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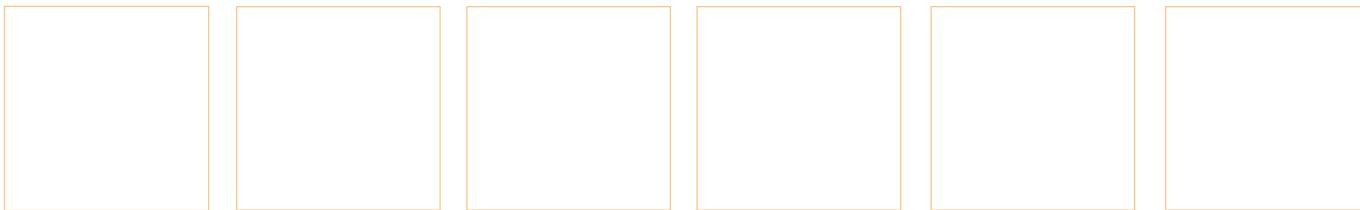
“The Long March towards an EU Power Target Model (1.0)... and the Journey towards a 2030 Target Model (2.0)”

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Highlights

- The European Union took more than 20 years to define a common market design for its internal electricity market: a European Power Target Model. And, a further 10 years to fully implement it. In the meantime, the reference generation set of that model has shifted from the Combined Cycle Gas Turbine (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 readily produce a “RES resilient” new power target model?
- While the European Union has succeeded in developing a “continent scale” power target model, which neither the USA nor Canada achieved, it has been a lengthy process. It has taken decades (since the first “internal market” directive in 1996) to produce this model which largely relies on the former concept of EU-wide “cross-border CCGT competition” (Glachant & Lévéque, 2009).
- 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? Could the EU easily develop 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”?
- It is difficult to foresee if the EU could succeed in undertaking all of the challenging but necessary “target model” upgrades to enter a 2030 forward-looking strategy.

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1. The long march toward an EU ‘Power Target Model’ (1996 - 2014)

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”).

As Leigh Hancher (1997) 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 a further six 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 (Glachant & Lévéque 2009). 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 3rd Energy Package (adopted in 2009), but an institutional framework was set up, which would later become instrumental in determining the European design.

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. 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. 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 central to 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.

2. The EU “RES push” questioning the target model

The EU finally got its own power target model. 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 (Glachant & Ruester, 2014; Vandezande et al, 2010).

2.1 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 this RES push (Henriot and Glachant, 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. But this view did not prevail for long. It is because all possible market designs differently arbitrate inherent power market trade-offs (in short, power is not a mundane commodity to easily exchange); as different designs may have to deal with 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 operate well in one context but not necessarily in another.



The second debate is: will market-based investment resume after a full RES market integration? 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 2012), 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.

2.1 The whole EU target model is affected by “real” RES integration and “guaranteeing ex ante” generation adequacy to the power system

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 (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. 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. If better proxies of the changing power system reality could only be found and signalled at a later stage than Day-Ahead, the accuracy and the efficiency of the brilliant “Day-Ahead market coupling” copper-plate would be deeply questioned.

In fact, the three bones of the existing EU target model are a long and comprehensive market and system single 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.

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 are not sure that they will easily “pool” their reserves and balancing tools across grid zones to go beyond 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.

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.

3. And so what? King Target’s dead: long live the next King Target?

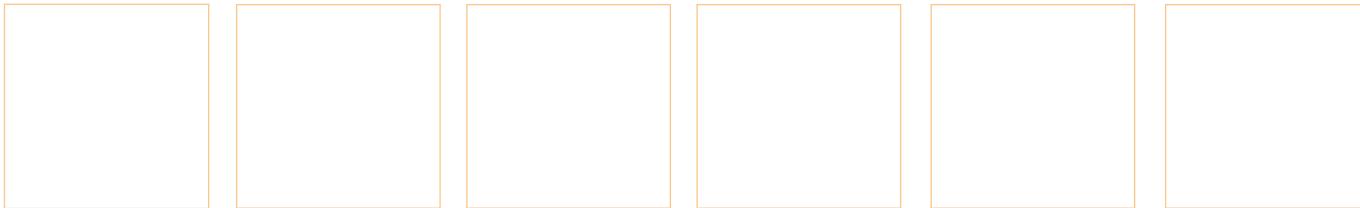
It is easy to conclude that the existing EU target model has to restructure in order to offer a workable market integration of massive RES and a credible ex ante guarantee of future generation adequacy. However, this does not help in understanding why the European institutions have not yet settled the 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.

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”).

3.1 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.

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”. 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 3rd 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.

3.2 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.

Although difficult, it is essential to identify the feasibility of implementing a new policy (Glachant, 2015). This applies to the core “energy policy manifesto” issued by the European Commission at the end of February 2015 (Energy Union Package) 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.

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. 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 3rd 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 3rd 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.

4. Conclusions and Policy Implications

The existing 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; Neuhoff et al 2015; Neuhoff et al 2013). 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 (ACER & CEER 1015). 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.

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 (He et al, 2013). Distribution system operators (DSOs) will enter more deeply into local actions interacting with the “global system operation” performed on transmission networks by the TSOs (Ruester et al 2014). 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 (Glachant, Rious & Vasconcelos, 2015). 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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