Market Design in Context:
The Transition to a Decarbonised Power Sector

Regulatory Assistance Project response
to the European Commission’s public consultation
on a new energy market design

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Summary

Europe is substantially oversupplied with capacity relative to resource adequacy requirements, the principle cause of financial instability in wholesale power markets.

The consultation asks whether the design of the power market is able to sustain investment needed to ensure security of supply and deliver clean-energy resources. Yet it fails to tackle the main factor destabilizing the investment climate: What should policymakers do about the glut of existing generation capacity that is depressing wholesale prices, artificially inflating the cost of low-carbon resource support policies, and foreclosing the market rationale for the new investments that the consultation presumes, explicitly and implicitly, will be required in coming years? Given that Europe as a whole is substantially oversupplied with capacity, prices that are too low to sustain investment should first be presumed to be the result of a failure to eliminate surplus capacity rather than a flawed market design.

Suggestions that new low-carbon resource investment should be "driven by the market" ignore the near total absence of market demand for the scale of new investment envisioned by current targets.

Current policy and legislation envision a scale and pace of investment in renewables and other low-carbon resources through 2030 for which there is no realistic prospect of market demand. New variable renewable capacity in particular will not replace dispatchable capacity on a one-for-one basis, but without a steady and substantial retirement of existing fossil capacity from the market, no market—of any design—will drive the expected expansion of low-carbon resources without policy support. Continued support for low-carbon investment, along with the managed retirement of fossil generation that is both surplus and incompatible with the direction of energy and climate policy, should be considered part of the envelope within which the market will have to operate effectively.

While support for low-carbon investment should continue, variable renewables can and should take on more responsibilities as mainstream system resources.

Key variable renewable options, such as onshore wind and solar PV, have reached a level of maturity and market share that warrant greater assimilation into the power system as mainstream resources. Responsibilities such as balancing, economic curtailment, and increased exposure to market prices can be introduced in ways that do not unduly disadvantage them relative to other system resources. This issue should be considered separately from the need for continued policy support for investment in renewables.

Claims of a need for more investment support to meet resource adequacy standards cannot be evaluated objectively without a fundamental overhaul of the adequacy assessment process.

Despite the fact of a general oversupply of generation capacity, individual Member States continue to insist that *their* security of supply is at risk and requires long-term, out-of-market support for generation investment, including existing capacity that is incompatible with other policy objectives. This points to an urgent need for a state-of-the-art resource adequacy assessment framework that is independent, transparent, and conducted at a regional level that reflects the physical reality of an increasingly integrated European market. Given the general conditions of oversupply, out-of-market support for capacity investment should be presumed to be unnecessary unless and until a need for it can be established by a more robust resource adequacy assessment framework.

The primary focus of wholesale market design reform should be on improving the quality of energy and balancing market prices.

The market design underlying the internal energy market (IEM) relies on energy prices that reflect the marginal value of energy, not just short-run production costs but also the costs of numerous other actions required from time to time to balance supply with demand, including the opportunity

cost of energy when balancing reserves are scarce. One of the things on which most market design experts agree is the importance of ensuring energy and balancing market prices that reflect as closely as possible the full real-time value of energy and balancing services. Proper scarcity and surplus pricing are fundamental. Perhaps most importantly, they are the only reliable way to capture the true value of flexible resources. Intimately related to this is the imperative of completing short-term (intra-day and balancing) market coupling.

Administrative measures may be needed to bolster the performance of markets until practical barriers are overcome, but such measures should be complementary.
Concerns have been raised regarding the ability of energy markets to yet function on their own to support needed investment while at the same time adequately protecting consumer interests. There may well be a need for administrative intervention to backstop markets. However, many proposals focus on direct out-of-market payments for capacity, in some cases going far beyond what has been shown to be effective. First priority should be given to measures that operate within energy and balancing markets to ensure that the security of supply value of investment in capacity is reliably, actionably, and equitably reflected in market prices, since such measures are inherently aligned with other energy and climate policy objectives. Only after such measures have been implemented should a need for additional, out-of-market remuneration mechanisms be considered.

The market governance and institutional framework are not yet up to meeting the needs of a fully integrated EU power market.
Whilst ACER and ENTSO-e have accomplished much, much remains to be done. Both organizations need to increase their ability to act independently of vested industry and Member State interests. ACER must be able to act more decisively to overcome barriers to full implementation of the IEM. Missing from the institutional framework are truly independent, technically competent, adequately resourced regional market monitors capable of policing the competitiveness of the markets on a regular basis. ACER's REMIT process is a partial solution but is probably too centralised, inadequately resourced, and insufficiently independent to take this function as far as it needs to go.

Investment in network infrastructure needs to be scaled up and optimised with fair cost recovery mechanisms that ensure efficient network use.
EU funds will drive only a small fraction of the identified projects of common interest; a contestable approach to financing interconnection could help advance financing of the remainder while giving regulators confidence that network capacity is being provided at the lowest reasonable cost to consumers. There are several high level principles that the EU could apply to distribution system operator (DSO) regulation to ensure grid modernization progresses at the pace and scale needed across Europe and to ensure cost recovery mechanisms contribute to achieving Energy Union goals.

A comprehensive strategy is needed to tap the potential of demand-side resources.
At the heart of this strategy should be market design reforms that fully reveal the value of flexibility. Market rules must be adapted to ensure aggregated demand can access the value of flexibility in all markets on a comparable basis. Policymakers should also recognize that market barriers to efficient energy use will persist, and that many of the best opportunities to deliver cost-effective energy savings will occur in parallel to market operations. For this reason, well-designed energy efficiency legislation will be needed to complement energy markets and the EU emissions trading system (ETS).

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Questions and Responses

1. *Would prices, which reflect actual scarcity (in terms of time and location), be an important ingredient to the future market design? Would this also include the need for prices to reflect scarcity of available transmission capacity?*

Yes — an essential ingredient. Markets that establish fully effective scarcity pricing can be effective in attracting investment at a reasonable cost when necessary to meet or exceed widely recognised security of supply standards, as has been demonstrated in actual markets elsewhere. Market design experts also widely agree that effective scarcity and surplus pricing is necessary to ensure investment not only in the quantity of resources needed to ensure security of supply, but also in the mix of resource capabilities needed to do so at the lowest reasonable cost. Prices that reflect temporal scarcity **and** surplus create the demand for flexibility and therefore reveal its value.

That said, we recognize that there may be practical concerns with the question of whether EU wholesale power markets can yet be relied upon to form effective and equitable scarcity pricing, or whether they will be allowed to do so given concerns about competition and market power. It may therefore be expedient to consider administrative measures that could address these concerns in the short to medium term without undermining the essential task of making wholesale energy and balancing market prices more transparently reflective of real-time system supply and demand conditions, at both the transmission level and, ultimately, at the local distribution system level. This is not only critical to the successful delivery of the IEM, but is also a critical component of the cost-effective integration of growing shares of low-carbon production resources. Capacity remuneration mechanisms that reflect the need for investment in capacity by administratively augmenting energy and balancing services prices have been successfully adopted in several real markets. They are far superior in this regard to mechanisms that commit, via auctions or obligations placed on suppliers, to pay for an administratively determined quantity of capacity on a per-MW basis. We discuss possible approaches to this in our response to Question 2 and elsewhere.

The same goes for locational scarcity. Today, wholesale electricity prices in the EU suggest that congestion largely stops at the borders of Member States, which of course is not the physical reality at all. Congestion is severe in many parts of the EU, and not just across borders but also within countries. It would be beneficial to define price zones based on congestion as differentiated prices from zone to zone would indicate to investors and decision-makers where greater investment in transmission, generation, or demand side management is needed. A balance needs to be struck between the advantages of large price zones in terms of liquidity and uniform prices, and the accuracy of locational pricing at a nodal level. If zonal boundaries are drawn so as to encompass significant congestion in order to retain these advantages, consideration should be given to applying locational signals through transmission charges. The EU Target Model and Network Codes are intended to define zones based on congestion, many national governments and national regulatory authorities (NRAs) have been reluctant to implement this. ACER would be well placed to intervene and ensure more effective implementation of the Network Codes to achieve price zones that better reflect congestion, but at present its powers are largely limited to solving cross-border disputes; these powers could be expanded.

Forward capacity markets offer the illusion of achieving cost-effective security of supply while masking the price volatility that would otherwise be needed to do so. The reality, as seen in other markets where capacity markets have been deployed, is that the expected security of supply fails to materialize unless market participants face effectively the same risk exposure for failure to perform when most needed, and the same opportunity for profit when they do as they would expect to face in a market with fully effective energy and balancing market price formation. This can be done directly through energy market scarcity pricing, indirectly through steep penalty-and-bonus provisions in capacity mechanisms, or some combination of both. Effective real-time scarcity pricing, in one form or another, is central to the task of ensuring security of supply. It cannot be circumvented.

2. *Which challenges and opportunities could arise from prices which reflect actual scarcity? How can the challenges be addressed? Could these prices make capacity mechanisms redundant?*

The opportunities that would flow from establishing more effective scarcity and surplus pricing are significant, especially in the European context. They include:

1) Reliably revealing the true value of the full range of flexibility services. It is impossible to imagine any of the more commonly cited forms of capacity mechanisms, such as forward capacity auctions, succeeding at the task of bringing forward the optimum mix of investments **without** collateral measures to improve the quality of energy and reserves market pricing signals as much as possible.
2) The creation of a robust business case for demand response as a flexibility product. In a low-carbon power sector, the most valuable role for demand response will be as a flexibility product, not as a capacity product, though demand response as peak-shaving capacity will continue to have some value.
3) Inherent compatibility with the needs of a low-carbon power system. Effective energy market prices ensure that the market incentives are aligned with, rather than in conflict with, the shifting value of different types of resources as more and more new low-carbon supply enters the market. And emphasizing energy market mechanisms rather than forward capacity markets mitigates the risk of overcompensating high-carbon, inflexible generation that will soon have to exit the market to make room for the new low-carbon investments.
4) Perhaps most urgently in the current European policy debate, inherent compatibility with the IEM and the Target Model. Market integration can only really succeed if energy prices are transparent and robust reflections of actual supply and demand conditions on the grid. Administrative capacity mechanisms that enhance energy market prices will accelerate implementation of the IEM, whereas mechanisms that tend to stand in for robust scarcity pricing will act as an impediment that must be overcome.
5) Energy prices that reflect scarcity will increase opportunities for cross-border trade and the attractiveness of increased interconnection capacity.

There are also a number of challenges that need to be addressed in realizing the central role that scarcity and surplus pricing should play in the achievement of the IEM and Target Model. Below, we propose some recommendations to address identified challenges. For more information, see Hogan, Weston, and Gottstein, 2015.

a. Ensuring wholesale energy prices fully reflect the true marginal <u>value</u> of energy in real time. It is a myth that energy prices are or should be determined by the short-run production costs of the marginal generating unit. Prices in those markets that have established effective scarcity pricing frequently exceed, sometimes by orders of magnitude, the short-run production cost of the most expensive generator on the system. Independent market monitors in those markets have generally found that these prices reflect legitimate market conditions, not abuse of market power. Prices in markets with real scarcity pricing are set by the marginal **value** of energy, not by short-run production costs, though it is fair to say that in many hours of the year the two are more or less the same.

This requires that all actions required to match supply and demand be reflected in the final clearing price. At the moment, in most markets across the EU this is clearly not the case, with the costs of various actions customarily undertaken by system operators to balance the system either socialised, subsidised or suppressed. At a minimum, price caps should be raised to levels high enough to allow prices to reach levels approaching the full value of lost load during legitimate system stress events. Clearly this is only feasible if done alongside the other measures discussed here.

Final clearing prices should also reflect the true cost of accessing price-responsive demand, which is simply the voluntary expression by some customers of the value of a given energy service or services rather than an involuntary loss of load to be charged against the reliability of the system, as some have tried to claim.

Energy imbalance ("cash-out") prices should reflect as closely as possible the true value consumers would be expected to ascribe operating reserves in ensuring security of supply, particularly when the supply of reserves falls below the amount deemed by the system operator to be necessary to meet resource adequacy standards. (See below for more on this.) Energy market prices should be expected to converge to that value as real time approaches. In other words, in a functioning energy market the energy price must reflect not just the direct costs of whatever actions are required to match supply and demand, but also the opportunity cost of generating energy rather than offering the associated capacity as system operating reserves. There are good extant examples of how to achieve many of these outcomes, including the recent cash-out reforms implemented by the Office of Gas and Electricity Markets (Ofgem) in the UK.

Externalities must also be adequately internalised with appropriate reforms and implementation of environmental protection legislation, without exemptions—in particular, the EU ETS and Industrial Emissions Directive (IED) (best available techniques reference document for large combustion plants (LCP BREF)).

b. Mitigating market power.

Dominant market players and the potential for abuse of market power remain concerns in some Member States, though in others there has been good progress. This will be a major impediment to effective market functioning wherever it exists unless and until it is effectively addressed, irrespective of the approach to market design. Capping prices in the energy market and shifting capacity remuneration to various forms of forward capacity mechanisms is seen by some as a shortcut to addressing this issue, but experience with this approach in other markets demonstrates that competition issues do not disappear, they simply migrate to the capacity markets. Competition issues must be tackled directly rather than swept under a capacity market rug.

The most obvious step is to enforce competition law at the EU and Member State levels aggressively to ensure that no market participant controls a large enough share to actually exercise undue market power. This is clearly easier said than done, but it should be more achievable if pursued in combination with the other recommendations offered here, in particular, further market integration.

A crucial related step is to institute effective market monitoring to assure consumers and their governments on a regular basis that regulators are doing their jobs, and that prices accurately reflect the state of the system rather than abuse of market power. This requires the appointment of a competent, sufficiently independent and adequately resourced market monitor. None of the existing market institutions fit the bill—the market monitor must be independent, and be seen to be independent, of transmission system operators (TSOs), Member State governments, and their NRAs.

Finally, the quickest and most readily available path to addressing market power across the EU will be the implementation of existing legislation mandating true market coupling and cross-border competition. The Commission, ACER, and the Court of Justice of the European Communities (ECJ) should take aggressive action against Member States that block flows across interconnectors/borders in open defiance of EU law. The Commission and ACER should also ramp up pressure on Member States to complete balancing market coupling.

c. Building and sustaining political support.

Politicians and regulators may be concerned that allowing more volatile prices and price spikes could chill needed investment, encourage abuse of market power, and harm consumers. They must be given confidence that these concerns are being properly addressed.

Effective mitigation of market power as described above is obviously critical. However, it may be necessary for now to give government and system operators more tangible means, other than crude and largely ineffective price caps, to ensure that consumers' willingness to pay for security of supply is fairly expressed without exposing consumers to undue risk of price gouging. Some markets, including most notably the UK and Electric Reliability Council of Texas (ERCOT), have adopted administrative mechanisms that leverage the process by which system operators constantly monitor the availability of reserves against the level needed to ensure the established security of supply standard. These mechanisms apply an administrative price curve, based on the assumed value of reliability to consumers, when and to the extent that the supply of reserves falls below the target quantity. This functions in essentially the same way as more conventional capacity remuneration mechanisms, except that it provides the remuneration in the form of shortage price adders to the reserves price and, indirectly, to the energy price. This allows market operators to access the benefits of effective scarcity pricing in the energy and balancing markets, while also affording them added confidence that investors will have sufficient opportunities to earn the full value of capacity needed to deliver security of supply when investment is needed, through both more robust energy market pricing as well as by driving trade in the forward risk hedging opportunities that generators and consumers will find valuable. It also gives market administrators a benchmark against which to monitor pricing during system stress events, to ensure that prices do not climb higher than they would be expected to do once consumers are finally in the position to express for themselves their willingness to pay more for more electricity.

Market administrators should do what they can to facilitate and monitor the growth of robust over-the-counter and exchange-traded forward hedging markets. This is what provides investors with the risk-management opportunities so often said to be needed by investors; it also gives policymakers the confidence that customers who prefer to be hedged against such volatility have ready opportunities to do so, directly or through supply offers. This will require attention to the extent to which financial market regulations unnecessarily constrain the growth of such trading activity.

Governments often promote new entry as an effective bulwark against abuse of market power, and new entry is indeed one of the indicators of a healthy competitive market. Greater reliance on surplus and scarcity pricing may make new entry by smaller competitors more challenging, relative to opportunities that may be created by a reliance on mechanisms such as capacity auctions. This is something that would need to be addressed directly, for instance by offering new entrants assistance with risk management and contracting.

Finally, education of government and regulatory officials can be effective. Officials who must deal with these issues without having special expertise in them should have access to reliable information about the nature of legitimate scarcity pricing; about experience with investment and resource adequacy in markets that rely primarily on effective energy market pricing (including investment in "peaking" resources that are required but that are expected to operate only a small number of hours in a year); and about the types of bilateral and exchange-traded long-term risk-management opportunities that emerge in markets where participants actually have the incentive to engage in them.

3. *Progress in aligning the fragmented balancing markets remains slow; should the EU try to accelerate the process, if need be through legal measures?*

Yes, **integration and alignment of balancing markets is a priority** action, as social welfare benefits could be significant with greater system optimisation, reduced cost of integrating variable renewable generation, increased competition and trade, and mitigation of market power. A central promise of the IEM—lowering the cost to all European consumers of security of supply in a low-carbon power system through cooperation in ensuring resource adequacy—will forever be out of reach as long as system resources that could contribute to meeting regional system balancing needs in real time remain balkanised behind arcane and protectionist balancing market rules.

4. *What can be done to provide for the smooth implementation of the agreed EU-wide intraday platform?*

The Guidance on Capacity Allocation and Congestion Management is based on continuous intra-day trading rather than timed auctions. The latter is superior with respect to providing efficient price signals and allocation of interconnection capacity. However, for the implementation of continuous intra-day trading, it is desirable to adopt an ex-post pricing model, with forecasts of pricing outcomes that would more accurately price capacity but with a price cap so that bidders would know the limit of their commitments.

5. *Are long-term contracts between generators and consumers required to provide investment certainty for new generation capacity? What barriers, if any, prevent such long-term hedging products from emerging? Is there any role for the public sector in enabling markets for long-term contracts?*

It is a truism, yet one that often gets lost in this discussion, that what investors want and what they require are usually two very different things. Investors in generation and in enabling demand flexibility do not require certainty, nor do they have a right to expect it. They do require a level of confidence in the prospects for risk and reward that competes favourably with other prospects for investing their capital, and they have a right to expect prospects for risk and reward that represent an equitable and efficient sharing of risks and rewards between investors and consumers. These can be based on a number of factors, one of which can be the availability of risk-sharing arrangements with creditworthy counterparties for a longer period of years into the future. As in any other commodity market, liquidity in trading in risk-sharing arrangements is directly related to the extent to which potential counterparties have an incentive to do so. The pervasive oversupply of capacity in the EU and the prospect for that to be the case beyond the horizon required to build new capacity means that buyers in the EU wholesale power markets have no need and thus no reason to share in the risks of investment in new capacity resources. This is only compounded by the fact that in most EU wholesale markets, the true costs of addressing real-time shortages when they do emerge are obscured from wholesale buyers in various ways. Investors will build, and have built at reasonable cost, new capacity in what are often referred to as “energy-only” markets on the back of a suite of forward commitments of various types and tenors with a wide range of creditworthy counterparties, including screen-based trading on exchanges. This includes even so-called “peaking” capacity, which is needed for resource adequacy but is expected to operate for very limited periods of time.

What is required to bring forward this sort of private market risk management activity is to **actually expose wholesale market actors to price and volume risk.** As the reality of these operating "energy only" markets shows, there may well be a public sector role in enabling the emergence of liquidity in the risk-management tools investors actually need. That role starts with measures to ensure that price signals from the energy and balancing services markets reflect actual conditions in those markets, including the real-time demand for and supply of the operating reserves needed to meet established resource adequacy standards. Measures that go beyond this, in the form of risk transfers imposed on consumers and taxpayers over extended periods of time, should be undertaken only as a supplement to rather than a substitute for mandatory measures to address shortcomings in energy and balancing market price signals. In addition, they should be considered only if and when it becomes apparent—based on objective, standardised, and transparent regional assessment processes—that the quantities and types of investment needed to meet regional resource adequacy standards are not coming forward in a timely manner. Forward-looking public sector undertakings should, in combination with other market mechanisms, expose beneficiaries to risks for non-performance at times of system stress that mimic as closely as possible the risks investors would face in a fully functioning "energy only" market.

Accumulated experience with such instruments in real markets demonstrates that the length of term offered for "long-term" forward commitments does not need to be very long in order to drive needed investment—rolling commitments of six months to a year offered on a regular schedule have proven quite effective—and that such commitments will not be effective in delivering the intended security of supply unless, as stated above, the risk exposure is comparable.

6. *To what extent do you think that the divergence of taxes and charges levied on electricity in different Member States creates distortions in terms of directing investments efficiently or hamper the free flow of energy?*

Divergence in taxes and charges applied at the wholesale level could impact competition between generators and so impact investment decisions and flow of electricity. Divergence in taxes and charges at the retail level can negatively impact the competitiveness of some industrial consumers. The share of taxes and levies in retail prices has been growing in many countries and in some countries this share now plays a decisive role in retail prices. In order to shape energy demand around the availability of generation and real-time status of the power system, it is critical that these taxes and charges are not fixed costs but instead linked to energy volume, or more ideally, linked to the real-time needs of the wholesale electricity markets. **Member States should be allowed or indeed encouraged to vary these taxes/levies in order to encourage efficient and responsive energy consumption.** For more information on such an idea, see RAP and Ecofys, 2014.

7. *What needs to be done to allow investment in renewables to be increasingly driven by market signals?*

There is zero reason to expect the scale and pace of investment in renewables embedded in current EU and Member State legislation and energy and climate policy to occur based to any significant extent on market signals, for the simple reason that the market is thoroughly saturated with capacity and can be expected to be so for many years to come. Even if and when some demand for new investment emerges in the early to mid-2020s, it will be a tiny fraction of the renewables (and other low-carbon) investment projected and required through at least 2030.

The only way the chosen market design—any market design worthy of the name—could be expected to drive that quantity of low-carbon investment during that period would be if Member States were to engage in a massive program of early retirement, preferably of the dirtiest, least flexible plants on the system, which would then create the demand for the cleaner, more flexible investments required for the transition, including investment in renewables. That is not too much to ask, but it is probably too much to expect. While managed disinvestment should be undertaken as soon as possible and may well happen to some extent in some Member States, the likelihood is that it will be nowhere near the scale required to be able to simply leave it to the market to drive the expected level of investment in renewables, or even in the new flexible dispatchable resources that will be needed to facilitate their integration into the grid.

Capacity markets that commit financial support years in advance to the plants that all of this new investment will be expected to replace will certainly do nothing to improve matters.

The more likely scenario, and the one that should be the baseline expectation, is that investment in renewables through at least 2030 will continue to be driven primarily by policy, and that policy-driven investment in renewables and other low-carbon resource alternatives will form a part of the envelope within which the market will be expected to function. And if the market does function as it should, one consequence will be that significant quantities of disinvestment—early retirement from plants that will, inevitably, have become stranded and/or are inconsistent with the delivery of established energy and environmental objectives—will eventually occur. This will happen because the market will continue to be saturated—probably over-saturated, but saturated is sufficient for this purpose—with supply and prices that continue to languish at low levels. **The only question is whether that disinvestment takes place in an orderly fashion consistent with other policy objectives, or in a chaotic fashion that deepens and perpetuates the current turmoil in the electricity sector.**

This is not to say that, once built, renewables shouldn't be more and more assimilated into the market as mainstream resources (see answer to Question 8 below). These are two different things. Imposing mainstream market obligations on renewables will probably, in the short term, increase the cost of policies supporting renewables investment before they once again resume their inexorable reductions in overall cost. And that is entirely appropriate. But that does not change the fact that **investment in new low- or zero-carbon resources at a pace far exceeding what would be required by "the market" over the next 15+ years is non-negotiable if the EU wishes to have any chance at all of achieving established climate targets, so expecting that investment "to be increasingly driven by market signals" during that period is simply unrealistic and unhelpful, almost regardless of what happens to ETS allowance prices between now and then, though it should also be recognised that the prospects for ETS prices to rise to anywhere near the level that would be required on their own to drive such a massive turnover in power sector assets in that timeframe are, shall we say, dim at best.**

As for what might happen beyond 2030, it is not at all inconceivable that in a market that (a) actually needs incremental new capacity investment, (b) has fully effective energy and reserves market pricing, (c) has substantially achieved the EU-wide market integration actually envisioned under the Third Energy Package, (d) is pricing carbon emissions at levels that actually drive investment decisions, and (e) is **setting and diligently enforcing** restrictive regulations of other pollutants, would readily support investments in renewables as well as any other appropriate resource options; energy prices in such an environment would **on average** likely be similar to what they are today, perhaps even a bit higher, but would also likely be far more volatile, reflecting increased volatility in energy supply and net demand. We recognize that that is all eminently debatable, for instance with respect to whether variable renewables would have a sufficient opportunity to earn revenues during periods of higher prices. However, that discussion requires looking beyond the horizon relevant to this current market design initiative, with far better foresight about market conditions, political environment and, perhaps most importantly, technological development than anyone involved in this discussion today can honestly claim to possess.

8. *Which obstacles, if any, would you see to fully integrating renewable energy generators into the market, including into the balancing and intraday markets, as well as regarding dispatch based on the merit order?*

In principle there are no obstacles to doing so that cannot be overcome simply by adapting market rules and market infrastructure as appropriate to recognize the characteristics of renewables without giving them special treatment, in the same way that market rules and market infrastructure were adapted—massively so, in some cases—to accommodate the integration of a large expansion of new nuclear plants into a power grid that had previously not had to deal with such very large and very inflexible single generating units.

Consolidating balancing area authority over larger geographic footprints, as implicitly envisioned by the IEM, would go a long way in making it easier to economically assimilate large quantities of renewable production. We're seeing that dynamic play out as we speak in the Western Interconnection of the United States, where more than 35 individual balancing authorities that in the past would have never even considered surrendering any of their balancing authority to a more regional organization are, one by one, now doing essentially that, driven largely by the inescapable benefits of doing so as more and more of their production comes from variable renewable sources.

One of the collateral **benefits of restoring scarcity pricing in most EU power markets is that it would spur trade in the very sorts of innovative risk management tools that renewables generators would value** in order to manage their positions efficiently.

It is not at all unreasonable to expect renewables to take on, in a staged fashion and in a comparable rather than an identical manner, more and more of the balancing responsibilities, locational exposure, exposure to fluctuations in market prices, and economic- and reliability-driven curtailment that any other mainstream resource is expected to bear. (The reference to "dispatch based on the merit order" is a little puzzling—renewables are probably always going to be first in the merit order per se by virtue of their zero marginal cost of production, and the drivers for curtailing renewables ahead of other resources will not be merit-order-driven but rather based on various system security imperatives such as transmission congestion, distribution system safety limits, or unit commitments necessary to meet reserve requirements.) But as noted above, **the question of greater assimilation into the system as a mainstream resource is fundamentally separate from the question of what should drive the decisions to invest in them** and in the other new resources required to complete the transition.

9. *Should there be a more coordinated approach across Member States for renewables support schemes? What are the main barriers to regional support schemes and how could these barriers be removed (e.g. through legislation)?*

According to a study by Booz & Co, commissioned by the Directorate-General for Energy (DG ENER) and published in July 2013, the benefits of coordination of renewable energy investment could be an additional €15.5–30 billion per year. As previously mentioned, locational marginal pricing could encourage efficient siting of renewable energy generation. Harmonization of support/subsidies for renewable energy generation would also contribute to the efficient functioning of the internal energy market so would be desirable. Opening of support schemes to cross-border participation will likely drive the amount of harmonization that will be useful and is a realistic way forward.

10. *Where do you see the main obstacles that should be tackled to kick-start demand-response (e.g. insufficient flexible prices, (regulatory) barriers for aggregators / customers, lack of access to smart home technologies, no obligation to offer the possibility for end customers to participate in the balancing market through a demand response scheme, etc.)?*

Scale-up of demand response, extending to the residential sector, will only happen if consumers can rely upon an agent to act on their behalf. These agents, often referred to as aggregators, can pool energy resources and manage consumers' energy consumption on their behalf, removing complexity and requirements from the consumer's view and maximising the value to the consumer from a variety of revenue opportunities. And these agents or demand response providers only act on consumers' behalf if they can establish a business case. This requires that flexibility is fully valued in wholesale electricity markets and that demand response providers can access this value and retain as much of it as possible.

The value of different types of flexibility needs to be properly revealed in all electricity markets in all timescales. Critical to achieving this will be the existence of accurate and efficient price signals that can incentivise a better matching of energy consumption to the availability of energy production and system conditions (see our responses to Questions 1 and 2).

Forward capacity markets have had some success in spurring demand response, a great deal of which has taken the form of traditional peak-day demand reductions, and while this still has some value it has become apparent that this sort of demand response is not really the same as generation capacity. This is because it is generally only available a limited number of days per year and exercisable only a limited number of times a year. As a result, capacity market operators in some US jurisdictions are moving away from awarding this sort of demand response comparable status with generation in their auctions, though they still award such status to demand response providers capable of offering comparable functionality. In these more mature DR markets, the trend is more and more toward demand response as a "flexibility" product, a product that really operates more like an energy and balancing services product than a capacity product. This can still capture the value of peak-day demand reduction, but it extends the market to embrace a much wider range of demand response services as well. This is actually to be welcomed (except of course by those who were receiving full capacity credit for a limited peak-day demand reduction service), since in an increasingly decarbonised power sector it is demand from whatever source, and from many different sources from one day to the next, that can respond to prices signaling scarcity and surplus whenever they appear, regardless of how often and at what time of the year, that will be most valuable. Anything that improves the quality of those price signals will strengthen the business case for all of the most important innovations taking place in energy products and services. And anything that better reveals the value of flexibility, including establishing the business case for innovative demand-side energy products and services, will lead to faster, more reliable and more affordable integration of new low-carbon resources such as wind and solar.

In summary, the following will help reveal the value of flexibility: restoration of scarcity pricing; convergence of energy and balancing prices; faster markets; competitive and transparent procurement of balancing and ancillary services as close to real time as practicable; definition of market products according to performance outcomes with consideration for energy demand resource characteristics; measures to drive development of and innovation in risk management options and liquid futures markets; reliability mechanisms that work with the IEM instead of against it (such as the administered reserve shortage pricing mechanisms or energy-denominated CRMs recommended in our response to Question 2); and pricing zone boundaries that are determined by congestion and not national borders.

In wholesale electricity markets, rules were originally designed around centralised thermal generation, not distributed demand-side energy resources which can be pooled or aggregated. Some European markets are starting to open up to demand response but progress across Europe is patchy and much greater progress is needed in most markets (see SEDC, *Mapping Demand Response in Europe Today 2015*). EU market rules therefore need to be systematically reviewed and adapted to enable **full participation of qualified aggregated energy demand and storage in all markets at all timescales on an equal footing with generators**, for example: allow asymmetric bids; ensure minimum bid size is not unnecessarily large (≤100kW); ensure rules are designed to work at the aggregate/pool level rather than at discrete resources; specification of availability, activation, duration, and recovery requirements that take maximum advantage of the variety of responses available and do not unnecessarily restrict delivery of the outcomes needed by the system.

Opening the markets to the demand side should spur innovation, but only if **markets are truly competitive and new service providers can easily enter the market.** New entrants could introduce innovative business models that would motivate incumbents to adapt their business models. A common framework is therefore needed to **allow demand response aggregators to act independently of the consumer's supplier** as suppliers are inherently in competition with independent aggregators. It is also necessary to clarify the rights and responsibilities of the market actors and establish a legal framework for their interactions. Other EU and Member State policies and legislation must also be compatible with the IEM to ensure a true level-playing field for competing energy resources. This requires an end to any preferential treatment for generation not compatible with EU energy policy goals—removal of subsidies; no exceptions for compliance with pollution performance standards (e.g., current LCP BREF revision). Effective enforcement of the EU's State Aid Guidelines, EU competition law, and IEM legislation will go a long way in ensuring a level playing field for demand response providers.

Minimisation of discretionary and transaction costs will be critical if aggregators are to retain enough value to establish a viable business case. A legal framework that clarifies the interaction between market actors, as mentioned above, will be helpful here. Other options should include:

- provision of a regulatory mandate or standards that will assist technology manufacturers in reducing costs and initiatives to reduce any upfront expenditure on the part of the consumer;
- standard processes for information exchange, transfer of energy and financial settlement;
- standardised baseline methodologies; and
- protocols and requirements (e.g., communication protocols) that apply at the aggregate level, not down to the level of the consumer.

Some value will also come from local networks, as DSOs could use demand response to manage local congestion and voltage quality. **Grid tariffs that reflect the real-time state of the energy system will be most effective in enabling demand response** (see response to Question 15). **Fixed cost components in tariffs are totally ineffective and should not be applied. Capacity components should be designed with care,** as it is capacity at the level of the transformer and not at the level of the consumer that matters. There exists evidence in some Member States that poorly designed grid tariffs focussed on maximum energy demand at the consumer level actually prevent demand response and does not enable efficient use of networks. **DSOs should also be allowed and encouraged to contract demand response in an open market and in competition with other users, in order to balance the grid and manage voltage quality, congestion etc.** Usually the state of the whole system and local system will be in sync but sometimes it will not be the case; in such instances **DSOs should compensate customers if they must veto customers' provision of demand response to the TSO**. This will ensure DSOs make optimal operation and investment choices.

How the allowed revenues of a DSO are set by the regulator can influence whether DSOs use smart grid technologies to manage distributed energy resources and so optimise capex/opex investment. **Some regulatory models bias towards capital investment and steps should be taken to remove this bias.** Traditional cost-plus regulation, for example, has been shown to be encourage excess investment in capital with too little attention to cost control. **This approach is not appropriate for development of the smart grid and should be discouraged or even prohibited in the EU.** To ensure sufficient, efficient investment in modernizing the grid and application of smart technologies, it is necessary to **decouple revenues from energy throughput**, incentivize cost control and achievement of service quality goals, and provide a price control period of sufficient length to ensure the DSOs have time to make major changes to business operations/structure and to take a long-term view (five to eight years). **Well-designed performance-based regulation can go a long way in incentivising DSOs to deliver public policy goals** (See Lazar, J., 2014: *Performance-Based Regulation for EU DSOs*.) Incentives need to be well designed to ensure rewards are sufficient to drive the required behaviour and penalties need to be applied with care such that the DSO is motivated but remains financially viable. **Incentives are best combined with a total expenditure (totex) revenue foundation that is capped with an efficiency factor applied to totex; this broad approach should be encouraged at EU-level. At EU-level, appropriate indicators should be identified in order to monitor progress in grid modernisation, to enable benchmarking of DSOs' performance and for use as revenue drivers in performance/output-based regulation. Transparency requirements could also be applied to enable understanding and monitoring of how DSO revenues are set and spent.**

Assurance for consumers in the form of, for example, rules for data protection and data management, quality and comparability of information, and measures to mitigate market power (e.g., improved market monitoring), are important prerequisites for consumer participation.

11. *While electricity markets are coupled within the EU and linked to its neighbours, system operation is still carried out by national Transmission System Operators (TSOs). Regional Security Coordination Initiatives ("RSCIs") such as CORESO or TSC have a purely advisory role today. Should the RSCIs be gradually strengthened also including decision making responsibilities when necessary? Is the current national responsibility for system security an obstacle to cross-border cooperation? Would a regional responsibility for system security be better suited to the realities of the integrated market?*

There is a limit to what can be achieved via cooperation between TSOs. For example, in all major system shut-downs that have occurred in recent times, both in Europe and the United States, communication failures between control areas have been a contributing factor. **If the integrated market is going to be operated efficiently and safely, an over-seeing regional entity is needed to plan and operate the integrated system.** This is inevitable and simply an extension of the ongoing process where transmission systems have expanded from local systems to regional systems to national systems and are now becoming international. **The European Commission should therefore establish independent regional entities with accountability for cross-border operational and planning issues**. It would likely be more effective to set up institutions from scratch right away, as there is a clear need for it, than to evolve the responsibilities and authorities of the RSCIs over time.

Given the current context, it will likely be politically difficult to pass high-level responsibility or decision-making for system security from Member States to the independent regional entities mentioned above. While regional entities should be responsible for assessing system security and delivering system security through system operation and management, Member States will likely retain overall responsibility for system security.

Directive 2005/89/EC requires Member States to "take account of the possibility of cross-border cooperation" in addressing security of supply. Given the progress in market integration to date and the further integration planned, it is necessary to ensure that cross-border trade is fully incorporated into security of supply assessments. **These resource adequacy assessments should be conducted at regional level by competent, independent regional institutions, as proposed above, in accordance with a standardised, transparent, probabilistic assessment process with independently vetted and approved inputs and assumption**s. The European Commission should require, as a condition of State Aid approval, that Member State actions to ensure security of supply must be preceded by a determination that there is in fact a security of supply issue to be addressed, as determined by this regional assessment.

In addition, Member States seeking to address an identified security of supply concern should be required, as a baseline *sine qua non,* to establish something like the cash-out pricing reforms recently adopted by Ofgem, similar in many ways to comparable reforms recently adopted in the ERCOT, PJM, NYISO, and ISO New England markets. Should a Member State or a region wish to also retain or adopt other, more traditional "capacity remuneration mechanisms", they could do so with the explicit expectation that improved energy and reserves market pricing, along with measures that allow consumers to express willingness to pay, would indeed over time render such out-of-market CRMs entirely redundant.

12. *Fragmented national regulatory oversight seems to be inefficient for harmonised parts of the electricity system (e.g. market coupling). Would you see benefits in strengthening ACER's role?*

The benefits of market integration are huge, as revealed by the Booz & Co study for DG ENER mentioned earlier. The net benefits of achieving basic market integration through implementation of the Target Model are in the region of €12.5–40 billion a year by 2030 (and could be much greater if integration would be deeper). These quoted benefits will not be fully realised if national interests prevent pan-Europe free flow of electricity and optimal transmission investment (reduction of €3.0–5.0 billion per year by 2030 if transmission investment 50% less than optimal), and if Member States pursue national measures to ensure system security (reduction of 3.0–7.5 billion per year). Further huge gains could be brought about through coordination of RES investment (additional 15.5–30.0 billion per year) and a rethinking on treatment of the demand side relative to the supply side with measures to ensure capture of all cost effective demand side resources including through market reforms to enable demand response (additional 3.0–5.0 billion per year) and complementary regulation to overcome well-known barriers to energy efficiency. **Fully capturing these huge benefits—through a broad "Efficiency First" agenda—is the sure way to achieve the desirable lower energy prices in the longer run and the innovation that will improve the EU's global competitiveness.**

Politically it is not difficult to support this agenda, but implementation is fraught with difficulties because of national interests and the immense challenge for some market actors to transition. Experience to date provides plenty of evidence of this, and the consequential price tag for EU citizens as a collective is extremely high. Institutional arrangements therefore need reform to ensure timely implementation that will deliver these benefits to EU citizens.

Today, many NRAs are not sufficiently independent of their national Governments as required by EU law. The right balance of accountability and independence ensures quality performance (see CERRE study, March 2012, and PWC/FSR study, September 2014). **NRAs that are insufficiently independent of their national Governments should not be participating in ACER's decision-making. There is a strong case, moreover, to ensure that NRAs have a clear European dimension and are not simply focussed on national priorities and welfare. Increasingly, the determination of individual NRAs to maintain an ability to "customise" outcomes is helping to preserve**

fragmentation and prevent truly European solutions from emerging. Similarly, ACER's governance structure needs to be strengthened in order to pursue these European solutions. This would much reduce the sub-optimal compromises and delays that hamper progress today.

Market monitoring needs to be much improved, particularly if market design reforms are to restore scarcity pricing, with respect to a) institutional mandate, b) human and financial resources and c) and scope. ACER, at least in its current form, is not independent enough to be given this function. The independent market monitors in the US are chartered jointly by the federal energy regulator and the ISOs but are, in a real sense, not answerable to anyone—they can be fired, but that's about it. They are free to look where they want, analyse what they want, and say whatever they feel needs to be said about what they find. As one of the objectives of a good market monitoring function will be to reveal the quality of competition and energy regulators' performance in carrying out their tasks, market monitoring should be carried out by an institution independent of ACER. The need for this would be even greater should ACER's powers be strengthened.

13. *Would you see benefits in strengthening the role of the ENTSOs? How could this best be achieved? What regulatory oversight is needed?*

As stated above, there is a limit to what can be achieved via cooperation between national TSOs. **Market integration has now reached a point where ENTSO-E needs to be made independent of national TSOs, at least in relation to cross-border issues.** It would still be dependent on national TSOs for data but should gradually take up responsibility for regional planning and operation. **ENTSO-e cannot be expected to assume greater responsibility for integrated regional system planning and operations and also continue to represent the interests of national TSOs at EU level, without giving rise to inevitable conflicts of interest. Representation of transmission owners, national or otherwise, could be undertaken by a newly formed transmission industry association, not formalised in EU law, similar to how energy regulators' interests are represented at EU-level by CEER.**

14. *What should be the future role and governance rules for distribution system operators? How should access to metering data be adapted (data handling and ensuring data privacy etc.) in light of market and technological developments? Are additional provisions on management of and access by the relevant parties (end-customers, distribution system operators, transmission system operators, suppliers, third party service providers and regulators) to the metering data required?*

In discussions surrounding the future role of the DSO, whether or not DSOs could act as a neutral market facilitator has been keenly debated. RAP takes the view that that the DSO can be a market facilitator, but only with respect to these core functions: efficient operation and development of network infrastructure; system security; technical data management; and managing network losses. In the future, the DSO will also be a market actor, procuring flexibility services in order to effectively manage the system. For this reason it is important to limit the DSO role as market facilitator to its core functions.

The more that DSOs are involved in non-core activities, the greater the need for regulatory control or unbundling. The more the market is developed, the less DSOs are likely to be directly involved in carrying out new activities.

DSOs should be allowed and encouraged to contract demand response and energy efficiency in an open market and in competition with other users, in order to balance the grid and manage voltage quality, congestion etc.. **DSOs should ideally contract through intermediaries or if not possible**

then directly with customers on a temporary basis until competing intermediaries become established.

In relation to data management, the DSO should not engage in any activity that would negatively impact the competitive market. In its recent consultation, CEER proposed three data management models: 1) DSO as market facilitator; 2) third-party market facilitator—independent central data hub; 3) data access point manager. Each model has its own associated benefits and costs and risks associated with these models vary to a considerable degree.

Increasingly, with growth in distributed energy resources and roll-out of the smart grid and smart technologies, DSOs will become major users of data. There is a clear conflict of interest if DSOs provide the data hub, even with safeguards in place. The DSOs have a clear inherent advantage over other market players. **The option of least risk is that of the third-party market facilitator—independent central data hub. This model should be the EU's recommended option, regardless of whether the DSO is fully unbundled.** For the case where a DSO is not ownership-unbundled, then the DSO should certainly not be allowed to act as a market facilitator.

15. *Shall there be a European approach to distribution tariffs? If yes, what aspects should be covered; for example tariff structure and/or tariff components (fixed, capacity vs. energy, timely or locational differentiation) and treatment of self-generation?*

Tariffs should be designed in order to:

- Fairly allocate grid costs to reflect the costs and benefits the user imposes on the system and also taking account the costs and benefits to wider society.
- Influence users' response in order to minimize overall system costs

Because tariffs are an important tool to influence consumption patterns, it is essential to ensure DSO revenues are properly decoupled from energy consumption (kWh) (see our response to Question 10 above). If decoupling is achieved it should not be necessary to update assumptions regarding consumption patterns resulting from tariff design. By contrast, **there should be flexibility in the regulatory framework to allow changes to tariff design during a control period so that the DSO can use this tool to full potential.**

Fixed costs which are not linked to any variable that is within the control of the consumer do nothing to promote demand side management. There is no reason why a DSO's fixed costs should be a fixed amount on a consumer's bill; this is not compatible with Article 15 of the Energy Efficiency Directive, which requires that grid tariffs encourage both energy efficiency and demand response. Incorporation of fixed cost components in grid tariffs should therefore be prohibited. The same principle should apply to taxes and levies (see response to Question 6). For further evidence, see Linvill, Shenot, and Lazar, 2013, and Lazar and Gonzalez, 2015.

Grid tariffs that reflect the state of the energy system will be most effective in enabling demand response. Time-varying volumetric tariffs promote both demand response and energy efficiency, as required by the Energy Efficiency Directive, and should be promoted. See Faruqui et al, 2012, and Lazar, 2013.

As mentioned earlier, capacity components should be designed while keeping in mind that transfomer-level, not consumer-level, capacity is what matters, and that poorly designed grid tariffs prevent DR and network efficiency.

The impact of grid tariffs on energy consumption and provision of demand-side flexibility should be closely monitored with timely adjustments to ensure both energy efficiency and demand response are incentivised. Effective monitoring and reporting of data is necessary in any event to ensure compliance with Article 15 of the EED.

The regulatory framework needs to provide sufficient flexibility to allow changes to tariff design during a price control period, so that the TSO/DSO can use this tool to its full potential and recover allowed revenues in a timely manner.

Network charges should be passed through to consumers in a transparent manner to the extent that they are a separate entry on the customer's bill alongside the energy commodity component and any taxes or levies.

16. *As power exchanges are an integral part of market coupling – should governance rules for power exchanges be considered?*

Yes, **all power exchanges should be brought within the electricity regulation fold, to ensure their operations are consistent with development of a pan-European market.** Financial regulation applies to power exchanges, but on its own is unlikely appropriate or sufficient. For example, the rules imposed by power exchanges in terms of trading requirements (e.g. credit requirements) can be discriminatory and disadvantage smaller players. Further, power exchanges are also often in dispute with each other and with TSOs.

17. *Is there a need for a harmonised methodology to assess power system adequacy?*

To date, resource adequacy assessments have been conducted at the national level using different methodologies. EU-wide assessments have been carried out by ENTSO-E using a standardised methodology though in the past these assessments have been a compilation of national assessments rather than an integrated regional assessment. To capture system efficiencies from interconnection and cross-border trade, assessments certainly need to be regional. The methodology employed by the Pentalateral Energy Forum (PLEF) provides a good example of what can be achieved at the regional level.

ENTSO-E recently conducted a consultation exercise to improve their methodology and are implementing some improvements. For example, ENTSO-e are in the process of moving to a stochastic approach to assessing resource adequacy and already adopt a semi-stochastic approach to assessing flexibility needs. But more progress is need to implement recommended improvements; for example, a more regional approach to resource adequacy seemed to be missing from the ENTSO-E's 2015 System Outlook & Adequacy Forecast. Another important issue is that ENTSO-E's methodology is completely dependent on individual TSOs for data, which is often not consistent. A recent survey by CEER placed a spotlight on the inconsistencies between TSO practices and shortfalls in TSO compliance with the ENTSO-e methodology.

Assessments must also take full account of demand-side energy resources. Assumptions relating to energy demand projections should be reasonable, consistently applied across all EU policymaking, and take into account relevant demand-side-related policies and laws. The need for strengthened governance for EU energy efficiency targets is highly relevant here, as enforceable targets would give planners and investors greater certainty and so reduce the need for overly conservative, and therefore expensive, contingency margins.

18. *What would be the appropriate geographic scope of a harmonised adequacy methodology and assessment (e.g. EU-wide, regional or national as well as neighbouring countries)?*

Overall, Europe is forecast to have a capacity surplus during the years ahead, although some Member States are forecast to develop significant capacity deficits. This suggests a regional or eventually pan-European approach to resource adequacy could have real benefits. Defining regional boundaries for the assessment of resource adequacy would need to take into account the topology and capability of the interconnected system, including planned developments. A regional approach will also need to formalise arrangements for assessing interconnector contribution to resource adequacy, arrangements for the participation of external participation in Member State capacity markets where they exist, and the rules that would apply in the event of widespread scarcity.

19. Would an alignment of the currently different system adequacy standards across the EU be useful to build an efficient single market?

Alignment of adequacy standards is beneficial but not essential to building an efficient single market. As Member States have competence to ensure security of supply, countries should be free to choose their own standard. Customers in those countries with higher standards would be exposed to higher costs. In a regional context, different standards might also influence where generation investment takes place. Reliability standards should reflect the value that governments and market administrators deem their domestic consumers would place on additional investment in capacity to reduce the incidence of generation-related supply interruptions. It is ultimately antithetical to an integrated energy market for a Member State government to adopt a lower resource adequacy standard than a neighbouring Member State, consequently lowering the cost of electricity to their consumers, and yet expect the system operator to give equal consideration to their consumers in the event of a need to ration scarce production. If energy prices reflect scarcity properly, then energy would be drawn to that Member State in a regional market that values continued supply most. Over time this would likely lead to a bottom-up harmonization of standards.

20. Would there be a benefit in a common European framework for cross-border participation in capacity mechanisms? If yes, what should be the elements of such a framework? Would there be benefit in providing reference models for capacity mechanisms? If so, what should they look like?

A common European framework for cross-border participation in capacity mechanisms could yield considerable benefits. As suggested above, there should be a common stochastic approach to assessing the contribution to be made by interconnection in resource adequacy assessments. In addition there should be a common approach to how external resources can participate in neighbouring CRMs, how availability and output is verified, and clear rules on mutual support. See Baker, September 2015.

Perhaps more important than developing a standard capacity mechanism or "reference models for capacity mechanisms" is the need to establish a standard menu of measures or pre-conditions needed before the Commission can approve any out-of-market capacity remuneration mechanism. These measures should focus on improvements to the functioning of the energy and reserves markets, and introduction of an energy-based capacity remuneration mechanism linked to the level of reserves, as outlined in our response to Question 2, could be a mandatory prerequisite to the adoption of out-of-energy-market mechanisms of whatever type. Application of these pre-conditions is on the premise that it is not possible to determine whether or not an out-of-energy-market intervention is needed unless and until the energy market has actually been implemented in accordance with the Third Energy Package and has been shown—via an independent regional resource adequacy assessment—to have failed to bring forward investment needed to meet established resource adequacy standards.

21. Should the decision to introduce capacity mechanisms be based on a harmonised methodology to assess power system adequacy?

Yes. If security of supply is to remain a national issue, Member States should always be able to take what actions they believe are necessary to meet their security of supply expectations. However, such actions should be based on an agreed standard methodology for determining that action is necessary, with standard approaches to interconnection contribution and a requirement that external resource should be able to participate. One step further that could be desirable would be to make the introduction of forward or long-term capacity commitments conditional on the existence of a regional rather than a Member State deficit, taking into consideration actual network constraints. It is also desirable to distinguish between "responsibility for ensuring security of supply", which currently rests with Member States, and "determination that there is a security of supply issue", as this needs to be assessed at regional level by an independent institution for reasons set out in our response to Question 11.