or that group of stakeholders. All observers noticed that the EU "market coupling" takes all of the existing PXs as they are and leaves each to its own incumbent business of "national order books". Similarly, each existing TSO retains the business of calculating its own "cross-border capacity" and of choosing the practical action plan to implement it. The European zones are indeed coupled in our EU target model, but they are coupled as they are (as national ones) and not as they should be if a European coordination centre or several regional coordination centres had to rationally and efficiently design all zones, markets and grids to be combined in the operation of the EU "single market" (see the recent Florence School of Regulation report: J-M Glachant, V. Rious & J. Vasconcelos "*A conceptual framework for the evolution of the operation and regulation of electricity*

transmission systems towards a decarbonised and increasingly integrated electricity system in the EU", EUI, Florence, 2015).

[II] The EU "RES push" questioning the target model

The EU finally got its own power target model, which has been empirically produced over two decades in a web of trials and errors fed by many stakeholders and reviewed step by step by the European Commission, TSOs and National Regulatory Authorities. Meanwhile, since 2008, a big RES push has been opened by the 20-20-20 EU policy and accelerated by many national decisions and the declining manufacturing costs of RES generating assets.

II-1 Two typical RES questions to the target model: (1) what does "fully integrating the RES into the power market" mean; (2) will market-driven investments then deliver generation adequacy?

Any RES push is inevitably questioning the EU target model, since this design has roughly been conceived as a platform for CCGT plants competing cross-border. Two main questions emerged with the RES push (Henriot and Glachant, 2013; Hirth and Ueckerdt, 2013). 1° Why not submit this RES wave to the same market discipline of other generation technologies? 2° Will generation investment restart smoothly, as soon as RES is integrated as a mundane energy product into the wholesale power market (Fagiani et al, 2014)?

To answer the first question, it was initially argued that integrating the RES in the power market as it is, and as it works, was a prerequisite in a market economy and from the EU internal market point of view. The EU already has its internal market framework; then RES generation could get some extra payment for its low carbon content, but has to remain as a mundane power commodity in the actual power system. This first approach, a "melting pot", so to speak, has been followed by quite the opposite approach: the "salad bowl" approach. In the "salad bowl" approach, the way the EU power market has already been conceived is not assumed as coming from a single superior intrinsic way of building a "real" power market in any place. It is acknowledged that all existing power markets already widely differ (PJM, Texas, California, Australia, or Nord Pool, to name a few). It is because these many market designs differently arbiter inherent power market trade-offs (in short, power is not a mundane commodity to easily exchange); and because they have different generation technology sets, grid architectures, system particularities and institutional frameworks. A given market design provides to a certain set of generators, in a certain grid and system architecture, and in a certain institutional framework, a toolbox of coordination mechanisms, incentive schemes, information and settlement devices which do the best possible for them here but not for the others there. It is acknowledged that most of RES (at least PV and wind) widely differ from other classical thermal technologies (gas, coal, nuclear) for their system characteristics. Getting the best of the "market discipline" that is placed on RES investment and operation has to go with specific rules conveying the RES to deliver their best for a given power system within the actual limitations of this given system. Hence, the "salad bowl" theory won the academic debate; but not yet the policy making in the real battle field, with several "thermal-like" market designs remaining, in many cases, the same.

The second debate is: will market-based investment resume after a full RES market integration? It is not yet concluded everywhere, but the battle field has already substantially shifted. Many "classic" power economists, having lived in the details for the 25 years since the opening of the "Electricity Pool of England & Wales" (for example, Newbery or Green), argue that investment will not spontaneously reach the level necessary for system adequacy because of the very unreliable price of carbon, a growing uncertainty on the level of consumption for the coming decades, and the already fierce pressure of low RES marginal costs on the average wholesale energy prices. In such circumstances, a kind of "long term" price contract has to be found if power systems are willing to guarantee their future generation adequacy. Several formulas are conceivable. The most popular being

a call to investors for a capacity level set by the TSO (a formula named as a "capacity mechanism"). To limit the impact of the changes to the EU target model, it was astutely suggested that "capacity mechanisms" were just some add-ons, acting as a kind of auxiliary engine helping the generation set to reach a decent level at which… the EU target model could continue to work well, smoothly and efficiently (see the Eurelectric Manifesto 2013).

II-2 The whole EU target model is affected by "real" RES integration and "guaranteeing ex ante" generation adequacy to the power system

I would rather think in the opposite way: a full integration of massive RES into the power market and a guarantee, to be given ex ante, to reach system generation adequacy can only shake up every bone of the existing EU target model (Cepeda & Finon, 2011 and 2013; Henriot & Glachant 2014; Newbery 2012; Newbery & Grubb 2015).

The first bone of the existing EU target model is that the Day-Ahead energy market price is a good enough proxy of the reality of the power system to rank all generating units by economic merit order with a good short term effect (the least system cost of generation) and a good long term effect (the economic signal given to generators to choose the technology and the capacity to invest in it). Alas, both short- term and long- term effects are affected by massive RES. If the technology and capacity choices of generators are to be detached from the internal logic of the Day- Ahead wholesale energy market and encapsulated into new "Capacity arrangements", the system will end up with a set of generators chosen from these "Capacity arrangements"; and the future portfolio of feasible Day-Ahead merit orders will be pre-determined by these very long- term choices and not by an endogenous market equilibrium. The weight of the Day- Ahead energy market pricing in the dynamics of the power system is therefore inevitably dwarfed. Furthermore, the ability of the Day- Ahead horizon to produce "good enough" economic proxies of the actual state of the power system will seriously decline. The likely generated power volumes of PV and wind are better predicted at shorter horizon spans than the Day- Ahead, and the same is true for their likely actual economic value for the system. The Day- Ahead energy pricing is then seriously weakened as a good proxy of the power system needs and capabilities.

The second bone of the existing EU target model, "easing cross-border access", has also seen the RES shift away from Day- Ahead pricing. This is because the EU target model eases cross-zone power trade by simplifying both the grid architecture and the flows constraints at the Day- Ahead stage. If better proxies of the changing power system reality could only be found and signalled at a later stage that Day- Ahead, the accuracy and the efficiency of the brilliant "Day- Ahead market coupling" copper-plate would be deeply questioned.

The three bones of the existing EU target model are in fact a long and comprehensive market and system loop: *first* Day- Ahead energy pricing; *second* Market Coupling; then, and *third*, closing the gaps with reserves and balancing energy. It is then inevitable that the third bone and final stage of the existing target model ("Closing the gaps") is also to be questioned along with the two others (Doorman & van der Reen, 2013). The EU TSOs have the knowledge and the tools to operate a dispatchable hydro and thermal generating system across their respective zones from decisions made at national level by these TSOs. However, this is difficult to manage if the positions taken by generators at each stage (Day- Ahead, Intraday, Real Time) are not closely linked to the value for the "power system as a whole" of each generator's actions at each stage (Brijs & al, 2015). In any three stage equilibrium, the generators gently "challenge" or "game" the system by building "financial proprietary algorithms", which privately value each of their individual deviations vis-à-vis the power system. In a system with much more intermittent generation, generators discover later, or more slowly, where they will actually be positioned vis-à-vis the system at the end of the three stages. Hence, the TSOs fear that they will be "arbitraged" or gamed too much by the generators (or by the suppliers; or by the parties responsible for balancing). Furthermore, the TSOs no longer believe that it will be

sufficient for them to "pool" their reserves and balancing tools across grid zones as in the existing EU target model. And, they would like to have much more sophisticated mechanisms to make generators (suppliers, BRPs) engage with the "system value" of their actions and imbalances; and therefore, be much more proactive in the coverage of their system needs at the final stage. Hence, if RES integration is to be massive, the "very late last stage procurement of balancing within existing grid zones" is no longer seen as the alpha and omega of the closing loop of the successive stages of the wholesale power market equilibrium (Lise & al, 2013; Chao, 2012; He & al, 2013; Dupont & al, 2014; Feueriegel & Neuman, 2014; Ruester& al, 2014).

We then end up with all the essential bones of the existing EU target model being questioned: *first*, the day- ahead pricing; *second*, the market coupling; *third*, in the end, the final balancing centred on each TSO's self- procurement.

[III] And so what? King Target's dead: long live the next King Target?

It is easy to conclude that the existing EU target model has to restructure in order to offer a workable market integration of massive RES and a credible ex ante guarantee of future generation adequacy. However, this does not help in understanding why the European institutions have not yet settled the case for the next EU target model (see the Commission consultation draft of July 2015). Well, the logic of the European institutions behaviour is… institutional. What we used to call the "European Union" (which is, most of the time, the European Commission; while the European Council and Parliament are two voting co-legislators) has no direct regulatory powers. In the EU, the process of the production of law (being named either "EU directives" or "EU regulations") is quite clear and simple; however, the production of detailed regulatory rules is not. In practice, producing "detailed regulatory rules" at the European level requires the enormous consent of numerous kinds of players, for the chance of having these "detailed regulation proposals" validated by the Member States. In the EU, the Member States literally vote on any "detailed regulation" framing, namely the "Comitology Process". The European Union is not a typical federal state where the federal level lives its life and the federated states their own. In the EU, we have an intertwined framework where the federated states share the Presidency of the Council of the European Union (every semester), co-vote on the laws (in a Chamber called the "Council of the European Union"), and validate with a "qualified majority" in administrative committees ("Comitology Process") the EU detailed regulation aimed at implementing the laws (these laws being called either EU "directives" or EU "regulations").

We have seen above that producing the existing EU power target model of today has been quite a journey. Furthermore, the production of the EU detailed regulatory framework to implement this first target model is not yet finished. To stop this ongoing process in an effort to open a new comprehensive process to define another "new target model" seems hazardous and perilous to many and frightens them all: the Commission, the EU agency ACER and quasi all the key stakeholders (national regulatory authorities, TSOs, utilities, etc.). This is why the commonly agreed moto in this new "Juncker Comission" era (since winter 2014) is "implementing our existing brave target model as it is"… with, why not, a few enhancements… (see the Commission consultation draft of July 2015).

III-1 The European Commission has guns…

The European Commission is not deprived of the necessary weaponry to respond to new trends in the electricity industry and the power system. It has the unilateral right and duty to ensure that the EU treaties are respected. It also has the monopoly of initiating and drafting new laws. Furthermore, it has executive rights in regards to the internal market (the freedom of goods and capital) and competition policy (as it relates to market abuse and state aids), as well as being responsible for the implementation of the internal market directives and regulations. However, this weaponry only extends to already existing frameworks and does not facilitate the drafting of new ones - particularly new normative

frameworks, as would typically be the case for new detailed market arrangements and regulatory rules. The Commission can, of course, threaten players and Member States who infringe upon a key rule(s). It can also enact unilateral guidelines, as it does from time to time in the Competition area; or open "enquiries", which are essentially legal hunting for crude mistakes punishable by DG Comp (or dealt with in negotiation with the Commission, hence opening a grey bargain for ad hoc new rule- making). All of these powers, and associated tricks, are actually used by the Commission (see, for example, the energy sector enquiry 2005-2007 which opened the way to the 3d Package in 2009; the winter 2013 guidelines to frame the "entry of RES support schemes and Capacity mechanisms into EU market competition rules"; or the fresh new sector enquiry opened in spring 2015 to hunt the field of "Member States Capacity Schemes"). While all of this exists, it does not transform these strong but reactive tools into pro-active tools. It does not provide a way to easily enact a new EU power target model which could be implemented across the EU.

III-2 The European Commission's 'guns' are not typewriters: The Energy Union manifesto

I know that identifying how EU institutions actually work in the process of producing norms is not in the interest of all energy economists. It is, however, quite a useful exercise when studying applied energy policy- making. A key analytical proposal of contemporary "New Institutional Economics", as with Oliver Williamson (Nobel Laureate 2009) or Paul Joskow (who has spent the past 30 years at MIT considering the building of "Markets for Power") is "remediability". In policy- making, economists should not ignore the actual conditions of implementation of the policies when they design "optimal policy programmes". It is quite the opposite: the key task in policy- making is to identify the feasible policy options, and accordingly consider what could be achieved with these constraints.

Although difficult, it is essential to identify the feasibility of implementing a new policy. This applies to the core "energy policy manifesto" issued by the European Commission at the end of February 2015 and welcomed by the European Council of MS one month later. In a surprising move, differing from the approach of the former two Commissions under Barroso, the new Juncker Commission revealed in its first semester of operation a comprehensive energy policy programme covering its full mandate period of 2014- 2019. And this entire five year programme is enshrined in a new high level policy concept: an "Energy Union". In this, we inevitably have the European master programme in which the power target model will evolve until 2020. And actually, the Commission manifesto is rich in proposals for the internal market and its governance. It proposes to issue new draft legislation in 2016 for both the retail and wholesale markets; integrating RES; phasing-out non market- based support to RES; and coordinating MS actions for capacity mechanisms. Furthermore, another draft legislation is proposed for 2018 to provide an EU framework for the security of electricity supply which, inevitably, should touch upon existing MS schemes for the security of supply, including their capacity mechanisms. The existence of a comprehensive programme of such legislative targets suggests that an agenda for new detailed regulation may open in the aftermath if, and only if, these legislations were to be adopted. However, nobody yet knows, indeed nobody can know, the real content or the likely acceptance of such legislation. The Commission's consultation draft on a new power market design, issued mid-July of 2015, draws complementary perspectives. But, as the new "Energy Union" is only a policy concept and not any new formal institution, all new legislative acts will still have to go through the usual hazardous journey of any EU law. And, there are seven existing directives and regulations being targeted for revision from July's consultation draft. Furthermore, the support given by the Council to the Commission's manifesto is conditional upon the strict respect of existing institutions in the process of creating the "Energy Union". This means that the Council does not commit itself to call upon MS to support the legislative revision initiatives which will come from the Commission. No one can then predict the direction of EU legislation, and subsequent EU detailed regulation (as new or revised ACER guidelines and ENTSO-E codes), or how it might be directed toward reaching the 2030 goals.

Parallel to this legislative intent, the Commission manifesto and the consultation draft also suggest modifying the existing governance of the power sector by reviewing the framework created by the 3d Package. It notably calls for: a) increasing the power of ACER to further 'Europeanise' existing MS regulations and the corresponding actions of National Regulatory Authorities; b) creating subsidiaries to ENTSO-E as regional operational entities with their own rights and duties in the operation of the power system. One will immediately remember that the current EU target model had not been drafted in the text of the 3d Package but embedded in the creation of two new European bodies: ACER and ENTSO-E. At this point, one should see that the new Commission's manifesto and consultation draft clearly flag the Commission's intent to move towards a "de facto new" target model through the re-design of these two key EU bodies.

As we could have expected, knowing how the EU produces its detailed power regulation, we cannot expect to find a straight blueprint of the expected new power target model. It will come from the institutional shadow after the consultation opened in July. The only certainty that we (the reader and I) have is that the Commission and the key EU stakeholders have already opened the discussion of a "Target Model +" (See, for example, the ACER and CEER joint declaration in September 2015). This "Target Model +" is to be made of the existing model flanked with a new "short- term add-on" (being a reflexive framework for system flexibility) and a new "long- term add-on" (being a friendly internal market framework for the capacity adequacy guarantee and RES investment).

[IV] Conclusions and Policy Implications

Thirty years ago, European policy opened a new frontier: a single act for a single market. Ten years later, the first energy package started implementing it for the power sector. But, at that stage, even the EU did not foresee that a particular "market design" (a set of market and grid operation rules) was necessary to make any power market work at EU level. It took a further thirteen years to give institutional roots to a "Power Target Model", while no such model was ever clearly described by the Commission or discussed by an EU legislator. Finally, the EU power target model has been produced in the aftermath of the 3d Package by the convergence between key stakeholders (such as the Florence Forum), the Commission and two new bodies born from the 3d Package: ACER and the ENTSO-E.

This EU power target model has three key characteristics. Firstly, the core is the wholesale price-making in Day- Ahead PX trade. Second, the auxiliary is simplifying grids and flows for this Day-Ahead trade and giving automatic "cross-border grid access" via "Market Coupling" mastered by the TSOs' unilateral decisions. Last, and third, the loop between the market deals and the real grids, plus the actual flows, is also mastered by the TSOs in each of their zones in a monopsony "real-time procurement" process.

The formidable changes brought into the power system by strongly expanding RES in a framework of open access for every national wholesale market already questioned the efficiency and the effectiveness of the existing target model (Glachant, 2015). The Commission, ACER, the ENTSO-E and many stakeholders (think utilities grouped in Eurelectric; traders in EFET; industrial consumers in EFIEC; etc.) are already looking beyond the current target model. They are discussing how to reach a "Target Model +" or a "Target Model 1.1" complemented with two add-ons. The first addition would be a "short term add-on" to give a reflexive framework for system flexibility at the intra-day and real time stage; and a second being a "long- term add-on" to build a friendly internal market framework for a capacity adequacy guarantee and RES investment.

However, any cold reasoning shows that the questioning of the current EU target model cannot stop with these two add-ons. The reasoning stated above, in the second part, suggests that the EU "RES Push" will inevitably, sooner or later, shake up any enhanced version of the EU power target model. First, the existing zonal approach to wholesale pricing and system operation will inevitably weaken. The existing zones that we have today are not efficient from a market point of view and are not effective from a system point of view. They will then be more and more disputed: either to rationally

redesign (such as internal zoning in Norway and Sweden); or to take a "big bang" approach, like nodal pricing. Second, existing annual energy fixed price contracts, which are offered to households and SMEs, will be increasingly disputed because they disconnect these consumers from the system value of flexible demand. The retail market needed for a highly flexible system (with high penetration of wind and PV; and millions of prosumers) can work well only with dynamic retail pricing. Third, existing power system operators and regulators are national or sub-national entities. Both will inevitably have to increasingly regionalise and 'Europeanise' their data, principles, analyses, and decision-making. Fourth, and quite disruptively, the transmission grid and the whole TSO industry will lose a substantial part of its weight in the system operation and the implementation of the decisions of system players. With the high penetration of RES and millions of prosumers already acting as primary links between generation and load, the building of more flexible power systems will inevitably further develop while more "short local loops" of flexibility would make local grids, local flows, and local systems work better and safer. Distribution system operators (DSOs) will enter deeper into local actions interacting with the "global system operation" performed on transmission networks by the TSOs. The EU has a target model for the EU internal market and for the transmission system operation. It has none for EU "RES pocket markets" and for the distribution system operation. And legally, those are mainly "national subsidiarity affairs". It is not a challenge: it is shift; a gap; or even a risk. It is a big leap forward. It calls for a totally new type of EU power target model: a real "2.0". It may even be as big as a direct jump to a "3.3": who really knows?

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