EXECUTIVE SUMMARY

Toward the Target Model 2.0
Policy Recommendations for a Sustainable EU Power Market Design
Preface

This report concludes the multi-client study *Toward the Target Model 2.0* which started in October 2014 and concluded with a public launch event on 29 June 2015.

The study provides a comprehensive assessment of the issues with current European electricity markets. The study investigates the lessons from market reforms in North America and in Latin America in the past decade to identify “out of the box” thinking to fill the gaps in the current European Target model. This report presents some of the research findings and concludes with a set of alternative potential directions for reform of European power markets models in the long term, as well as a number of concrete policy recommendations in the short term (“low regret actions”). A series of public and private workshops for study sponsors were held during the course of the study to discuss the research conducted by the FTI-CL Energy team. FTI-CL Energy is a cross-practice team of energy experts from FTI Consulting and its subsidiary, Compass Lexecon.

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The views and analysis presented in this report are those of the FTI-CL Energy authors and not the views of the sponsor companies or FTI Consulting, Inc. or its management, its subsidiaries, its affiliates, or its other professionals.

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THE CHANGING POLICY CONTEXT OF EUROPEAN POWER MARKET INTEGRATION

One of the 10 key priorities of the new European Commission President Jean-Claude Juncker consists of “reform(ing) and reorganis(ing) Europe’s energy policy into a new European Energy Union”. The Energy Union work programme released on 25 February 2015 suggests that a new electricity market design is needed in order to tackle Europe’s chosen policy objectives of decarbonisation whilst maintaining security of supply.

The current regulatory and market framework does not provide a sound basis for the investments needed to maintain security of supply and decarbonise the power sector at an affordable cost. As policy priorities in favour of decarbonisation and maintaining security of supply have taken centre stage on the policy agenda in the past decade, the design of liberalised electricity markets has failed to evolve and be reconciled with these new priorities. In addition, the issues of competitiveness and affordability of electricity in Europe remain central in the discussions about the market framework.

The objective of this study is to assess the deficiencies and gaps in the current European Target Model and the wider regulatory framework for power generation and to propose a number of policy recommendations for improvement. Recognising the need for “fresh thinking” on the issue, this study looks outside Europe to learn the lessons from experiences with a range of alternative market designs that exist around the globe.

ALIGNING MARKET DESIGN WITH INVESTMENT NEEDS AND A NEW COST STRUCTURE

The International Energy Agency (IEA) projected a need for about €2 trillion of total power sector investment over 2014-2035 in Europe, 70% of which for power generation. However, this is in stark contrast with recent trends which have seen investment stall for new thermal plants and decrease significantly for clean technologies in the past decade.

The profitability of the European power generation sector has fallen dramatically in recent years. For the non-regulated merchant activity in Europe, utilities are actually destroying value as return on capital employed has trended below the cost of capital. Whilst this is in part due to the drop in demand associated with the economic crisis, policies to support renewables have also significantly contributed to building the oversupply that affects power market dynamics. This results in distrust among investors which raises hurdle rates for financing the required investments, increasing costs for customers and threatening security of supply.

To understand how financial security for investments in the power sector could be improved, it is useful to compare the utility industry with other sectors. The utility industry is capital intensive, but this does not need to be a barrier to investment if a supportive investment framework is put in place to reduce risks for investors, and/or if the returns on investment are high enough to attract investors. De-risking investment in power generation through an efficient allocation of risks is the key enabler of the implementation of a sound regulatory framework to attract investment.

Moreover, the market and regulatory framework needs to be reconciled with the evolving cost structure of the assets. The European electricity industry is moving from an “OPEX world” into a “CAPEX world” as most clean technologies are capital intensive. This implies that fixed cost recovery will become the key issue for investment in the years to come, and suggests that a transition to a market design that complements marginal pricing with some other mechanism supporting fixed cost recovery will be needed.
DIAGNOSTIC OF THE ISSUES WITH THE CURRENT MARKET FRAMEWORK

Discussions about the definition of a Target Model to harmonise and integrate the design of the European electricity markets started in the early 2000s. As of today, much progress has been made in implementing some elements of the Target Model, such as the day-ahead market coupling across many European countries. However, other elements of the Target Model, such as integration of intraday energy and balancing markets and flow-based transmission capacity calculation, have seen more limited progress.

Most importantly, the focus of the Target Model on improving the functioning of short term European power markets is largely at odds with the new policy priorities in favour of decarbonisation and security of supply, which will require a long term coordinated framework to drive the significant investments required. The Target Model leaves a number of “white space areas” necessary to provide a value for different short term and long term electricity products and services, as well as to provide locational value of electricity.

We identify four main issues in the current market and regulatory framework that should guide the priorities for reform:

- **First and foremost, current electricity markets in Europe are overlaid by a range of environmental legislations and regulations which create an inefficient interface.** Examples include policies supporting the production of renewables electricity sources (RES), which lack coordination and can introduce distortions into power markets. The European Emissions Trading Scheme (ETS) needs reforming, as the current price signal is ineffective at driving clean technologies investment. In short, there is a need to better coordinate these environmental policies and power market design across Europe.

- **Second, the development of intermittent renewables reinforces the need to reward better operational flexibility, both for flexible power plants and demand side response.** The value of operating flexibility is typically captured through within-day price variations, intraday markets and ancillary services. However such short term price signals do not currently convey the proper value of scarcity and operating flexibility.

- **Third, concerns are growing that current electricity market arrangements do not provide adequate investment incentives to maintain security of supply in the medium to long term.** A number of recent national reforms putting in place capacity remuneration mechanisms suggest that security of electricity supply is considered by most governments to be so critical that it should be guaranteed through a specific mechanism. The patchwork of approaches across Europe creates a risk of distortions and the need for a common framework to deal with security of supply.

- **Finally, there is a lack of coordination in sending appropriate locational signals to electricity market operators and investors in Europe.** European countries have different approaches to congestion management and network usage and connection charges, which will likely undermine a sound development of the network. The issue is likely to grow with increasing volumes of decentralised capacity connected to the European grid, which require stronger coordination between network and generation development.

Figure 1 provides a schematic description of these four types of issues. All these issues require Europe to consider additional substantial changes to market design beyond those envisaged as part of the current Target Model implementation, in order to support the investment needed to meet its objectives at the least cost.
LESONS FROM INTERNATIONAL CASE STUDIES OF ‘HYBRID POWER MARKETS’

In order to provide ideas and recommendations for addressing the issues identified in the diagnosis of the European electricity market design, we consider a number of international case studies, from Latin and North America, as well as the recent Electricity Market Reform (EMR) in the UK. These case studies show that 25 years after the start of liberalisation of the power industry, most power markets are ‘hybrids’ with some regulatory intervention and role for the state in either planning or capacity procurement.

Based on the case studies of Latin America, the US, and the UK, we identify the types of hybrid mechanisms which can enhance market functioning through risk sharing mechanisms, such as long-term contracts. We also consider case studies illustrating arrangements for coordination of investment for transmission, merchant generation and policy-driven clean technologies.

Latin America

The initial wave of electricity market reforms that started in several Latin American countries in the 1980s failed to stimulate timely investment. This triggered a second wave of electricity market reforms in early 2000s which introduced ‘hybrid markets’, with long-term contracts implemented to support and coordinate investment.

This hybrid market framework ensures competition in two steps: First, there is competition “for the market” through the auctioning of long-term contracts. Second, there is competition “in the market”, where existing generators compete in supplying energy into the spot market. These arrangements identify specific roles for the spot market and for long-term contracts:

- Short term system optimisation (dispatch) based on spot market prices; and
- Long term investment decision-making largely driven by auctioning of long-term contracts.

In practice, there are significant differences in the key implementation parameters across Latin American countries, such as the degree of centralisation of the arrangements, the responsibility for load forecasting, the type of product procured (energy or capacity, delivery date) and the auction procurement approach (frequency, type of auctions, etc.). For example, the Brazilian model features centralised procurement of long-term contracts while the Chilean model features a decentralised procurement model.
These ‘hybrid markets’ have attracted significant interest from investors in a range of technologies through the long-term contract auctions. One key benefit of long-term contracts is that they support an efficient allocation of risks and enable project financing with reasonable hurdle rates, thereby reducing financing costs. However, there are still concerns about the effectiveness of the auction mechanisms and there have been continuous improvements in the past decade.

US and Canada

The failure of the Federal Energy Regulatory Commission (FERC) ‘Standard Market Design’ initiative in 2002 to harmonize power markets in North America has led to a variety of market structures among US states and Canadian provinces. Aside from the areas with regulated utilities, the market structures currently represent a spectrum of arrangements for investment in power generation from heavy to light administrative intervention. We consider three case studies covering this range of market frameworks:

- **Administrative contracting by a single buyer in Ontario.** Under this system, the administrative body Ontario Power Authority acts as a single buyer with responsibility for long term forecasting and planning of the state’s future energy needs. Once it determines what type and amounts of capacity is needed, it runs tenders to contract Power Purchase Agreements (PPAs) with the various generating companies. Aside from the long term contract system for generation investments, the Ontario mechanism maintains an important role for the dispatch optimisation in the spot market.

- **Forward capacity market in Pennsylvania-New Jersey-Maryland (PJM).** This framework combines a resource adequacy requirement with an organised market for forward capacity products. The PJM capacity market arrangements, including an administrate demand curve and price controls for capacity, have evolved over the years but provided a valuation of capacity differentiated depending on the resource location.

- **Scarcity pricing in Texas.** Although Texas does not directly intervene to ensure resource adequacy, regulatory intervention targeted at scarcity pricing is intended to allow spot electricity prices to rise to the levels consistent with value of lost load (VOLL) in the period of energy scarcity, while ensuring that such high prices are not driven by generators exercising market power.

Overall, no market framework seems yet to have emerged as a best practice approach in North America to stimulate efficient investment although the East coast forward capacity markets with locational prices seem to provide better signals than in European power markets. In PJM for instance, with locational marginal pricing, congestion on the transmission network results in higher energy prices in the import-constrained areas. The locational investment signals are further strengthened by the zonal structure of the capacity market, which values capacity in the import-constrained areas higher than in the export-constrained ones.

UK Electricity Market Reform

In the past five years, the UK has implemented a wide ranging reform of its electricity market arrangements in order to attract the investment needed to achieve decarbonisation of the sector and to ensure security of supply. The UK Department for Energy and Climate Change (DECC) considered that stronger coordination and significant de-risking of investment is necessary to reach the UK energy policy targets. The Electricity Market Reform (ERM) consists of three main mechanisms:

- **Carbon price floor.** The UK considered the European Emissions Trading Scheme as an insufficient incentive for investment in low-carbon technologies and introduced a top-up carbon tax over the ETS with the aim of ensuring a predictable and increasing carbon price;
In parallel of the EMR, the UK is performing several other reforms of the market arrangements. The electricity balancing reform aims to provide better price signals to value scarcity and flexibility. The reform of zonal network charges aims to provide better locational incentives and coordinate network and generation development.

The EMR reintroduces a strong role for integrated planning of the generation mix and gives a central role to DECC and National Grid in planning and delivery of investments. Despite strong state intervention, the UK EMR reform received State Aid clearance from the European Commission because procurement mechanisms are mostly market-based, and long-term contracts for CfDs and capacity market were justified because of market failures hampering risk hedging.

In the long term, however, the EMR vision is for a decreasing role for the Government, with an eventual phase out of CfDs when clean technologies become competitive, which relies on two critical assumptions: by 2030, the carbon price will rise sufficiently and clean technologies will be mature enough to compete in the electricity market.

Lessons for European power market reforms

The survey of international experience with electricity markets shows that electricity markets around the world are all ‘hybrids’ with some form of public intervention. However, the rationale for intervention and the modes and type of intervention vary greatly across jurisdictions.

The main reasons for intervention into the power markets surveyed revolve around three main drivers: i) to procure capacity in order to maintain security of supply; ii) to determine part or some of the generation mix through support for specific technologies, such as clean technologies; and/or iii) system planning to optimize transmission and generation development. These drivers of policy intervention resonate with the European context characterized by a revival of government interventions to guarantee security of supply though the introduction of capacity mechanisms, the willingness of policy makers to support clean technologies in order to decarbonise the European power sector, and the growing complexities and challenges of system optimization and network planning in the context of decentralized generation development.

The failure of the FERC’s attempt in 2002 to introduce a ‘Standard Market Design’ yields some lessons from Europe. The US experience demonstrates the difficulty of defining a unique market framework that would fit with local power system constraints, and the need to build in any ‘target model’ enough flexibility for implementation in order to recognize different institutional and policy contexts.

Moreover, the US and Latin American experiences with liberalization illustrate the difficulty of putting in place an approach that allows fixed cost recovery and efficient risk transfers for investment in capital intensive technologies. In fact, the drive for liberalization in the US in the past 20 years was highest in periods of low fuel prices implying that short-run marginal costs (SRMC) were lower than long-run marginal costs (LRMC), and therefore promising gains in the short term for consumers. With a technology mix dominated by fixed cost technologies (hydropower and more recently other renewables), most Latin countries concluded in the early 2000s that a market approach based solely on SRMC would not provide a sound basis to support investment, and introduced tenders for LRMC-based contracts to attract new investment.
As illustrated in Figure 2, the Latin American power sectors evolution in the past decade points toward a two-step competition, in order to separate i) Short term system optimization (dispatch) based on spot market prices, and ii) Long term investment decision and fixed cost recovery largely driven by auctioning of long-term contracts.

**Investment planning (years ahead)**

- Tendering of long-term contracts
- Can be technology neutral or specific
- Puts competitive pressure where it matters: CAPEX
- Can be used to stimulate new entrants and development of competitive market
- Ensures coordinated system development

**Operations planning (days/hours ahead)**

- Well integrated and liquid forward, day ahead and intraday markets
- Optimizes short term dispatch and minimizes costs for consumers
- Level playing field with balancing obligation
- No distortions as subsidies not based on production

Figure 2: Two step competition in Latin American countries
Source: FTI-CL Energy

Another lesson from international experience is the necessity to have a holistic approach to market reform to support investment, and to make sure that power markets convey scarcity signals and reflect environmental externalities. Locational prices as well as capacity markets in the East Coast markets play a key role in signalling the differentiated need for investment at different places on the network. In the UK, whilst the CfDs and capacity market are central to attracting new investment, the carbon price floor drives power prices up and contributes to investment in clean technologies, whilst the reform of the cash out balancing market arrangements seeks to ensure a better valuation of scarcity and flexibility.

**Investment coordination mechanisms**

Interventions into power markets take very different forms depending on the market surveyed. A first general finding is that the international experience with hybrid markets calls for caution in implementation as complementary mechanisms can be counterproductive if not carefully designed.

One key issue resides in the responsibilities and incentives of regulatory authorities and/or operators in charge of these planning and coordination mechanisms. Independence from policy makers, as well as the ability to resist potential capture by vested interests is key. In the European context, Transmission System Operators will likely see their role change in the context of the transition to a decarbonised power system. In the UK, for instance, the Government decided to confer the delivery function for its Electricity Market Reform (EMR) programme onto National Grid owing to the strong synergies with its existing role in the electricity market, which raised a number of questions regarding potential conflicts of interest.

However, the planning process does not necessarily have to be centralized. The experience of Chile, although it highlights the complexities of a decentralized approach, demonstrates that obligations on suppliers to contract generation in the long term can avoid some of the usual pitfalls with central planning. In Europe, the French capacity market proceeds with a similar decentralised approach relying on obligations on suppliers.

Another issue is the access to information and the asymmetry with market players for the authority in charge of system planning, which points towards the use of information revealing mechanisms such as auctions. The organization of competition ‘for the market’ through the tendering of long-term contracts has
proven an efficient way in Latin America to put competitive pressure on investors and drive costs of both clean technologies and thermal plants down.

**Risk sharing mechanisms such as long-term contracts**

The international experience demonstrates that long-term contracts can have a pro-competitive effect and support an efficient allocation of risks between market players. In Europe the difficulty to hedge generation risks without a ‘sticky customer base’ represents a barrier to entry for new investors. In contrast, tenders for long-term contracts in Latin America have driven intense competition for investment in the market, and a number of new entrants have successfully entered into the generation market without having a prior established consumer base in the past decade.

The experience in Latin America and in the UK also points toward the role of long-term contracts with a reliable counterparty in facilitating financing, allowing higher leverage and reducing hurdle rates, thereby reducing financing costs. Long-term contracts allow the use of project finance or hybrid financing approaches, with a clear allocation of risks between the different stakeholders, supporting a high ratio of debt financing and thereby reducing the cost of financing. Similarly, in the UK, long-term contracts in the capacity market have an impact on the financing arrangements, as the long term capacity contracts provide a secure stream of revenue which is used by banks as a guarantee for debt, whilst equity is need to cover the less predictable energy revenues.

A state counterparty guarantee is usually the easiest way to facilitate financing and reduce the cost of capital. But in the European context, a body grouping solidary suppliers could act as the counterparty of long-term contracts, as initially envisaged in the UK for CfDs. Mixed approaches involving some limited state guarantees and/or capped counterparty risk exposure levels warrant further research in a European context in order to strike the right balance between reducing hurdles rates and allocating risks in an optimal way between the different stakeholders.

In the European context, the role of long-term contracts in supporting risks transfers and investment will raise a number of implementation issues. Retail competition hampers the natural demand for long-term contracts between producers and suppliers, such that long-term contracts will likely need to be imposed by regulation (to the exception of contracts between large energy buyers and producers).

Such regulations putting contracting obligations on suppliers could either involve a centralised planning and procurement process, or rely on a decentralised obligation on suppliers with bilateral trading. In practice, a regulatory organisation could be mandated to define the type of contracts needed and to procure them through a centralized auction (e.g. capacity auction, CfDs, etc.). Another option would be a decentralised process in the form of contracting obligations on suppliers (e.g. capacity obligation, hedging obligation, etc.). In some specific cases, where there remains a supplier by default, such as in Italy, there could for instance be an obligation on the supplier by default to contract long term for part of its anticipated supply needs.

In order to make such obligations compatible with retail competition, a mechanism is needed to ensure that when a supplier loses or gains customers, the contracting obligation follows these customers. Such mechanism exists for example, in PJM’s Capacity Market\(^1\), where customer switching is tracked on a daily basis and monthly settlement of suppliers’ obligation is calculated based on the number of days each supplier has actually served each customer. This is also similar to the French capacity mechanism arrangements. Although the mechanism that automatically transfers contracting obligations does not imply an automatic transfer of contracts themselves, it provides suppliers the opportunity to rebalance their contract portfolio in the secondary contract markets.

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\(^1\) See for example, PJM Manual 18: PJM Capacity Market, www.pjm.com
Last but not least, some of these contracting obligations could possibly raise competition and/or state aid issues and would therefore have to comply with European regulations. The evidence from past cases surveyed in this report (such as in the UK CfDs and long tenor capacity contracts state aid approval) suggests that the European Commission adopted a pragmatic approach when assessing the rationale for intervention in electricity markets in the past and accepted that security of supply and decarbonisation objectives could legitimate such interventions under certain conditions (see Appendix D for a more thorough discussion).

CONCLUSION: POLICY RECOMMENDATIONS

Our general goal with these recommendations is to address the issues raised in our diagnosis of the EU power system, while paving the way towards a more sustainable power market design through which dispatch is performed efficiently, long term investment signals are provided to ensure security of supply and a policy compatible generation mix, network and generation developments are coordinated in an efficient way, and renewables are fully integrated in the market.

However, there are a number of profound technological, economical and policy uncertainties about the transition toward a decarbonised electricity system in the long term. One key issue is whether renewables will become competitive in the medium term, which depends on the speed of renewables cost reductions but also on the evolution of carbon and power prices. A second key issue is whether risk transfers mechanisms such as long-term contracts will develop naturally or be imposed by regulators in order to reduce the financing costs associated with increasingly capital intensive power generation assets.

A useful approach is therefore to segment the policy recommendations depending on the time horizon considered (Figure 3):

- In the medium to long term, two alternative ‘policy pathways’ representing possible alternative models for organizing the power industry market and regulatory framework depending on the evolution of a number of key technological, economic, and policy drivers.
- In the short term, we identify a number of ‘no-regret’ policy actions which are necessary reforms robust across a range of uncertainties and independent of the choice on the long term industry regulatory framework;

Figure 3: Process for our policy recommendations
Source: FTI-CL Energy
Long term vision: Two alternative policy pathways

The longer term vision depends on how different sources of uncertainty – technology innovation, socio-economic evolutions, and policy approaches – materialise. We have therefore considered two possible futures, or “visions” for European power markets, as described on Figure 4:

- **Pathway 1: Competition ‘for’ and ‘in’ a technology neutral market.** Because RES and possibly storage costs have dropped significantly and CO\textsubscript{2} prices are high enough to provide adequate price signals for investment in low carbon technologies through electricity prices, RES and storage technologies are competitive and can develop within the market together with other technologies without subsidies. In this pathway, policy makers would also need to accept not to intervene beyond setting decarbonisation and security of supply objectives. In such a pathway, market design would be structured around energy, capacity\textsuperscript{2}, and reserve/balancing market segments, in which all technologies, including RES, storage or demand-side response (DSR) could participate on the basis of their technical capabilities. Locational signals would be introduced to coordinate the development of the network with centralised and decentralised generation. The market would efficiently determine the amount of the different technologies needed and their location on the network, whilst ensuring that the two main policy objectives of security of supply and decarbonisation are met. In order to reduce financing costs for capital intensive technologies, risk transfer arrangements such as long-term contracts will likely need to emerge or be imposed by regulators. This could lead to a two-step technology neutral competition ‘for the market’ through the tendering of long-term contracts followed by competition ‘in the market’.

- **Pathway 2: Competition ‘for’ and ‘in’ the market with technology specific support.** Despite RES cost decrease, specific support for clean technologies is still needed to meet the decarbonisation and security of supply policy objectives. This could be due to a CO\textsubscript{2} price that is insufficient to support power prices, and/or to RES deployment combined with barriers to market exit for thermal plants which maintain overcapacity and depress power prices. More fundamentally, the willingness of policy makers to control the generation mix (e.g. for industrial policy reasons) could lead to such pathway. In this case, hybrid market arrangements with the introduction at the regional-level of a form of long term indicative planning to determine the resource mix and/or maintain security of supply in a coordinated way followed by tenders for long-term contracts by technology would need to be introduced. Coordination with network development would be ensured in the regional planning process, and tenders – possibly through a single coordinated tendering procedure at the regional or European-level – would be organised to allocate long term capacity contracts for each technology. Alternatively, decentralised obligations could be imposed on suppliers so as to meet the different criteria (such as capacity margins and RES shares, for example).

\textsuperscript{2} The capacity product could be linked to peak demand.
At this stage, Europe seems closer to Pathway 2, insofar as RES technologies are not yet competitive in the market and policy makers seem keen to remain in control of the generation mix and security of supply. Pathway 1 seems however more desirable in the long term insofar as it allows a fair and neutral competition between all types of technologies while meeting key objectives such as cost efficiency, decarbonisation and security of supply. It is worth emphasizing, however, that seen from today, a critical set of uncertainties remains, such as technology cost evolution, and policy choices need to be made to improve the market before deciding on which pathway is optimal.

But since the current starting point is closer to Pathway 2 and given the urgency to unleash investments to support decarbonisation and maintain security of supply, a transitory step through Pathway 2 is likely needed before possibly arriving at Pathway 1 in the medium to longer term. In other words, whilst the objective may be to arrive at a technology-neutral and market-based framework to determine the generation mix in the long term, the urgency to fix some of the issues described in previous sections with the current regulatory framework suggests that implementing the regulatory framework described in Pathway 2 is likely needed – at least as a transitory solution to the Pathway 1 in the longer term.

“No regret” short term policy reforms

Given the significant uncertainties that remain on the evolution of critical technological, policy, and economic drivers that will determine the long term shape of the electricity industry, it would be unwise to propose today a set of policy recommendations that would only be efficient in one of the possible alternative pathways for the long term market and regulatory framework.

The ‘no regret’ recommendations presented below aim to improve the current market framework and are efficient and required steps toward both long term pathways. These policy recommendations therefore aim to address the key issues and areas of white space in the current market framework as identified and described in our diagnostic in Section 4: Strengthen the CO\textsubscript{2} price and improve renewable support mechanisms for RES. Whilst the carbon price in the ETS should remain market-driven, a gradually increasing and credible carbon price floor trajectory (possibly coupled with a price cap) could be introduced through e.g. a reform of the Market Stability Reserve. A structural reform of the ETS should also tackle carbon leakage issues. Support mechanisms for RES support should evolve towards investment-based support, which could be tendered to minimize costs, in order to limit their impact on the
energy market and pave the way towards phase out and/or technology neutral tenders of capacity. In addition, national plans for RES development to 2030 should be coordinated through regional and European RES roadmaps to minimize costs and control volumes. Finally, a level playing field between centralised and decentralised generation and storage technologies should be established, through the implementation of cost reflective retail energy prices, including energy component structure, network usage tariffs and taxes.

- **Re-prioritise and fast track the implementation of the Target Model 1.0.** This will require setting more ambitious goals for balancing markets to foster their harmonisation and integration. In addition, short term price signals in balancing markets should be improved (e.g. by introducing marginal price and single settlement) to remunerate better operating flexibility. A sound framework for demand-side response and storage participation in power markets across different timeframes will need to be established. This also includes improving the EU governance framework by strengthening the role of ACER and ENTSO-E to foster integration and to encourage regional approaches.

- **Define a common framework for security of supply and long term generation investment.** This includes implementing regional resource adequacy assessments with a common methodology and working towards cross-border participation in capacity mechanisms, and eventually towards a common approach to maintain security of supply at the regional-level. This will require the development of a policy framework (e.g. through bilateral intergovernmental agreements) and an operational framework (through TSOs cooperation) to manage coincidental stress events. In addition, barriers to risk sharing arrangements such as long-term contracts should be removed in order to reduce financing costs and support investment.

- **Reinvent coordination between network, centralised and decentralised generation.** This will require implementing regional coordination groups (perhaps as part of the recently set up European Electricity Coordination Group) and providing TSOs with stronger incentives to optimise system planning across borders (e.g. by creating regional TSOs or by aligning incentives to cooperate through e.g. shared ownership). These regional coordination groups could be tasked with coordinating the national energy transition plans and evaluating their impact on electricity markets, security of supply, and cost for consumers on a regional basis. Locational signals should be created/strengthened by introducing locational energy prices through well-defined bidding zones possibly compounded with a) locational capacity prices in the capacity mechanisms, or b) geographically differentiated connection charges or capacity-based network tariffs. Last but not least, coordination mechanisms should be introduced between decentralised generation, conventional generation and network development.

To achieve these reforms in a reasonable timeframe, we also recommend adapting the current European and regional governance structure, so that it facilitates decisions impacting several member states, without going through numerous national parallel processes or through the lengthy Comitology procedure. We therefore recommend granting more responsibilities and power to ENTSO-E and ACER and adapting their governance rules, so that they can take European/regional decisions, without requiring unanimity votes and individual members’ separate approval processes. We also suggest reinforcing the role of the European Electricity Coordination Group and giving it a regional dimension by creating regional Electricity Coordination Groups. These groups would be instrumental in strengthening the regional initiatives in order to fast track some of the necessary reforms – possibly by initiating these at the regional-level.