



## ENTSO-E Response to the European Commission's Public consultation on Renewable Energy Strategy

07 February 2012

### Introduction

The European Network of Transmission System Operators for Electricity (ENTSO-E) is pleased to respond to the European Commission's Public Consultation on Renewable Energy Strategy. ENTSO represents 41 TSOs from 34 countries and is therefore, in our view, uniquely placed to comment on the important issues raised in the consultation document. While we have tried to set out brief answers below, we consider that the breadth and depth of issues covered in the document merits more detailed discussion. We would therefore be very pleased to discuss the issues raised in the consultation document and in this response with the Commission in the near future.

### The Grid Integration of Renewable Energy

1. *Do you consider that any of the following national rules and framework conditions will still create obstacles to renewable energy production after 2020? If so please specify which obstacles and the nature and degree of them for each of the following:*

- *Grid connection rules*
- *Cost-sharing rules*
- *Balancing rules*
- *Curtailment regime*
- *None of the above*

The Grid Integration of Renewable Energy creates significant challenges for TSOs. When the volume of variable renewable energy was marginal these challenges were manageable and well understood. At a larger-scale of development new issues are arising which make TSO's core business more difficult; leading to higher integration costs and imbalance situations. However, ENTSO-E's members have demonstrated they are able to overcome these challenges through innovation and cooperation at national and European level. At one stage it would have been inconceivable to consider a network operating with levels of non-synchronous generation of over 30% and up to as high as 50%. Today this is the norm in many countries. The key to continuing to facilitate this transition towards more renewable energy integrated into Europe's network are clear and stable regulatory and policy

frameworks which provide freedom to TSOs in operating networks; provide rewards which are proportionate to the risks they face; and ensure there are suitable levels of oversight and control of generation and load connected to the network. With these conditions in place, TSOs are confident that very significant volumes of renewable energy will continue to be integrated into Europe's network

### **Connection rules**

Given the transposition of the Renewable directives into Member State law it is difficult to see how connection rules per se will be problematic post 2020; provided they are developed in line with emerging network codes being developed by ENTSO-E in conjunction with ACER. However it is important, as RES play an increasingly material role in power systems, that these units are obliged to meet a full range of technical capabilities including low voltage ride-through, active power and voltage control capability and frequency/inertia response to ensure power systems evolve in an efficient and secure manner. In addition the volumes of RES generation that will physically connect to the system, affording priority or guaranteed access, in a timely manner are significant. The Transmission System Operators will have a significant role in contributing in this space and cost recovery for necessary resourcing will be a pre requisite.

### **Cost sharing rules**

In our view, charging regimes should operate on a non-discriminatory basis, treating all parties equally. In addition, ideally, these costs should reflect an appropriate proportion of the costs of network development to generators and load in order to promote efficient decisions. The temptation to provide additional support via network charging regimes should be resisted as it impacts on the efficacy of connection signals and potentially will lead to inefficient network development. As a general rule, ENTSO-E advocate transparent supports which exist independently of other aspects of regulatory regimes.

### **Balancing rules**

ENTSO-E considers that the goal of European energy policy should be to reach a point in which all parties can compete effectively within liquid markets. Once renewable technologies are mature, ENTSO-E considers that it would be beneficial that they are fully exposed to imbalance price signals and balance responsibility. In particular it is important that the more a technology becomes mature and material in volume the greater these producers should be exposed to balance responsibility even if the signals can be differentiated at low penetrations (i.e: special rules for variable RES). A system of balance responsibility would minimise the volume of imbalances within Europe and reduce the associated cost, as well as providing very strong incentives to invest in technologies (e.g. better forecasting tools) to minimise imbalance risk.

### **The curtailment regime**

Managing a grid with very high levels of variable generation requires TSOs to have a range of tools at their disposal to respond flexibly to different circumstances. In simple terms priority access and priority dispatch arrangements limit TSOs' ability to respond flexibly and therefore constrain their ability to deal with emergency situations. As such, they can have a negative impact on system stability. ENTSO-E would caution that these arrangements may

have unintended consequences at high levels of RES. Furthermore, it is absolutely vital that there is clarity about the relative priority between different support mechanisms<sup>1</sup>. In particular there is a need to remove ambiguity within priority dispatch units (e.g. renewables and CHP) as well as interconnection.

2. Which renewables-specific grid related rules do you consider necessary and proportionate in a post-2020 perspective? (Please explain why)

- *Obligation for network operator to develop network*
- *Priority or guaranteed access*
- *Priority dispatch and obligation on TSO to counteract curtailment*
- *Other (please specify).*
- *None of the above*

## Obligations to deliver network

The core business of TSOs is planning, building and operating networks. The integration of significant volumes of RES generation creates a substantial need to expand, extend and reinforce networks across borders and within countries. TSOs are committed to delivering these networks in a coordinated and efficient manner, as shown in the Ten Year Network Development Plan (TYNDP).

However, it must be acknowledged that delivering network needs to be facilitated by fit for purpose regulatory mechanisms which appropriately fund or incentivise the construction of infrastructure, and planning and permitting regimes, which allow infrastructure to be delivered in a timely manner.

Delivering network should also be facilitated by planning and permitting regimes, which allow connecting links and new electrical highways to be delivered in a timely manner. Permit granting should be improved in order to significantly reduce the delay TSOs are facing in many countries that can exceed a decade in some cases to complete all the different steps outlined in the administrative procedures. Developing sufficient networks and transmission grids is a key enabler and critical success factor for the development of large-scale RES.

## Priority dispatch

The evolution of priority dispatch obligations came from a desire to rapidly increase the penetration rate of RES from a very marginal level to large-scale deployment. In the beginning, the effect of support mechanisms on the operation of the power system and the efficient running of the electricity markets was thought to be of a second order of magnitude compared to its associated benefits. With large-scale development of variable RES

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<sup>1</sup> Two immediate examples to highlight the issue are that it is being proposed to give Combined Heat and Power priority dispatch status similar to RES under the energy efficiency directive. Yet under European regulation all interconnection needs to be maintained with re-dispatch first before capacity is withdrawn. This raises the issue of which units to dispatch down first RES (on-shore wind, off shore wind, solar), CHP or interconnection. If this is left to Member State level it may have impacts for the efficient operation of the internal market at high combined levels of RES, CHP and interconnection. Evidence of this policy ambiguity is already being seen in Member States with high RES penetration today. Post 2020 these policy ambiguities need to be fully resolved.

technology and other priority dispatch units (e.g. CHP) this is no longer the case. The implementation of priority dispatch at high levels of RES and CHP may lead to increased security issues and inefficiencies in the internal market. These may unintentionally limit the capacity of the system to successfully integrate the resource levels that these statutory instruments were introduced to facilitate in the first place. Due to the reducing efficacy of these support schemes and the associated security implications to the system ENTSO-E recommend that these types of support should be kept under review.

It is essential to ensure that all priority dispatch units are fully controllable and observable in real time in order to assist in maintaining system security. Absolute priority status without other conditions should only be reserved for emerging RES technologies when they are at level where these supports have only a small impact on the secure operation of the system.

*3. With regard to system integration of wind and solar power, what measures do you consider most important to increase the flexibility reserve of the system:*

- Increase flexible back-up capacity (capacity payments ...)*
- Increase availability of demand response (smart grids ...)*
- Accelerate infrastructure development and interconnection*
- Market-based measures: better use of interconnectors (implicit auctions), trading closer to real time*
- Increased availability of storage*
- Enable renewable generators to offer balancing services to TSOs*
- Other (please specify)*

### **Increase flexible back-up capacity (capacity payments)**

The addition of significant volumes of variable non-synchronous generation (wind and photovoltaics) fundamentally alters the dynamics of the system. This creates challenges not only in balancing the system in real time but also in long term adequacy, system transient stability, network steady state voltage control and disturbance response. Managing these situations requires a range of system services (provided by parties on the generation and demand sides of the market) to be available in multiple timeframes. For example, while having sufficient capacity is important, it is also vital that TSOs can access system services that can provide energy rapidly following a disturbance to maintain frequency and support the voltage in both steady state and disturbance conditions. As such, any reward scheme should seek to incentivise the delivery of the needed system service. Understanding the needs of the system is central to any design of a reward mechanism and as such the TSOs should be closely involved in this aspect. It is not appropriate to create a reward structure where there is no scarcity.

Notwithstanding this, ENTSO-E considers that well-functioning markets with the prerequisite infrastructure are essential to ensuring appropriate reward. After that, TSOs must develop new tools and find innovative approaches to ensuring system security in this changing environment. It is also important to recognize that the full impacts of higher renewable integration, that have been managed successfully so far by the TSO's, are not yet fully understood. There may be further challenges to be identified and managed as Europe moves

towards an even higher degree of renewable integration. However it is clear that variable RES will have to play an increasing role in system service provision. It is through a combination of evolving in forcible standards and appropriate market and system service design that the facilitation of RES can be best managed. ENTSO-E has developed considered thinking in this area and are available to discuss.

### **Increase availability of demand response**

TSOs are already having to adapt and innovate in order to meet the new challenges to power system security. At the same time significant innovation is taking place on the demand and generation sides of the industry as new technologies and processes are developed. In ENTSO-E's view, market arrangements should aim to promote further innovation by providing opportunities for all parties, of all sizes and all technologies on the demand and generation sides of the market to participate in non-discriminatory, ideally market based, mechanisms.

### **Accelerate infrastructure development and interconnection**

The significant growth in the connection of renewable generation within Member States is likely to fundamentally alter the power flows throughout the European transmission network. This impact will be particularly significant where large volumes of renewable generation are clustered in relatively small geographic areas or where they are connected a long distance from demand centres. Securely incorporating the flows from renewable generation into the European grid will require action within and between countries. A safe and secure European power system requires robust internal networks in Member States and increased interconnection between them. Accommodating RES requires overcoming the barriers that prevent internal transmission networks from being reinforced especially planning and permitting issues. Nevertheless risks rise if renewable generation in certain regions expands faster than the transmission network to bring that generation to the loads where it is contracted for - which is for now a function of national support schemes. If this is allowed to happen then there is a real risk of significant curtailments of RES generation, or of provoking network security risks. The recent increase in RES in tightly meshed synchronous networks make such situations difficult but also urgent to resolve.

### **Creating efficient markets**

In ENTSO-E's view, a real commitment is needed to deliver competitive markets by 2014. ENTSO-E has worked with stakeholders over a period of years to develop a common market model for Europe. This so called 'Target Model' provides a blueprint for allocating capacity and managing congestion on interconnectors between Member States in all timeframes – from the allocation of long-term rights in forward markets, to the creation of liquid spot markets, through the use of continuous intra-day markets and into the balancing timescale in which the TSOs are single buyers. This model is being put in place across Europe and will be in place by 2014. Implementing the target model will provide more reliable price references, enhance competition and provide a more certain market place in which to make generation investments. However, in order to deliver these benefits a commitment from all Member States and stakeholders to delivering this market design across Europe is required.

## Increased availability of storage

At high penetrations of variable RES the addition of large scale coordinated storage systems may be beneficial. In particular, there is evidence that this technology can provide increased demand when there is too much RES and generation when there is not enough reducing the level of RES curtailment and facilitating its integration. However the promotion of storage technologies will be best achieved by explicitly rewarding for services that power systems require to manage the increased variability and uncertainty that high levels of RES will introduce. These will likely encourage storage technologies and innovations in technologies with similar service provision including active demand side response.

## Enable renewable generators to offer balancing services to TSOs

In many parts of Europe certain types of generator are supported in a way which means they are not exposed to the signals sent by markets. This reduces the effectiveness of those markets and can increase the challenge of balancing the system (for example, how should one act if it would be efficient to stop a particular fuel type generating but that fuel type has been afforded priority) In ENTSO-E's view making policy choices which treat generators on a non-discriminatory basis and expose generation and demand side participants to price signals will increase the effectiveness of markets, enhance the signals they send and reduce risk for all players in the market. These markets should also seek to allow all parties to provide balancing services where they are able to do so.

## Other

The importance of consistent long-term transmission planning supported by novel planning approaches based on dedicated Research and Development is essential to releasing the inherent balancing and flexibility in the pan European network. To this end ENTSO-E has established a study consortium consisting of its members, relevant associations, research institutes and universities within the e-HIGHWAY2050 study project. This project will examine the transmission of bulk via electricity highways. This may also allow the integration of the large storage capacity in countries with this potential. Out of this work there may come novel ideas in how to reward flexibility.

## Market Integration

*Current national support schemes expose renewable energies to market signals to various degrees. In many cases, these support schemes nevertheless result in parallel "systems" for conventional and for renewable generation which are largely unresponsive to each other. The following questions ask in which way this could be addressed in a post-2020 perspective where renewables will represent a significant share of the market.*

*1. In which of the following ways could renewable energy be made responsive to market signals?*

- Price risk - producers of renewable energy should be obliged to sell their production on the market and aid be granted exclusively as a) premiums or b) investment aid*
- Price risk – producers of renewable energy should operate without any aid*
- Producers of renewable energy should bear greater responsibility for system costs.*
- Balancing risk – producers of renewable energy should bear balancing responsibility towards TSOs (if so, please specify how: responsibility on individual*



*operator or centrally organised, same balancing rules for all operators or specific rules for variable generation?)*

*- Producers of renewable energy should continue to be treated separately (no exposure to conventional market)*

ENTSO-E recognises that to realise the 2020 RES targets a variety of financial support mechanisms have been utilised across Europe. These schemes, while being designed with respect to the resources and commercial conditions in each Member State, often have varying impacts on the efficacy and efficiency of their markets. At low levels of RES the distortion this creates is relatively insignificant. However with increasing penetrations of RES this will need to be considered carefully and balance the principle of national subsidiarity and long term pan-European objective of market integration.

In our view, the long-term goal should be to have all market players, on both the generation and demand sides of the market, participating in markets on equal terms. We consider that exposure and response to price signals is far more likely to drive efficiency and promote innovation and lead to a more effective and secure pan-European power system.

However, before all plant can be exposed to price, volume and balancing risks, we consider that a series of conditions need to be in place. Markets need to be genuinely pan European, sufficiently liquid and need to be capable of accommodating participants of different sizes (which may require the development of aggregators). It is for these reasons that ENTSO-E is working to deliver a pan-European market model.

Highly liquid day ahead markets will allow parties to sell their output to a range of buyers. The continuously traded intraday markets which the market will create will allow renewable generators to fine tune output closer to real time, allowing them to effectively mitigate balancing risks. In addition, cross border balancing markets will optimise the use of resources to enhance system security. Hence, in our view, the delivery of a competitive pan-European market which sends reliable price signals has an important role to play in facilitating a move to market places in which RES generators are increasingly exposed to market risks.

## *2. How can it be ensured that market arrangements reward flexibility?*

- Dedicated arrangements to reward availability of generation capacity*
- Favourable regulatory treatment of storage operators*
- Develop demand response to market signals (please specify, e.g. smart grids, smart meters, demand aggregation, interruptible demand)*
- Current market arrangements are sufficient to reward flexibility*

See the response to Grid Integration Question 3

## *3. In how far do you think today's market design needs to be adapted to provide an appropriate framework for renewables*

- The current wholesale market model based on short-run marginal cost pricing is appropriate*

- *The current wholesale market model based on short-run marginal cost pricing would have to be supplemented by instruments incentivising investment in generation capacities with a high capex/opex ratio (please specify which)*
- *Wholesale markets would have to move to reflecting full costs*
- *Electricity markets should evolve into energy services markets, earning revenues from more than just electricity*

ENTSO-E believes that the current move towards completing the internal market by 2014, as requested by the European Council and following the Target Models defined by ENTSO-E and industry stakeholder should get all the priority it deserves in the coming years given the scale of the effort.

Once the Target Model has been successfully delivered, the consideration of the need for adapting the design of markets for additional “flexibility” raises challenging issues. Firstly, any discussion of these changes will impact the efficacy of the existing market signals and should not be underestimated. Secondly the need for flexibility needs to be appropriately determined by national and European regulatory bodies and TSOs as appropriate. This review may well determine that there are other needs that are required other than “flexibility”. There is no need for explicit “flexibility” rewards if there is no scarcity of “flexibility”. Depending on the nature, magnitude and need of the system there are a range of different solutions. All of these have potential impacts on delivery of the core pillars of sustainable, security of supply and competitiveness and need to be considered carefully. ENTSO-E have developed a detailed analysis of the issues relevant to this consideration and would be happy to discuss this with the EU Commission.

## Regional & International dimensions

*The cooperation mechanisms of the current Directive offer a framework for cooperation between Member States and with third countries. A number of initiatives are currently under consideration for putting regional coordination in practice, both within the EU as well as with neighbouring regions.*

*2. Do you think the EU should further facilitate cooperation with third countries when it comes to the development of the potential for renewable energy?*

- *No, the EU should first focus on developing its own renewable potential*
- *Yes, cooperation with third countries should be further promoted (please specify how and with whom, i.e. only neighbouring countries or more widely)*

While there is clearly scope for enhancing cooperation, we also consider that an element of priority and proportionality is required. Europe does not yet have the robust, interconnected network or efficiently functioning markets which could easily integrate renewable generation from third countries. In our view, were this to be the case, there would be strong incentives for third countries to wish to participate in these markets and there may be expected to be a natural incentive to cooperate.

The highway 2050 project will examine the feasibility of integrating large amounts of renewable energy from third countries. One of the specific aspects to be explored is the mechanism for



improving co-operation. ENTSO-E would be happy to share our findings in this regard with the Commission.

*3. Should investments in electricity networks in some Member States (i.e. Spain, Greece, Italy) be prioritized for this purpose?*

- *Yes (explain in which way and to which degree)*
- *No (explain why)*

ENTSO-E's Ten Year Network Development Plan identifies a need for significant investment across Europe building on existing national and regional investment plan. In our view, the priority must be to deliver these investments and create a robust pan-European grid which would be capable of integrating renewable energy from third countries. In addition the 2030 and 2050 longer term horizons are being examined by ENTSO-E through the European electricity highways project. This project will examine strategies for energy infrastructure development in order to encourage adequate grid investments. It will provide insight into common features of varying decarbonisation scenarios.

*4. Which measures do you consider appropriate and necessary in order to foster cooperation with third countries in this area?*

- *Bilateral agreements between Member States and third countries*
- *Agreements between the EU and third countries*
- *Other measures (please specify)*

Developments with third parties have traditionally been developed through bilateral arrangements with Member States. To date there has been no formal mechanisms to develop EU and third countries. ENTSO-E believes there is merit in considering such schemes where the development is consistent with long term EU energy policy objectives. In particular ENTSO-E support bilateral, and where relevant, multilateral arrangements that are based on the regional coordination and a set of common EU-principles. This will ensure these developments have the best chance of providing maximum benefit to wider EU membership and that the interests of the interacting Member State are fully reflected.

*5. In its Communication on security of supply and energy cooperation – "The EU Energy Policy: Engaging with Partners beyond our Borders"<sup>7</sup>, the European Commission proposes to promote cooperation on renewable energy projects with the Southern Mediterranean countries and to gradually build a renewed EU-Mediterranean energy partnership focus on electricity and renewable energy. How do you consider this should relate with the EU internal renewables policy? What should be the priorities?*

The development of external EU RES projects should be done in conjunction with a long term (at least to 2050) EU energy policy. This will allow co-ordination and convergence of many different market and regulatory instruments. However the benefits from trading with third party countries will not be realised unless there is a well functioning internal market in operation with the associated TYNDP development.

*6. The possibility to explore regional cooperation and a coordinated, more strategic approach to grid connection for the rapidly growing volume of offshore wind generation in the North Sea is currently being explored in the framework of the North Sea Countries*

*Offshore Grid Initiative (NSCOGI). Do you think such cooperation should be further fostered? What benefits do you think could arise from it? Do you consider that this experience could be generalised and applied elsewhere?*

ENTSO-E supports the NSCOGI model for facilitating regional co-operation between TSOs, Member States and the EU. ENTSO-E also supports other regional initiatives like the Mediterranean Solar Plan (MSP) in the framework of the Union for the Mediterranean. It is only through fostering regional thinking and promoting co-operation that practical implementation of super national infrastructure can be physically delivered.

## General Policy Approach

We do not wish to go into details on issues concerning the general policy approach, financing or administrative procedures. However, we have made a number of general remarks.

- Irrespective of whether targets are put in place, ENTSO-E considers that a number of points need to be considered and that policy measures need to be coherent and consistent.
- At its most basic, support mechanisms reduce the efficiency of markets. As such, their existence needs to be carefully considered having taken these negative consequences into account. As far as possible, any support should preserve exposure to price signals.
- It must also be recognised that national decisions have pan-European consequences. While we do not advocate the complete and immediate harmonisation of support mechanisms (either design or level), ENTSO-E does consider it vital that mechanisms are designed with the impact on power system and on neighbouring countries in mind. Coordination is vital and progressive harmonisation is likely to be beneficial in enhancing efficiency. This harmonisation may be stimulated by designing mechanisms in a way which allows non-national players to participate.
- The complementarity of renewable generation and grid investment must be recognised. Only through grid investment will it be possible to deliver the significant volumes of generation required to decarbonise Europe. This policy measures must look to facilitate grid investment, for example by streamlining planning and promoting social acceptance, as opposed to focussing solely on the renewable generation itself. It should be acknowledged that public acceptance is a major difficulty in all countries. The solution to solve this issue should rely at least on a strong support by all stakeholders (involved in Renewable issues) during public debates, whether it is at a local, regional or national level. Communication actions should be undertaken to stress the crucial role networks play for renewables, in order to fight against the usually accepted idea that both renewables and demand management can reduce the need for new high voltage lines.

## Technology development

*The SET plan presents the strategic framework to accelerate the development and deployment of cost-effective low carbon technologies in the perspective until 2020. For a limited number of technologies industrial initiatives were set up according to two criteria, their large-scale availability by 2020 and the willingness of industry to engage in public private partnerships.*

*1. For a first set of renewable technologies, namely wind, solar, bio-energy, the SET Plan aims at a cost-competitive market roll out of renewable energy by 2020. It also aims at enabling integration of renewable energy into the electricity grid and smart cities and communities. In your view, what would be the remaining key challenges of these technologies to be addressed by research and innovation in view of the 2050 objectives?*

- Technology performance and cost-competitiveness
- System integration
- Industrial manufacturing and supply chain
- Other (please specify)

By 2050 the core of the EU energy system will rely heavily on the large scale of renewable energy sources from the Northern Seas to the Mediterranean and as such the transmission network will play a crucial role. The integration of new technologies, new components and interoperability into a secure power system are key challenges to achieving this.

The combined integration of Distributed Energy Resources and of large scale of Renewables into the transmission network has to be designed to ensure the overall security and robustness of the network. This fundamentally changes the nature of power system and will require new thinking in both the operation and development of networks if security of supply is not to be compromised.

The Transmission network will have to implement an increasing combination of technological solutions. Power electronics will be deployed at generation level (for wind turbine and for PV) and within the grid (FACTS devices, DC links, DC networks,...) to allow for increased real time power flow control. This would lower today's pan-European system inertia making the system even more sensitive to any type of disturbances. At the same time, novel technology solutions will make way for improved network design and operations.

The deployment of new technologies will be realized in a phased basis and should efficiently use the existing transmission infrastructure. In order to emphasize the role of the system integration, as a key challenge for the development of low carbon perspective, it can be mentioned preliminary results on the development of off-shore wind parks in the North Sea Region. The studies<sup>ii</sup> have compared the solutions for the connection of wind parks to the grid: radial solution (point to point) versus integrated solution (multi-terminal). The conclusions pointed out the superiority of the solution of integrated offshore grid with multi-terminal, sharing assets between wind connections and cross border capability, by developing connections between wind parks in different countries, and also sharing costs and benefits on a wider European scale.

Up to now, off-shore wind energy is connected exclusively via radial or point-to-point connections. Multi-terminal HVDC solutions still need to be investigated from a technical and economic point of view.

*2. Which additional measures and/or instruments should be developed to address these technologies and their remaining challenges and to ensure that the EU innovation fabric is geared to supporting the significant deployment up to 2050?*

The development of HVDC technology and grids is a key issue in order to integrate large-scale renewable energy generation. The availability of DC breakers with appropriate performances, both for fault clearing and switching topological actions, is not yet proven and needs investigation.

*3. In your point of view, which technologies other than those covered by the current industrial initiatives should be given priority in the post-2020 perspective? Please justify with reference to the criteria mentioned above, i.e. large-scale availability and willingness of industry to engage in public private partnerships?*

Both wind and solar sources generate variable electrical energy. Today the bulk of the robustness and security of power systems is provided by conventional synchronous generation. If these sources are to be gradually replaced by variable RES then it is incumbent on those technologies to improve and evolve to ensure the long term security of the pan European network.

In addition the increased variability over multiple timeframes (seconds to years) needs to be managed. Both demand side participation and Storage technology can help. However improvement in technologies in these areas is still required.

*4. How successful do you consider the existing measures have been and which have been the main drawbacks? Explain why.*

- *Very successful, no drawbacks*
- *Successful but some drawbacks (please specify which)*
- *Not successful*

From technology development perspective research models like EEGI (European Electricity Grid Initiative) are proving successful. These initiatives give visibility on Research, Development and Demonstration. They are driven with active participation by Transmission and Distribution System Operators and are helping to accelerate necessary innovation.

The EC mandates on standardization are also successful drivers. They provide useful visibility to the industry and therefore adequate signals for the necessary investments in order to provide the expected technologies on time.

It is important that the European manufacturers will go with the development of EU energy policy and will benefit from activities and employment generated by the new challenges.

*5. Do you consider that assistance in technology development should be linked to a certain result to be achieved by a certain deadline?*

Yes, the assistance in technology development must be linked to results to be achieved by a certain deadline. Road-maps linked to European Initiatives (e.g. EEGI) already provide a useful reference for the commitment to technological innovation. Thus the success of EU Research must be measured based on results, not on objectives.

## Conclusion

ENTSO-E hopes that the points raised in this response are useful. The consultation is far reaching and will have broad impacts for Europe and the European power system going forward. We would be keen to explore the issues raised in this response with the Commission at as early a stage as possible.

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<sup>i</sup> Offshore Grid Development in the North Seas – ENTSO-E views ([www.entsoe.eu](http://www.entsoe.eu))

<sup>ii</sup> Offshore Electricity Infrastructure in Europe ([www.offshoregrid.eu](http://www.offshoregrid.eu))