eurelectric
ELECTRICITY FOR EUROPE

RENEWABLE ENERGY AND SECURITY OF SUPPLY: FINDING MARKET SOLUTIONS

A EURELECTRIC REPORT, OCTOBER 2014

EURELECTRIC IN BRIEF

EURELECTRIC represents the common interests of the electricity industry at pan-European level. Our current members represent the electricity industry in over 30 European countries. We also have affiliates and associates on several other continents.

Our well-defined structure of expertise ensures that input to our policy positions, statements and in-depth reports comes from several hundred active experts working for power generators, supply companies or distribution network operators (DSOs).

We have a permanent secretariat based in Brussels, which is responsible for the overall organisation and coordination of EURELECTRIC's activities.

EURELECTRIC pursues in all its activities the application of the following sustainable development values:

Economic Development
► GROWTH, ADDED-VALUE, EFFICIENCY

Environmental Leadership
► COMMITMENT, INNOVATION, PRO-ACTIVENESS

Social Responsibility
► TRANSPARENCY, ETHICS, ACCOUNTABILITY

RENEWABLE ENERGY AND SECURITY OF SUPPLY: FINDING MARKET SOLUTIONS

Final Issue Management Communication Report

EURELECTRIC Markets Committee, Energy Policy and Generation Committee, Working Group Wholesale Market Design, Working Group Renewables, with the support of all other EURELECTRIC Committees

EURELECTRIC Issue Manager:
Thomas Barth (E.ON)

Contact:
Anne-Malorie Géron – amgeron@eurelectric.org
Paulo Lopes – plopes@eurelectric.org
Koen Noyens – knoyens@eurelectric.org

EXECUTIVE SUMMARY

1 REALITY CHECK: RECONCILING GROWTH IN RES WITH WELL-FUNCTIONING ENERGY MARKETS

Figure 1 – European decarbonisation targets for GHG emission reductions below 1990 levels

The EU has set a roadmap to cut its greenhouse gas (GHG) emissions by 80% below 1990 levels by 2050[1]. The 2020 package and the 2030 framework now under discussion both set ambitious checkpoints on this road to decarbonisation (Figure 1).

The power sector is expected to contribute heavily in this energy revolution. In essence, it is expected to be decarbonised by 2050 (Figure 2).

Renewable energy sources (RES) are fundamental contributors to the decarbonisation of the power sector. For instance, meeting the EU's target of a 20% share of RES in final energy consumption by 2020 requires the power sector to contribute with a RES share of 35%. In the 2030 framework currently under discussion, a 27% EU RES target and a 40% GHG reduction target would implicitly lead to a share of around 45% RES in the power sector[2].

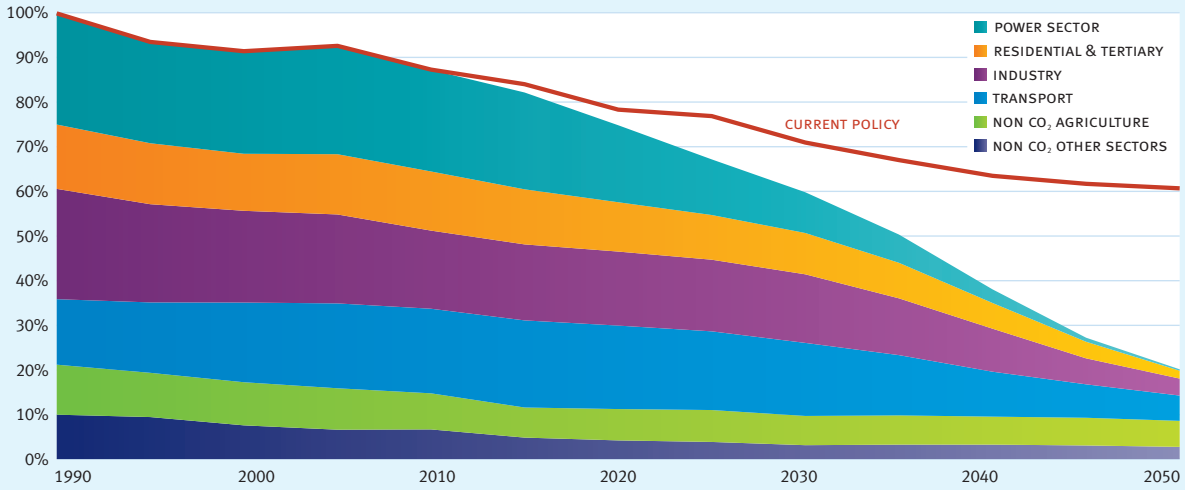
This expected – and necessary – growth of RES brings with it the need for market adaptations that have to meet two fundamental requirements of electricity customers across Europe:

- To give customers value for their money, the sector transformation has to be carried out as efficiently as possible – this implies developing RES through integrated electricity markets while keeping their costs down.
- Customers expect that their lights stay on – security of supply is key and should also be guaranteed in a cost-effective way.

1 *The European Commission Communication "A Roadmap for moving to a competitive low carbon economy in 2050" points to a 93% to 99% of greenhouse gas reductions in the power sector by 2050 compared to 1990 levels.*

2 *From the European Commission's impact assessment for "A policy framework for climate and energy in the period from 2020 up to 2030".*

Figure 2 – Decarbonisation path per sector



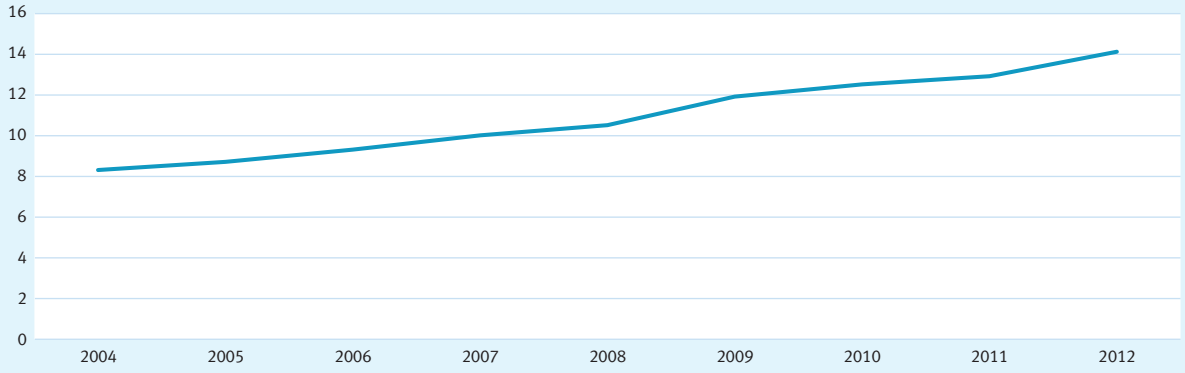
Source: European Commission, "A Roadmap for moving to a competitive low carbon economy in 2050"

2 INTEGRATING RES INTO THE MARKET TO ENABLE FURTHER, SUSTAINABLE RES DEVELOPMENT

The EU has experienced a steady growth of RES in the last years (Figure 3) and this trend is expected to continue as Europe pursues its decarbonisation agenda.

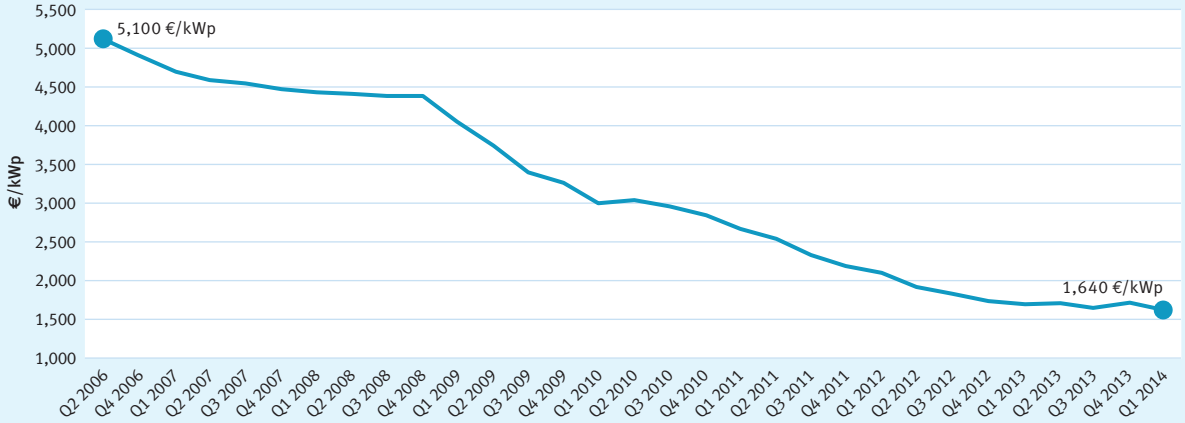
In the electricity sector, RES growth will continue to be strongly based on the implementation of mature RES. As these technologies are implemented to an ever greater extent, their deployment costs decrease. The evolution of the price index of rooftop solar PV in Germany provides a snapshot of the cost evolution that these technologies have experienced (Figure 4).

Figure 3 – Share of energy from RES, EU 28, 2004-2012
(in % of gross final energy consumption)



Source: Eurostat

Figure 4 – German solar PV rooftop system price index, 2006-2014



Source: BSW-Solar PV Price Index 2/2014

RES competitiveness should be further fostered by allowing them to compete in the market with all other technologies. This implies two main lines of action:

A. Operational integration of RES into the markets;
B. Evolution to market-oriented, cost-efficient RES and less market-distortive support policies.

A. OPERATIONAL INTEGRATION OF RES INTO THE MARKETS

EURELECTRIC sees 5 priority actions that guarantee operational integration of RES into the markets:

I- Move towards placing operational market responsibilities on all generation, either directly or indirectly through a service provider

Balancing obligations are necessary for all generation plants – existing and new ones (universal balancing). Further integrating RES into the market by giving them balancing responsibility should provide them with additional economic incentives to develop better generation forecasts and put in place improved control systems, thereby reducing system imbalances and flexibility needs. As for existing generation, it should be left to the discretion of the EU member states to decide whether balancing responsibility should be applied on a voluntary basis through incentives or made mandatory, with RES operators being compensated for additional costs. Either way, full market integration should remain the final objective.

II- Enable commercial parties to offer balancing and/or commercialisation services to balance responsible RES generation

Placing balancing obligations on RES generators will naturally create a demand for balancing services, which will be offered by the market. The introduction of balancing obligations on RES would further improve the functioning of the power market, create new opportunities including for RES, and put an end to 'produce and forget' approaches.

III- Improve the functioning of day-ahead, intraday and cross-border markets and gate closure in order to give RES producers all (short-term) opportunities to trade their imbalances

In order to set up a level playing field for balancing between controllable and variable generation, gate closures of national and cross-border intraday markets should be moved closer to real time: a shorter forecasting horizon makes the generation more predictable and long or short positions can be managed via the intraday power market. Consequently, the need for ancillary services would be less pronounced and the costs of running the power system would be lower.

IV- RES generation should bear the same technical requirements and charges for grid connection and network use as other generators

Member states should be free to apply their preferred type of connection regime. However, in order to make optimal use of the existing network, all relevant actors, including network operators, investors and local authorities should be involved in the analysis of connection requests. Such connection arrangements should always ensure a level playing field for all generation types. Prosumers should pay network fees based on their need for network capacity.

V- Remove the priority of dispatch for RES technologies and, especially, incentives to produce when market prices are below variable costs

Support schemes may – depending on the circumstances – lead to negative prices and thus to inefficient re-dispatch at high costs for society in cases of RES generation with variable costs or of support schemes based on Euro/MWh.

B. EVOLUTION TO MARKET-ORIENTED, COST-EFFICIENT RES POLICIES

EURELECTRIC believes that RES should be implemented in a cost-efficient way. Thus, RES policies should be market-oriented and investments driven by market signals.

The RES support policies that started in the previous decade have secured initial RES capacity growth and deployment, but are unsustainable now as they are costly and too narrowly focused on ensuring deployment. RES policies up to 2020 have to be reformed to be more effective and market compatible. Going down this path sets the direction already now for the period after 2020.

To this end, RES policies must fit into a "system approach" taking into account the impact of RES development on the energy policy triangle (sustainability, security of supply and competitiveness), on the internal market and market mechanisms, and on the EU ETS, the EU's main instrument for decarbonisation.

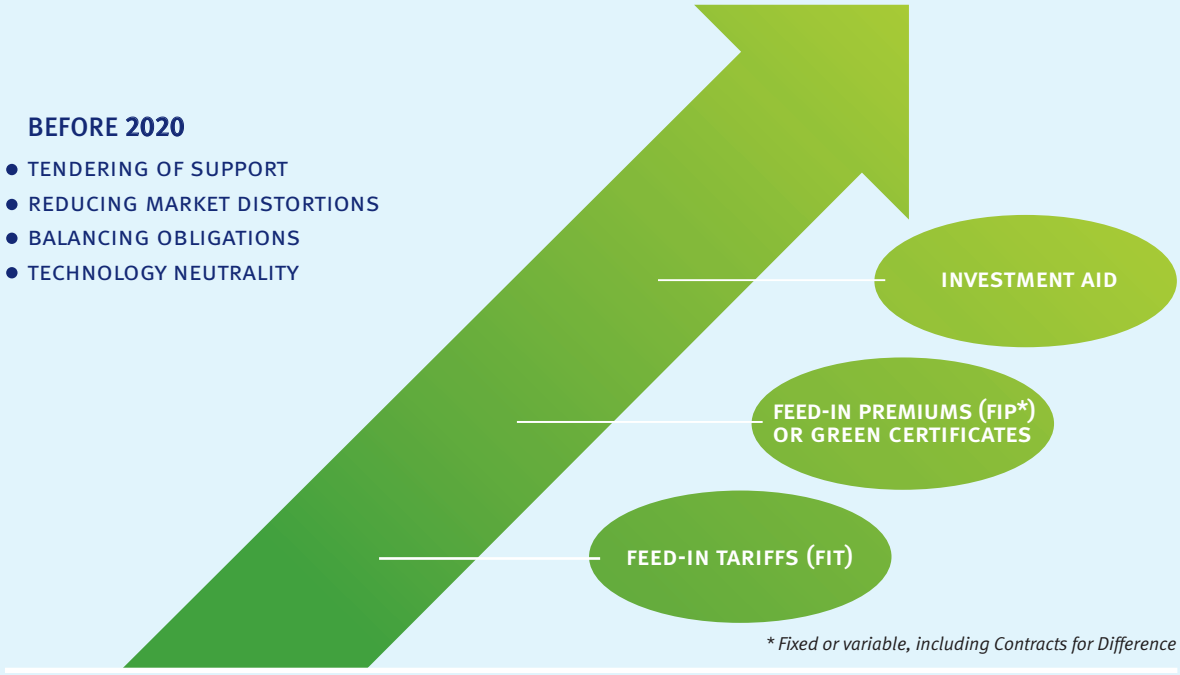
RES support schemes should be market-based, cost-efficient, least distortive (regarding investment and dispatch decisions), and effective and reliable for RES investors. Action should start to be taken now so that support schemes for mature technologies adopted before 2020 are more efficient (Figure 5).

A positive evolution can be achieved by transitioning from feed-in-tariff (FIT) schemes to more market-oriented schemes such as:

- feed-in-premiums (FIP), where a premium in Euro/MWh is paid to the RES producer on top of the energy market price;
- green certificates, where the Euro/MWh of the green certificate market is paid to the RES producer on top of the energy market price;
- investment aid, where a Euro/MW value on top of the electricity market price is agreed upfront and paid to the RES producer for the capacity installed. This scheme minimises market distortions as RES producers are incentivised to optimise their market operation in relation to the electricity market price in order to maximise their revenues.

Retroactive changes must, however, be avoided. EURELECTRIC believes that sound regulation should include clear and transparent review clauses or a contractual commitment that makes the policy framework transparent and predictable for investors.

FIGURE 5 – EVOLUTION OF RES SUPPORT SCHEMES UP TO 2020



EURELECTRIC thus proposes the following set of measures to achieve an effective RES policy reform:

I- Increase cost-efficiency by avoiding overcompensation

- Move to tenders for investment or operating aid, with multiannual planning of volumes for investor visibility or green certificate systems.
- Move to technology-neutral tenders for technologies that are mature: foster competition between all RES technologies, while not excluding less mature ones from entering the market. Technology-neutral tenders are preferable if limited to a scope of rather homogenous RES technologies (similar cost, similar typical project sizes, etc.). Otherwise, some cases of technology-specific tenders could be appropriate.
- When no tender, apply degression rates, reducing the level of support for new installations throughout time as technology evolves, if transparency to investors is ensured.

II- Avoid market distortions

- In operating aid schemes, eliminate payments that distort operational/dispatch decisions.
- Give operating aid for a certain number of remunerated hours with positive market prices instead of for a certain calendar period.
- Introduce investment aid (€/MW), as it minimises distortion, can be technology-neutral and facilitates the transition towards full market integration of RES.

III- Link support schemes to their stage in the maturity value chain (Figure 6)

- RD&D phase: investment grants.
- Demonstration plants: the gap between small-scale pilot performance and real-world deployment is greater than in many other sectors, making demonstration a critical bottleneck in the overall innovation process, thus requiring specific funding.
- First commercial scale: choose aid that minimises energy market price risk with volume control.
- Mature technologies: steer volume and set market-based support level.

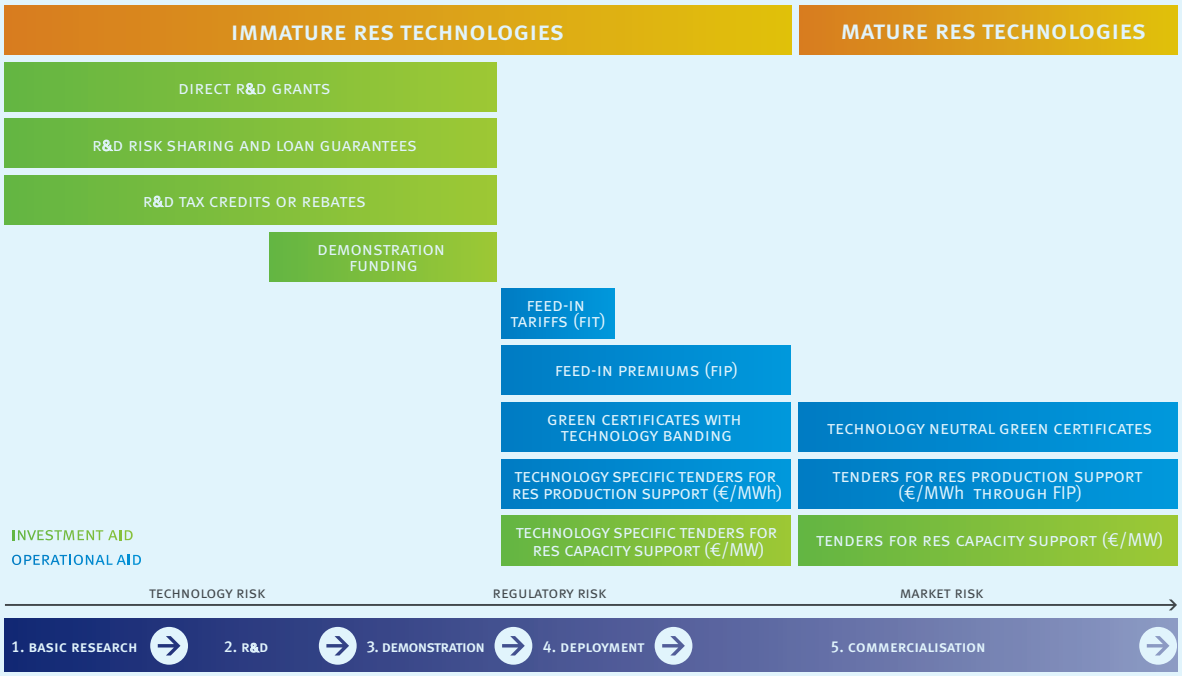
IV- Avoid retroactive change for existing and firmly committed projects

- Sound regulation should include clear and transparent review clauses or a contractual commitment that makes the policy framework transparent and predictable for investors.

V- Promote further Europeanisation of RES support schemes

- Increase the use of cooperation mechanisms: the review of the RES Directive is an excellent opportunity to tackle persisting barriers and enable member states to further set up cooperation on RES deployment.

Figure 6 – RES support schemes along the maturity value chain



3 THE COMPLETION OF THE INTERNAL ENERGY MARKET (IEM) AS A NO REGRET OPTION

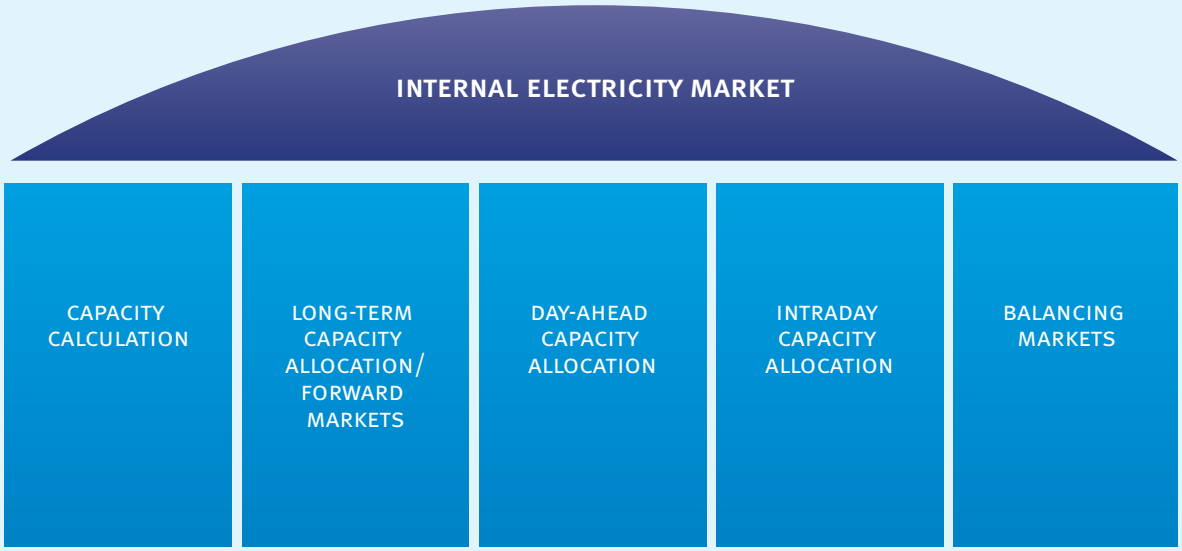
EURELECTRIC believes that the completion of the IEM is the fundamental building block for all market developments. A harmonised and integrated European wholesale electricity market will deliver increased competition through cross-border trade. This should ensure that electricity is brought to consumers at the lowest possible price.

The completion of the IEM should thus be achieved across all timeframes and geographies (Figure 7).

The integration of forward, day-ahead, intraday and balancing markets optimises the use of assets across the whole of Europe. This leads to more efficient market participation by all agents and, ultimately, to more cost-efficient delivery of energy to consumers.

More interconnections between national markets would further deepen market integration. In addition, wholesale and retail electricity markets would benefit from the removal of distortions like wholesale price caps and regulated end-user tariffs.

FIGURE 7 – PILLARS FOR THE COMPLETION OF THE IEM



4 A STRONG EMISSIONS TRADING SYSTEM (ETS) AS A KEY DRIVER FOR RES INVESTMENTS

Beyond 2020, Europe's energy policy must avoid contradictory measures on energy efficiency, technology development and decarbonisation: going forward, the ambition to further decarbonise European society will require a strong ETS[3] with a significant carbon price that is able to drive investment in low carbon technologies including RES. In particular other national and European policies must be designed in a way that does not undermine the effectiveness of the EU ETS. Coherent and integrated policy instruments based on a well-functioning ETS will be key to achieve the EU's low carbon goal on a level playing field and in the most cost-efficient way.

EURELECTRIC thus sees an 'ETS plus' agenda for the post-2020 period, with the 'plus' made up of support for high-potential immature technologies, channelled through a new focus on research, development and demonstration. New public support after 2020 should be primarily oriented towards high-potential immature[4] low-carbon technologies, products and services that have not reached market readiness by then. It is crucial that technologies are not developed as an 'art pour art' exercise, but with an eye on their potential contribution to the energy system at large. Technologies should be measured against their performance along the innovation chain, taking a dynamic approach to technology development.

In summary, RES policy after 2020 should be guided by the following principles:

- Ensure a market-based and cost-effective deployment of RES through a strengthened ETS;
- Avoid further subsidies for mature RES, while respecting existing contracts to support RES until the foreseen time horizon;
- Adopt a reinforced approach to support for immature technologies: support should be subject to a dynamic approach following the technology development;
- Public support should be primarily oriented towards new, high-potential immature low-carbon technologies that have not reached market readiness.

3 *For a more comprehensive EURELECTRIC position on the EU ETS, see the EURELECTRIC Manifesto for a Balanced, More Efficient European Energy Policy (www.eurelectric.org/manifesto).*

4 *Immaturity is made up of three criteria: (1) not competitive on the market, (2) limited market penetration, (3) the potential to reach maturity across a limited time period (learning curve). A technology should be considered immature only if all three criteria are met.*

5 ENSURING A STABLE ELECTRICITY SUPPLY

A. THE NEED FOR FIRM CAPACITY

Developing the RES necessary to pursue the EU's decarbonisation agenda creates the need for market adaptations. In many power systems that have to handle increasing intermittency, firm capacity needs to be present to back up variable RES.

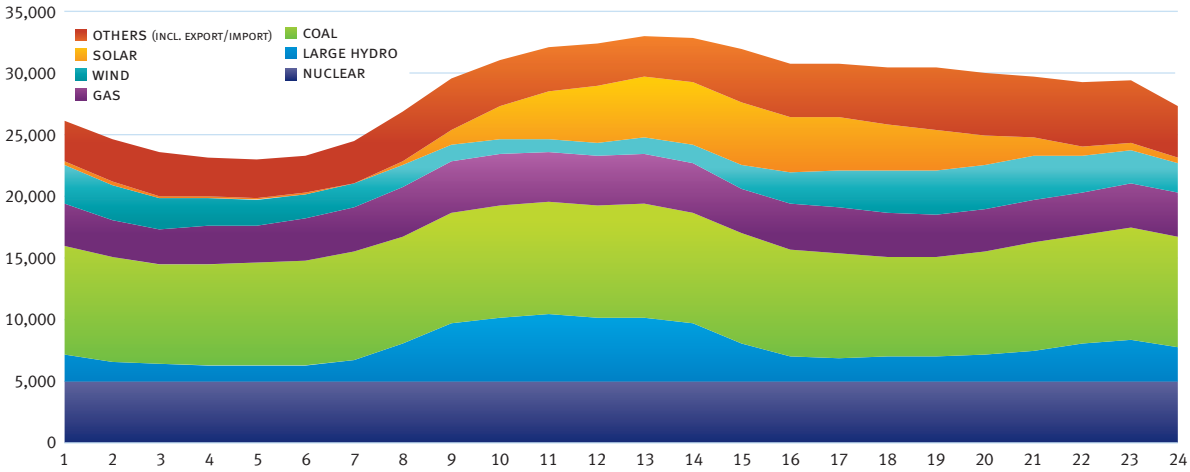
Two main factors should be taken into consideration: increasing market uncertainty for all market participants and political reluctance to leave security of supply to the energy market.

A typical intermittent day in Spain

The generation mix throughout a typical day in Spain (Figure 8) provides a good illustration of the changing patterns in power generation. The Spanish power system already incorporates a large share of variable RES: in 2013, onshore wind represented 22% of total generation and solar 5%. In this example, wind generation at its peak was nearly 4 times higher than at its lowest hour of production. Solar also varied throughout the day, fluctuating between zero generation and a 16% share.

Firm capacity needs to be available to back up these variations in wind and solar generation. One of the main technologies that is able to ramp its production up and down is gas-fired generation. During the same day, CCGT production varied 50% between its lowest and highest values. This firm capacity was able to adjust its production to accommodate the intermittency within the power system.

FIGURE 8 – ELECTRICITY BALANCE IN SPAIN, MWh, 20/06/2014



Source: REE

I- Increasing market uncertainty for all market participants

The market participants that typically provide power systems the insurance that there is an adequate level of capacity are having less and less chances of being competitive in the energy-only market. Gas-fired power plants are a clear example of a technology that provides this service of firm capacity to power systems. The generation volume of these plants in wholesale energy markets has been decreasing throughout the years (Figure 9).

The fact that such plants are working fewer hours does not imply that they are all less needed in power systems. On the contrary, the firm capacity with which they back up many power systems is increasingly necessary. However, in the current system, it is simply not valued and thus not incentivised to continue providing this 'lights on' insurance to customers.

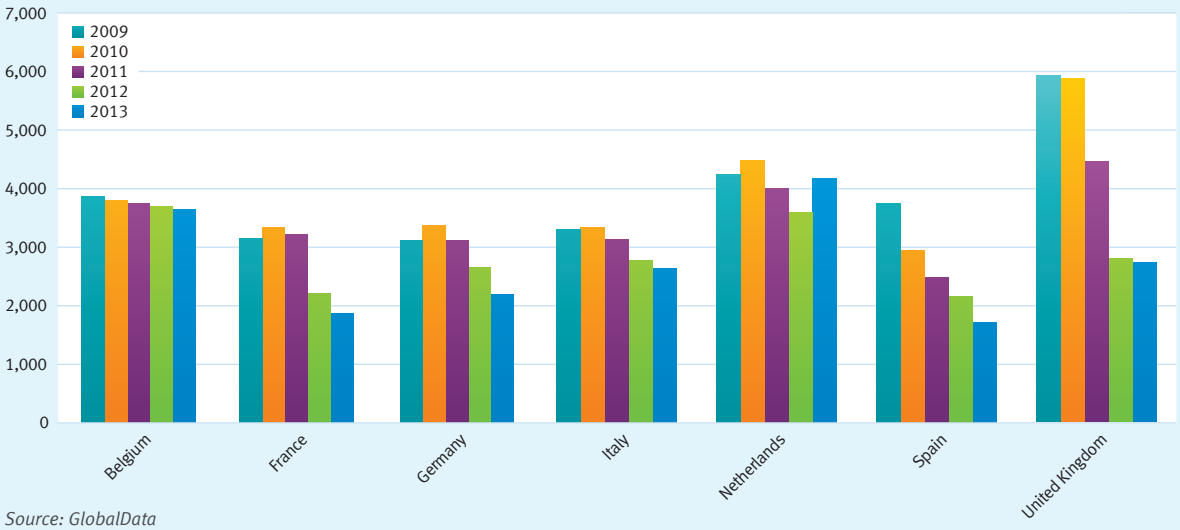
To achieve the decarbonisation targets, the growth of RES generation has been outpacing demand in many markets. The displacement of conventional generation and the decrease in working hours of conventional generators are a direct consequence of this development.

In addition, under today's market environment, providers of firm capacity are also being impacted by a decrease in wholesale market prices. This decrease is due to a range of factors. Most importantly, wholesale prices reflect the costs of generating an additional unit of energy for each technology. Since, for decarbonised technologies, this additional cost is very close to zero (e.g. to produce an additional unit of wind energy, the only incremental resource needed is wind itself), the wholesale price is dropping across wholesale markets. While at first sight this would be positive for customers, it further discourages firm capacity providers from remaining active.

There is also increasing uncertainty around the fluctuation of future power prices. While some years ago supply and demand forecasts were reasonably simple to estimate, this is not the case going forward. Greater RES intermittency on the supply side coupled with greater demand participation, energy efficiency, and macroeconomic impacts on the demand side are making market outcomes increasingly difficult to predict. A brief snapshot of wholesale market prices in the Iberian market in December 2007 compared to December 2013 illustrates the unpredictability of wholesale market prices (Figure 10). However, in light of the developments described above, assets needed to manage this unpredictability and ensure that customers' lights stay on might not be available.

While the factors above add to the uncertainty of having the necessary available capacity in many power systems, other factors are contributing to the decrease of that capacity. Measures such as the Industrial Emissions Directive or various national plans to phase out nuclear generation have merits in addressing particular policy objectives, but as a side-effect also reduce the levels of available capacity.

Figure 9 – CCGT load factors, hours, 2009-2013



Source: GlobalData

II. Political reluctance to leave security of supply to the energy market

Security of supply is perceived as a common good. In normal circumstances, supply and demand, expressed through the corresponding wholesale price, determine the distribution of energy between customers within normal regulatory boundaries and regulations. In an extraordinary situation, it may be difficult for public authorities to accept that a subset of customers could be cut off. This is the main reason why some governments feel the need to reduce the risk of a blackout for customers by setting an "insurance level" which the power system must meet. This is also a goal of the Security of Supply Directive[5].

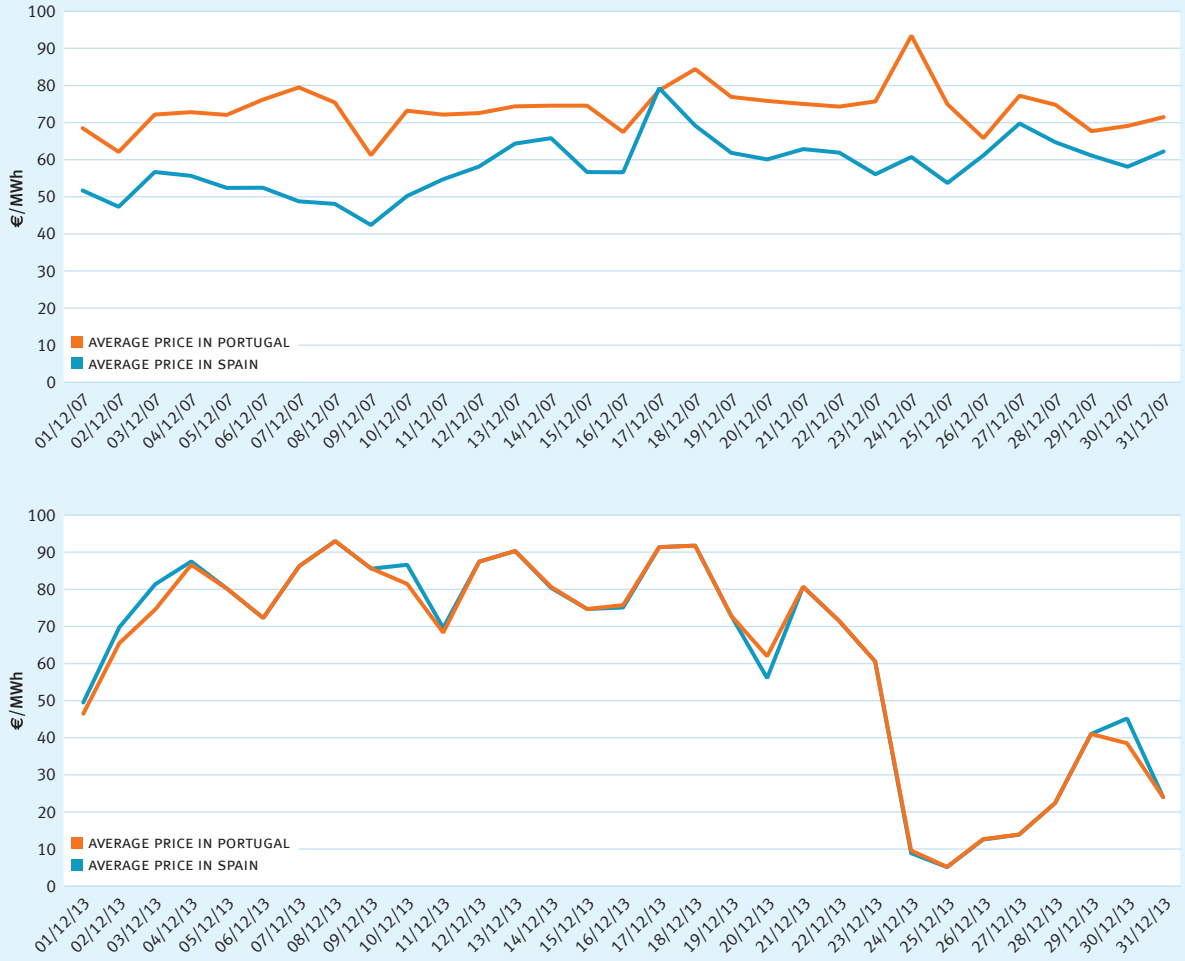
Security of supply is managed in very different ways across Europe, traditionally focusing on short-term flexibility and curtailment procedures. Lately some governments have wanted to go further in regulating national security of supply.

Two examples of this reality are the French and UK markets. Feeling the pressure of potential blackouts over the medium term (see tightening reserve margins in Figures 11 and 12), a decision has been taken to drastically reduce the chances of a blackout by ensuring, through two different forms of capacity markets, that enough assets are available.

In summary, there are two main reasons why current markets are not expected to deliver firm capacity everywhere:

1. **Increasing market uncertainty for all market participants:** Both existing capacity and new investments face a lack of visibility on what the energy market will look like in the future. The energy-only market provides increasingly shorter term signals, whereas existing and/or new firm capacity needs more visibility into the future to be available and thus provide security of supply.

FIGURE 10 – DAILY WHOLESALE PRICES IN THE IBERIAN MARKET, DECEMBER 2007 (TOP) AND DECEMBER 2013 (BOTTOM)



Source: OMIE

5 *See Directive 2005/89/EC.*

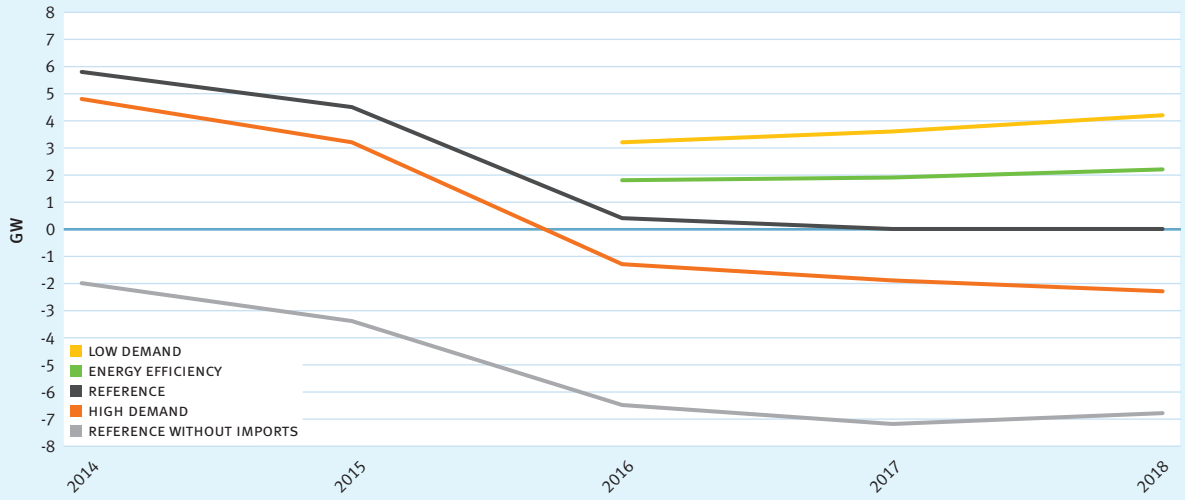
2. **Political reluctance to leave security of supply to the energy market:** Security of supply is viewed as a common good. High peak prices or curtailing a subset of consumers as the outcome of a normally functioning energy market lack political acceptance. Governments thus tend to create a form of insurance that the lights do stay on for everyone, following the goal of the Security of Supply Directive.

B. THE NEED FOR FLEXIBILITY

While firm capacity needs to be available in power systems that face growing intermittency, there will also be a growing demand for flexibility services. Flexibility in power systems is needed to meet short-term system adequacy challenges, in parallel with the firm capacity needed to ensure long-term system adequacy.

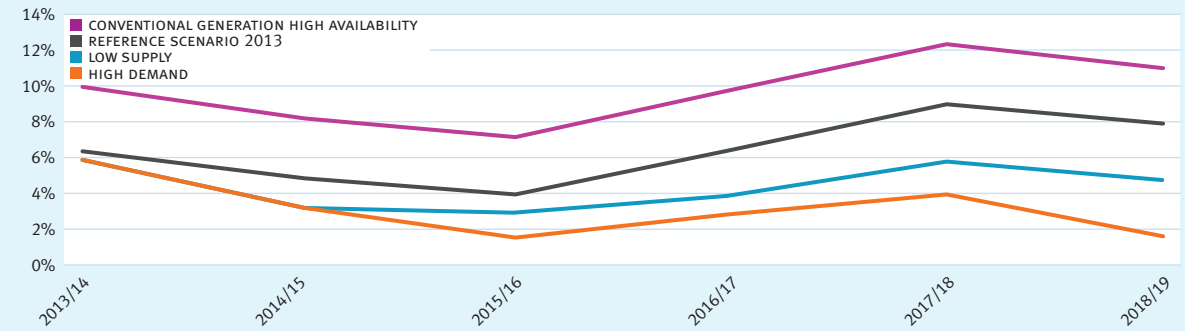
Flexibility should be priced through improved day-ahead, intraday, balancing and ancillary services markets. As highlighted in Chapter 3, the design of the current balancing and intraday markets must be improved, introducing, for instance, a) possibilities to trade balancing forward and more sophisticated products, and b) timeframes that better fit the flexibility requirements (ramp-up, down rates, etc.). Additional flexibility services for system operators, related to smart grids, have to be developed. All different sources of flexibility, such as generation (including storage), demand response and cross-border participation, should be considered, allowing flexibility to be delivered in the most cost-efficient way. The choice of the best compatible technology should be left to the market.

FIGURE 11 – RESERVE MARGIN OUTLOOK IN FRANCE, 2014-2018



Source: RTE

FIGURE 12 – RESERVE MARGIN OUTLOOK IN THE UK, 2014-2019



Source: OFGEM

6 THE NEED FOR AN EVOLVED MARKET DESIGN THAT RECONCILES THE IEM WITH CAPACITY MARKETS

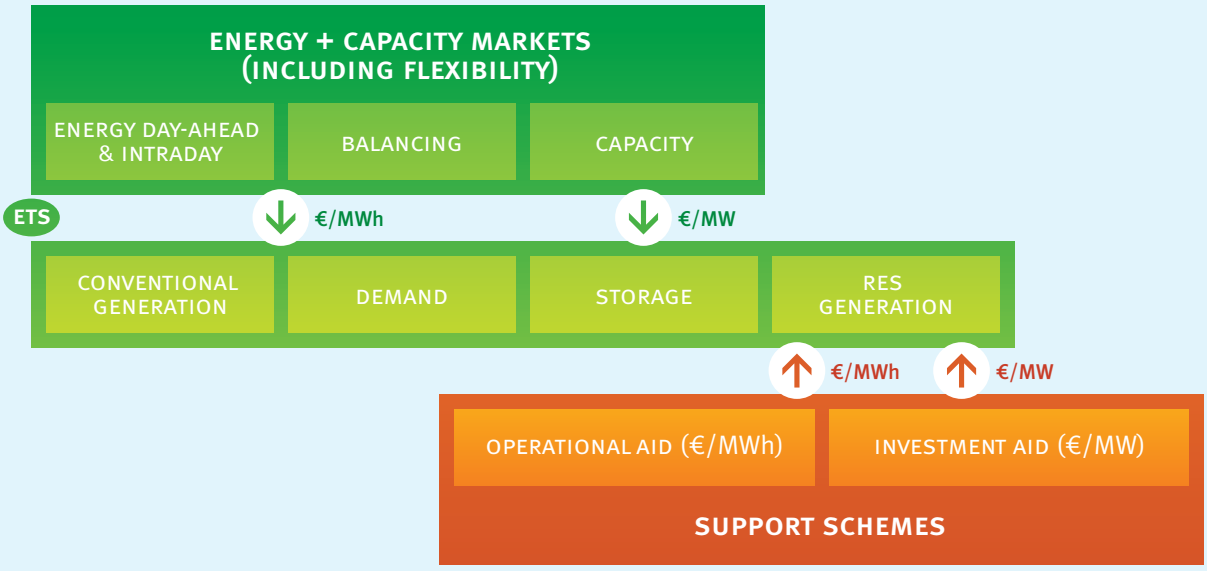
Energy-only markets remain the reference for the completion of the IEM. However, as in many markets the introduction of a capacity element is becoming increasingly important, EURELECTRIC recognises that properly designed centralised or decentralised capacity markets are an integral part of a future market design. Before 2020, the energy-only market and capacity markets (where needed) should work together in a converging market design with less market distortive and more cost-efficient RES support (Figure 13).

Energy and flexibility should continue to be valued and traded in energy markets and capacity should be valued and traded in capacity markets. All market participants (conventional and RES generation, demand, storage) should have access to these markets on a level playing field. Recommendations on improving RES support schemes before 2020 are described in Chapter 2.

After 2020, all technologies should be remunerated under the same market design, thus creating a level playing field. Mature RES would not receive specific investment or operational aid since the ETS will be the main driver of RES development (Figure 14). Immature technologies could still benefit from reinforced support, although such support should dynamically follow technology development.

EURELECTRIC believes that energy, flexibility and capacity are all needed and should therefore be properly valued in a future-proof wholesale market design, as Table 1 shows.

Figure 13 – Proposed market design up to 2020



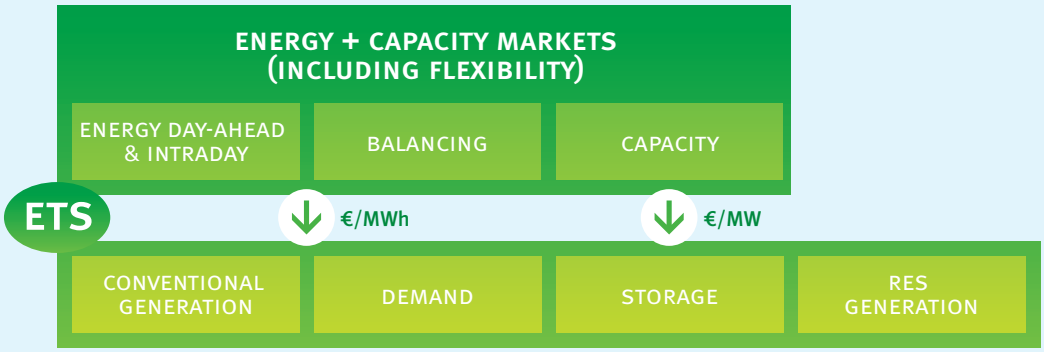
These three elements of market design should not be seen as opposing each other, but rather as interplaying elements of a more efficient market design to ensure continued security of supply. Flexibility should enable the system to respond to short-term variations in the supply/demand balance. This covers e.g. short-term reserves (generation, storage, demand) to cover potential incidents that decrease power supply to the system or to respond to short-term variations in demand. In contrast, capacity should ensure long-term system adequacy in case of extreme load peaks or moments where capacity has to be available to back up intermittent renewable generation.

Market participants who optimise their performance across these competitive markets will be the most commercially successful while delivering the most cost-efficient outcome. Take, for example, the market performance of a flexible capacity asset versus a non-flexible one. While both assets may receive the same earnings from the energy market, the flexible asset will be more competitive in the flexibility market. In the capacity market, the flexible asset will again be more competitive as it requires fewer earnings to provide its availability product. The same principle applies to generators or demand response providers with low marginal costs: they will have higher earnings in the energy market and thus incentives to stay in the market. This is the type of competitive marketplace that EURELECTRIC advocates: agents that play a more efficient role within the electricity systems are incentivised to stay in the system while delivering the most cost-efficient solution to the customer.

TABLE 1 – ELEMENTS OF MARKET DESIGN

	Energy	Flexibility	Capacity
Goal	Efficient dispatch	Short-term system adequacy	Long-term system adequacy
What it does	Delivers energy in the most cost-efficient way by letting the market define the system's merit order (i.e. the optimal use of existing assets)	Enables the system to respond to short-term variations in the supply/demand balance	Ensures long-term system adequacy, e.g. in case of extreme load peaks or to back up intermittent renewable generation
Market instruments	Forward, day-ahead and intraday markets	Day ahead, intraday and balancing markets, ancillary services	Capacity markets
Where we are today	Ongoing energy market integration with market coupling and cross-border intra-day markets	Energy market integration and cross-border balancing ongoing, grid related services to be developed	Largely separate national initiatives for capacity remuneration mechanisms, with an increasing discussion on cross-border participation

FIGURE 14 – PROPOSED MARKET DESIGN FOR AFTER 2020



7 DEVELOPING CAPACITY MARKETS: GOING BEYOND NATIONAL BORDERS

Capacity markets are market-based solutions that deliver long-term power system adequacy by properly valuing capacity and thereby providing signals for existing, necessary capacity to stay online or new capacity to be built.

The overarching goal of any capacity market must be to ensure generation adequacy, i.e. firm capacity. Other political objectives such as decarbonisation can be better met through instruments like the ETS and should therefore be left out of the capacity market debate. Consequently, the capacity market should only price plant availability.

In order to maximise cost-efficiency and market orientation, any capacity market should follow a set of fundamental design features:

- **Market-based** – Capacity should always be valued in a competitive market;
- **Technology-neutral** – All technologies that provide firm capacity should be able to participate in the market without discrimination;
- **Open to new and existing plants** – The market should be based on a level playing field between both new and existing firm capacity providers, including through interconnectors;
- **Open to generation, demand response and storage** – All forms of capacity throughout the value chain should be able to participate in the market.

A properly designed capacity market should not interfere with the operation of the IEM. This means that the capacity market should have no effect on the dispatch order: it prices availability/firmness, not production. However, capacity markets do tend to lead to less extreme price peaks in the energy market because they ensure that sufficient capacity is available, which leads to less scarcity pricing. System costs must be kept under control by correctly identifying the amount of capacity needed for the security of the system. Properly designed capacity markets should not lead to overcapacity.

The introduction of capacity markets affects both capacity that stays online and new investments that guarantee a predetermined level of security of supply, leading to different market outcomes in the long term. Such markets will ensure that only the capacity strictly needed for long-term system adequacy is delivered. They should not provide a safeguard for poor investments that are not competitive. The risks of capacity market implementation can be minimised by following the fundamental design features indicated above.

EURELECTRIC has analysed different options for implementing capacity markets and favours the following two, as they are most likely to cost-efficiently ensure long-term security of supply:

- **Decentralised certificates** – Long-term generation adequacy is supported by a market for tradable capacity certificates. All capacity providers (existing and new, conventional and RES generation, demand response, storage) sell certificates in the capacity market with a view to providing availability in periods of system scarcity. Market actors (mainly suppliers and large customers) and also grid operators (for the amount of grid losses) need to buy sufficient capacity certificates to make sure that there is sufficient available capacity to serve their customers or cover their own demand at all times. If sold capacity is not available or if suppliers or large customers have fewer certificates than load, a penalty regime applies.
- **Centralised auctions** – Long-term generation adequacy is ensured by a centralised capacity market for firm capacity (generation, storage and demand response) based on fixed payments that represent a price for capacity (€/MW) resulting from an auction. The amount of firm capacity to be procured is determined by an overall desired level of security of supply for a given period of time, to be set by a centralised body.

The product could be defined as a provision of firm capacity in the moments close to scarcity in the system. Generators will estimate their own firm capacity during the periods of scarcity and then bid the price of it. Those who qualify will receive revenues from the marginal price of the auction (€/MW) plus the incomes obtained for the energy they sell in the market. A penalty mechanism should be applied to capacity providers that fail to deliver firm capacity they committed at scarcity moments. The auction capacity payments will be distributed on all consumers, e.g.in relation to their peak load.

THE CROSS-BORDER EUROPEAN PERSPECTIVE

Investment decisions might be distorted if different capacity market models are implemented without coordination and effective cross-border participation. Suboptimal use of capacity, at least at a regional level, should be avoided.

The implementation of capacity markets should thus move away from today's national piecemeal approach which does not make optimal use of cross-border capacity to ensure security of supply (Figure 15).

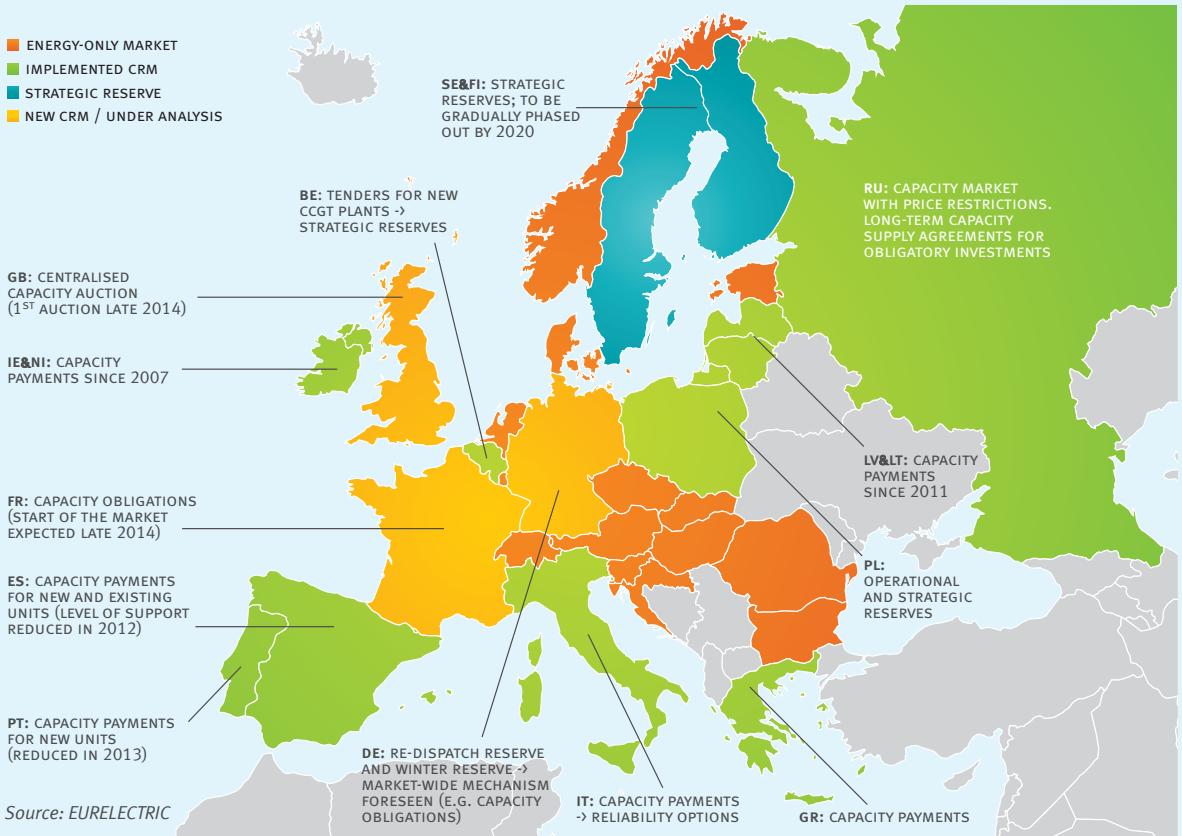
Instead, capacity markets should result from a coordinated effort to establish regional instead of national models in the short/medium term. To guarantee this evolution, the European Commission should push for harmonised solutions and Member States should, at the very least, coordinate among themselves and adopt market-based mechanisms that allow cross-border participation. Ideally, the preferred approach would be to adopt the same model at regional level.

Cross-border participation and a seamless cooperation of transmission system operators (TSOs) will therefore be the cornerstone of any market design adjustments.

Capacity markets should be taken into consideration when planning system operation across Europe. The Network Code Emergency and Restoration should take into account the emergence of capacity markets.

EURELECTRIC has carried out an extensive analysis of the different models for implementing cross-border participation of capacity markets. We propose a model where the capacity provider is the responsible for offering cross-border capacity and where availability is the product being traded across the border.

FIGURE 15 – IMPLEMENTATION OF CAPACITY REMUNERATION MECHANISMS ACROSS EUROPE, AS OF JUNE 2014



Source: EURELECTRIC

A model for cross-border participation

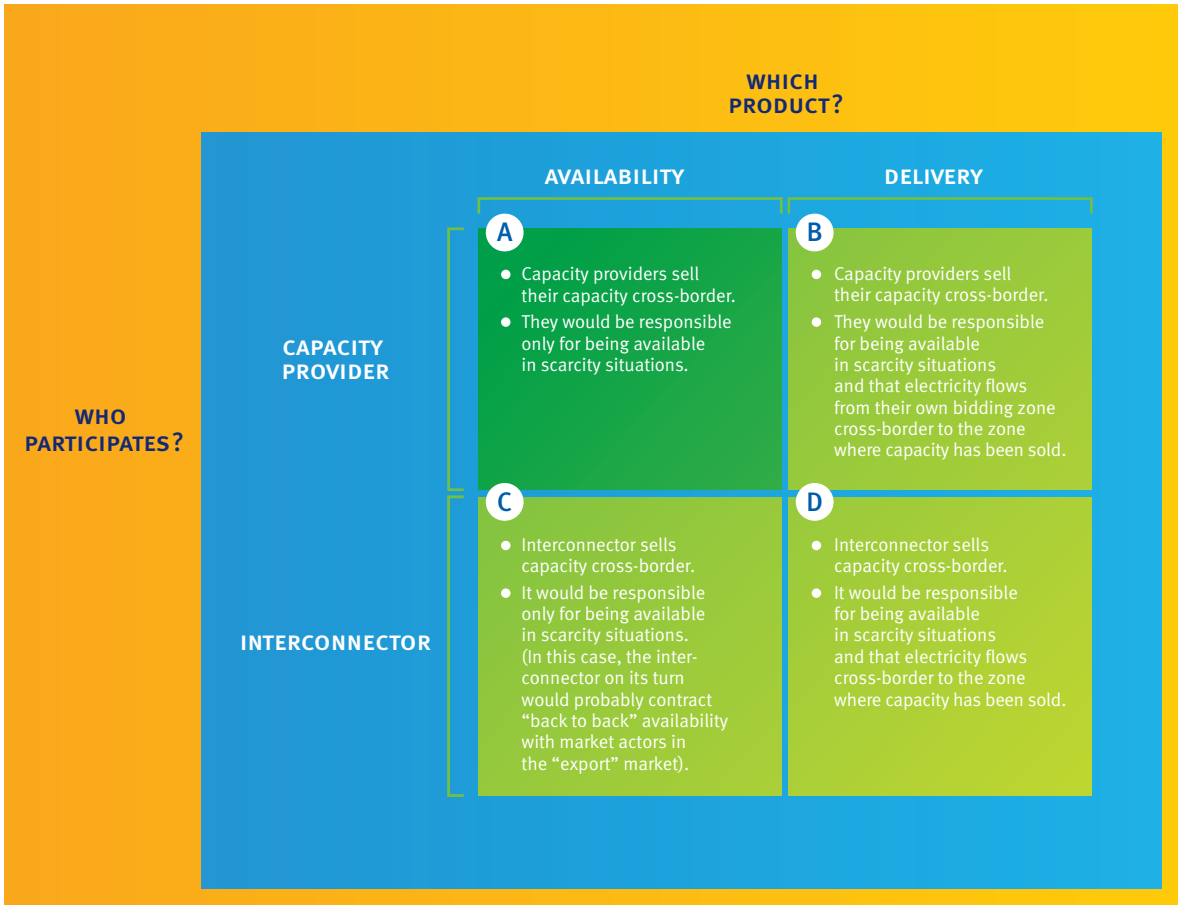
The choice of model for cross-border participation hinges on two fundamental options: who is allowed to participate in cross-border transactions (capacity provider or interconnector) and which product is traded (availability or delivery) – see Figure 16.

EURELECTRIC supports **Model A** where the capacity provider sells availability, with the interconnector getting paid for the "congestion rent". This model minimises energy market distortions while guaranteeing that market agents, and not regulated entities, participate in the capacity market. Delivery as a product, as in **Models B and D**, has the potential to distort the energy market by forcing delivery of energy that could otherwise be out of the merit order. The main drawback of **Model C** is also that interconnectors participate in the capacity market in competition with market participants.

In developing Model A, EURELECTRIC believes that a set of key principles for cross-border participation in capacity markets should be verified:

- Common requirements and market rules for all capacity market participants (e.g. certification, penalty regime, availability requirement, etc.);
- Participation with the same capacity in more than one capacity market should not be possible (no double commitment and earnings);
- TSOs should offer a certain amount of cross-border participation (to be approved by National Regulatory Authorities);
- No reservation of cross-border capacity should be introduced in order not to interfere with the functioning of the forward, day-ahead, intra-day and balancing markets, which will determine the actual direction of the energy flow;
- TSOs have to define how much generation can be made available from the market with a surplus to the country with a capacity market.

Figure 16 – Options for cross-border participation in capacity markets



SUMMARY OF RECOMMENDATIONS

EURELECTRIC believes that the European electricity market is entering a new phase, driven by the decarbonisation agenda that is being pursued. To achieve a successful transition that gives customers continued security of supply while decarbonising the electricity sector in the most competitive, cost-efficient way, EURELECTRIC proposes the following measures:

Enhance market functioning as a "no regret" option – completing the Internal Energy Market is fundamental	**Make RES fit for the market** – achieve operational integration of RES in the market, design more cost-efficient and less market distortive RES policies	**Make the market fit for RES** – adopt a European mind-set and take a regional approach to market design that avoids uncoordinated national developments, in particular in regard to the implementation of capacity markets
• Fully implement a European energy market through integrated forward, intraday, day-ahead and balancing markets to ensure incentives for flexibility, including demand response • Set up more interconnections between national markets • Remove wholesale price caps and regulated end-user tariffs and other distortions in wholesale and retail electricity markets	• Introduce a universal balancing requirement as a first step • Use market procedures such as auctions to make new investments cost-efficient • Adapt existing support schemes and introduce new mechanisms to minimise market distortion • Post-2020, the ETS should be the main driver for RES investments	• Capacity markets, where necessary, should be market-based, technology-neutral, open to existing plants and new investments, and equally open to generation, demand and storage • Decentralised capacity certificates or centralised auctions for capacity are the preferred types of capacity markets as they are most likely to cost-efficiently ensure long-term security of supply • Adopt a regional instead of national approach to capacity markets • All capacity markets must be open to cross-border participation • Evolve towards a market design that delivers a level playing field for all market participants and properly values energy, flexibility and capacity

eurelectric

ELECTRICITY FOR EUROPE

Union of the Electricity Industry - EURELECTRIC

Boulevard de l'Impératrice, 66 boîte 2
1000 Brussels
Belgium

T.: + 32 (0)2 515 10 00 - F.: + 32 (0)2 515 10 10
website: www.eurelectric.org
twitter.com/EURELECTRIC

Design by www.generis.be / © photos www.shutterstock.com