

Regulatory aspects of the integration of wind generation in European electricity markets

Public Consultation Evaluation of responses

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1 Introduction

In December 2009, CEER launched a Public Consultation document on the integration of wind in European electricity markets. The purpose of this consultation was to present the European regulators' emerging views on the issues associated with the integration of wind generation into the market and network arrangements and to solicit feedback from stakeholders on the regulators' approach to date. A workshop was held on 11 February 2010 to discuss the issues with stakeholders. CEER also met a number of stakeholders on a bilateral basis. The call for consultation responses closed on 18 February and CEER has received 43 responses (one being confidential). This note summarises the issues/positions of the respondents and addresses each of the main issues. It should be read in conjunction with CEER's Regulatory aspects of the integration of wind generation in European electricity markets: A CEER Conclusions Paper (ref: C10-SDE-TF-16-03).

1.1. Responses

The public respondents constitute 13 from those representing the interests of integrated companies (with production, network and supply interests), 6 representing the interests of network owners, 8 representing the interests of generation only (including wind generation) and 3 representing consumer interests. Other respondents include Greenpeace, the Scottish Highlands and Islands Enterprise and the Swiss National Regulatory Authority (NRA), Elcom. Of the 43 responses, 8 are from European or international organisation; the rest are from Member States. Annex 3 lists all respondents by their country of origin and their activity.

2 Executive Summary

General issues

Most respondents welcomed the consultation document and acknowledged the role regulators have in addressing these issues. There was agreement that the issues CEER highlighted were the correct ones and many explicitly agreed that treating renewables as distinct from the rest of the market was no longer appropriate. Section 3 addresses each of the questions and the points raised by respondents in further detail.

With respect to the impact that increasing wind generation will have on the markets, this was described as “substantial”, “significant” and “severe”.

Over half of the respondents discussed the impact increased wind generation will have on security of supply. Many respondents stated that, as a result of increased wind generation (which is variable in its supply), the price on the wholesale market is becoming more volatile. This, they argued, is having a fundamental impact on the incentives the market has to invest in conventional generation. Several respondents also argued that increasing grid capacity, particularly cross-border grid capacity, should be a priority and that, within this context, there was considerable discussion on congestion management and the appropriate guidelines – broadly, there was support for intraday, implicit continuous allocation of capacity.

There was also broad support for non-discriminatory, cost-reflective arrangements for connection and use of the system. Respondents were particularly mixed, however, over support for a locational element within the use of system charging. Most respondents also called for an increasingly pro-active, strategic approach by the transmission system operator (TSO) in the development of the network.

There was some discussion on the design and harmonisation of support schemes. Some respondents stated that they should be more market-based and argued that feed-in tariffs do not provide the appropriate incentives. There was also some support for harmonisation of support schemes.

Market issues

In considering the market rules, many respondents recognised that at least some change is necessary as a result of increased wind generation. Intraday trading for capacity and balancing and increased transparency was suggested as a basis by many.

Several respondents focused on how best to encourage flexible generation. They argued that this will be increasingly necessary as the proportion of intermittent (wind) generation increases. The flexible forms of generation discussed include electricity storage and wind generation pooling. There was also some discussion on the importance of encouraging demand-side management. Two respondents also suggested the introduction of capacity payments though there appears to be a lack of support for price caps and floors.

Respondents were mixed about the appropriateness of priority dispatch. Some respondents discussed the impact priority dispatch is having on conventional generation.

With respect to the gate-closure time (GCT), most stated that it should be nearer to real time. Advantages, it was argued, include more accurate wind forecasting and reduction of system costs. There is also support for harmonising gate-closure times across Europe. With respect to the most appropriate gate-closure, many respondents stated that one hour or less is best. There was also support for considering the level of information that is available in the market prior to gate-closure. However, many stated that developing liquid and integrated cross-border intraday markets should be a priority over shortening gate-closure time.

With respect to capacity allocation, there was some support for the models currently being developed. Nearly half of respondents identified intraday capacity allocation as a priority for the integration of European energy markets. With respect to the particular models, several supported implicit allocation and there was also support for continuous allocation. With respect to reservation of capacity, four respondents explicitly state this should not happen. One, however, stated that it would support reservation of capacity so long as it is paid for. There was also particular support for cross-border capacity for balancing and ancillary services.

Over half also supported having balancing obligations for wind generation on the grounds that it helps solve congestions, limits the risk of gaming and improves forecasting. Four respondents, however, did not support having balancing obligations on wind generation on the grounds that it can damage liquidity and may inhibit achievement of the ambitious targets for renewable energy.

Network arrangements

Almost all respondents stated that Research & Development (R&D) is necessary to address the network integration of wind generation and, of these, there was very strong support for TSO-led R&D to address issues such as security of supply and achievement of the 2020 renewables targets and to help reduce costs and contribute to optimising the development of the network. What form R&D should take varied among respondents and included analysis, full-scale demonstrations, delivering new technology and, from one respondent, projects which lead to harmonisation of support schemes. Furthermore, many respondents called for increased coordination among TSOs and between TSOs and industry, government and NRAs. The role of the distribution supply operator (DSO) in R&D was also highlighted as being imperative by some respondents. With respect to the funding of R&D, some respondents supported an incentive-based funding, while others proposed that investment costs for R&D have to be fully covered by regulatory frameworks or provided through a cap on losses.

With respect to non-discriminatory access, there was broad support among respondents. The advantages of non-discriminatory access which were cited include minimisation of market distortions and promotion of a level-playing field. However, with respect to locational charging, respondents were mixed. Five supported their use, arguing that they ensure developers consider the cost implications when selecting a location and that they lead to a more equal distribution of renewable energy. However, some respondents warned that NRAs need to take account of the impact of this regime on wind generation. Five respondents stated they do not support a locational element in the charging regime. They argued that wind generation should locate where resources are best and should not be discriminated for doing this.

With respect to the risks associated with grid development, some respondents stated that long-term, strategic grid planning can minimise these risks. Most respondents agreed that the TSO should undertake this and that it should include a consideration of the needs of the network on a short- and long-term basis. Other respondents suggested that it should include renewable energy scenarios and identify appropriate locations with existing infrastructure for new generation. Some respondents also stated that NRAs should minimise the risks in grid development by, for example, judging the social and economic welfare of a project.

The issue of how to encourage anticipatory investment was raised by a number of respondents as an important issue to consider. To address this, it is suggested that NRAs could take a less cautious approach and consider socialising the costs in the event of an asset being stranded. More strategic and long-term planning was also proposed as way to meet anticipatory investment.

Supergrid issues

Many respondents stated that they support the idea of a “supergrid” and several agreed that CEER had identified the correct issues, particularly regarding who pays and who benefits. Further issues that are highlighted include further consideration of onshore issues, the interaction between national regimes and the need for regulatory cooperation.

Three respondents discussed the issue of combining interconnection with offshore transmission and the implications of having potentially two separate regimes.

In considering the cost of developing a supergrid, some suggested that the long term benefit and the social welfare benefit should be considered.

With respect to solutions, there was some support for harmonisation of market rules in order to help develop a grid. Introduction of a “super regulator” and a “super system operator” were also raised as possible solutions by three respondents though one respondent said this would not be a practical solution. It argued that ACER and ENTSO-E could fulfil a coordinating role instead.

Regarding the ownership of offshore grid, respondents were mixed about whether this should be generator or TSO-led. Three stated that this was irrelevant so long as full third party access was guaranteed. None of the respondents explicitly mentioned the potential impact of the 3rd Package.

3 Response per question

In the Public Consultation, CEER posed 12 questions. The response to each of these questions and other issues raised by respondents are addressed below. Where appropriate, the respondents’ views are discussed and, in light of this, CEER’s own developed thinking.

Due to the large number of responses, we have not provided an exhaustive analysis of each response to each question but instead have addressed the key points. If any respondent would like a more detailed reaction, they are invited to contact the CEER secretariat.

Question/Issue	Respondents' feedback	CEER's developed thinking
Question 1: How will the expected growth in wind generation affect the market in which you operate? What are the key challenges you foresee?		
Overview	<p>In response to how the expected growth in wind generation will affect the market, three respondents described this as “significant”, “substantial” and “severe”. Another respondent stated that while it is inevitable that wind generation will affect the market, market participants can develop any necessary changes without the need for government intervention.</p> <p>In considering the particular challenges, respondents highlighted a range of issues, including some that were not directly addressed in the Public Consultation.</p>	
Security of supply	<p>Several respondents considered the impact increased wind generation will have for security of supply and the need for increased investment in flexible, conventional generation. They argued that, as a result of increased wind generation, prices on the wholesale market are becoming more volatile which affect conventional generation. For example, it was stated that this gives “producers and consumers economic signals for short-term behaviour”. Also it was pointed out that “allowing wholesale prices to ‘spike’ freely at times of system shortage would provide an investment signal [but] it is by no means clear that this signal will be robust enough, given that the frequency and magnitude of such wholesale prices would be unpredictable in timing or duration”. Furthermore, the price volatility was described as an “insufficient economic signal” to promote new entry and maintenance of existing capacity”. In addressing this, respondents stressed the importance of considering investment signals for conventional generation in order to secure short-term, flexible, dispatchable generation.</p> <p>With respect to flexible generation, some respondents highlighted investment in gas-firing technologies as a particular issue, given that it is flexible as a backup fuel for intermittent wind generation but a cleaner, more efficient carbon fuel. It was stated that if gas-fired capacity is the principle means of backing-up intermittent wind generation, “it could imply relatively sudden and sharp changes in demand for gas for power generation”, which is a key concern that needs addressing. One respondent also argued that “gas contracts should have enough flexibility to accommodate CCGT lower average load factors, where possible spikes may occur occasionally”. The importance of gas storage facilities was also raised.</p> <p>Several respondents also highlighted the impact that increased wind generation has on the reliability of existing conventional generation. One of the respondents pointed out that while the life of the station may be prolonged, running the plant less results in less performance and reliability; another respondent argued that lower operating hours and more frequent start-ups will drive operating costs upwards.</p>	<p>In response to the feedback received on this, CEER recognises that the increase in renewable energy can have a significant impact on the investment climate for all generation types. To consider further this issue within a European framework, CEER proposes looking at the impact that wind generation, and other renewable energy, has on the investment climate for conventional generation and the role that European regulators could have in considering the issues (if any) as part of CEER’s Generation Adequacy work.</p>

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>To address such security of supply issues, one respondent argued that capacity payments would convey the right signal to generators and lead to maximisation of social welfare. It was also argued that capacity payments could be a possible solution to guaranteeing a diversified generation mix. Another respondent also argued that it has the potential to mitigate uncertainty of existing and potential investors. With respect to the use of price caps and price floors to deliver security of supply, three respondents stated that these distort the market in that they omit signals of future shortages of both flexible and back-up capacity. While one respondent stated that the only solution is to reduce wind power output, either by reduced support to wind power at negative prices or by curtailment by the TSO. Finally another respondent stated that it will monitor the impact of negative prices, which some Member States have introduced as a way to stimulate the flexibility of existing generation capacity, to see what impact it has on wind generation.</p>	
Grid capacity	<p>Several respondents stated that a major challenge is the lack of grid capacity and that addressing this should be a priority. One respondent stated that “the work of eliminating transmission congestion is the most important challenge”. It was also stated that “huge investment into the grids” will be necessary as a result of wind generation. It was argued that there is a lack of coordination among TSOs and that cross-border grid capacity, in particular, is an issue. One respondent stated that capacity offered by TSOs up to the day-ahead stage could decrease due to this problem. Another respondent argued that “network security concerns may cause TSOs to take a more conservative long-term allocation approach which may lead to capacity curtailments of conventional generation”. Another respondent said that more grid interconnection in the North Sea is particularly important.</p>	<p>CEER recognises that the lack of grid capacity, particularly cross-border capacity, should be a priority issue for European regulators. In addressing this, CEER reiterates its call for governments to speed up the process for consents for construction of electricity infrastructure. CEER also suggests that there is potential for the TSOs' ten-year network development plans to play an important role in identifying where there are particular issues associated with the authorisation procedures for the construction of transmission lines.</p>
Support schemes	<p>With respect to the design of support schemes for renewables, it was argued that these are further distorting the investment signals for flexible, conventional generation by establishing a “de facto [] separate market”. One of the respondents pointed out that the presence of feed in tariffs in the early years of projects' lives mean that investment decisions do not take account of any expectation of lower wind revenues or more volatile markets. Similarly, another respondent argued that they should be made compatible with markets by incentivising renewable producers to sell on the market. It was also argued that there is a need for stable, transparent and predictable support schemes for wind generation. One of the respondents argued that differing, incompatible national support schemes leads to imperfect and illiquid markets. Finally another respondent said that it has found that, when working across multi-jurisdictions (as it does within the context of the SEM), it is helpful to have clear and broadly consistent renewable targets. Regarding the role and responsibilities concerning renewable energy, one respondent argued that this differs to a great extent among Member States, which will impact the penetration of wind.</p> <p>With respect to the harmonisation of support schemes, two respondents stated that “a gradual convergence of the support schemes at a European level would also facilitate the convergence</p>	<p>A number of respondents broadly agreed with the position CEER took in the Public Consultation. They agreed that support schemes for renewables should be compatible with the market and network arrangements and should be volume-based and transparent and should provide clear signals to the market.</p> <p>CEER recognises that the existence of different, national support schemes for renewables can have an adverse impact on the incentives investment has in choosing where to locate. This is particularly relevant within the context of offshore supergrid development. At the same time, however, CEER recognises that while harmonisation would be desirable, it should not be a precondition for European network development. Indeed, given the challenge associated with introducing a harmonised</p>

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>towards a European internal market". Another respondent stated that "national" solutions for support of renewables will lead to imperfect and illiquid markets. Similarly, it is argued that the differences in roles and responsibilities will impact the penetration of wind. An EU-wide market based support scheme for renewables was also recommended. However, one respondent said that support schemes should be harmonised on account of the "meteorological specificities of different Member States".</p>	<p>European support scheme, it is more appropriate to concentrate on ensuring compatibility of support schemes. This should be a key concern for governments.</p>
<p>Question 2: What are the implications for market rules? Can you identify changes which would better facilitate integration of wind generation, including management of intermittency?</p>		
<p>Overview</p>	<p>Most respondents recognised that at least some change to existing market designs will be necessary. They stated that current market rules were designed in a national framework and for a generation mix that is considerably different from the one being developed for the one we wish to pursue. However, one of the respondents stated that they do not see the need to design completely new market models. Another respondent stated that it is not necessary to harmonise market rules at this stage.</p>	
<p>Demand-side management</p>	<p>Many respondents highlighted the importance of demand-side management. However, one of them argued that while demand-side management may have a role to play in managing fluctuations, at present "it simply creates uncertainty for potential investors in back-up stand-by plant". It also argues that the potential and role of "smart demand" is very unclear.</p> <p>Others argued that further consideration should be given to the exploitation of electricity storage, including the exploitation of electric cars. It was argued by one of the respondents that incentives for investment in electricity storage could facilitate management of intermittent generation. It was also stated that this will absorb most of the variations of wind power so that it expects "only moderate" increases in price volatility. Finally it was also argued that investment in distributed generation and electrification of transport is a key challenge.</p> <p>One respondent argued that pooling solutions would also lower the need for peak demand reserves.</p>	<p>Consideration of these issues has been undertaken in the ERGEG Position Paper on Smart Grids: An ERGEG Conclusions Paper, 10 June 2010.</p>
<p>Priority dispatch</p>	<p>With respect to priority dispatch, one of the respondents stated that the introduction of it and guaranteed access for renewables means market rules will have to be reviewed. It was also argued that, given the nature of non-storability of wind, priority grid access should be given to wind. One of the respondents argues that Member State's obligation to ensure dispatch is "skewed towards renewables [which] will be open to local regulatory interpretation and local distortion". It suggested that, in reality, a TSO/balancing responsible party "will find many 'operational security' excuses not to call off a base-load nuclear plant simply because it is windy". Another respondent argued that, for both market efficiency and network safety, wind generation should be "dispatched off" and that market players and TSOs should have direct observation on wind power, in real time, so they that can use the latest available data to optimise their portfolio</p>	<p>Following feedback from some respondents, CEER recognises that the introduction of priority dispatch or guaranteed access may pose issues for the market rules. As such, CEER will consider this further within ERGEG's input to the framework guidelines on third party access, which ACER is expected to develop by late 2011.</p> <p>However, it is worth clarifying that MSs are responsible for the implementation of the Renewable Directive. Furthermore, given that the market arrangements differ</p>

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	<p>and operate the network. One of the respondents stated that it would be better if priority dispatch was not a rule of the system but a logical consequence of its design and that given the low input costs and subsidy scheme for renewable generation, renewable generation is almost always granted priority which is efficient and market-based. Finally it was suggested that centralised dispatch is an option and that while there are a number of advantages, the details of the arrangements are "crucial"; also, in the event that the TSO cannot dispatch wind generation due to operational security, the rewarding mechanism should be "strictly cost reflective".</p>	<p>among MSs and that MSs' generation mix is unique to that each country, it may be preferable for each MS to develop the most appropriate means by which to implement this requirement.</p>
<p>Question 3: Would moving the gate-closure time to real time facilitate the deployment of wind generation? Would this have any adverse consequences on the functioning of the electricity power system?</p>		
<p>Overview</p>	<p>Of the 43 responses, 34 explicitly said that GCTs should be nearer to real time. The advantages cited of having closer GCTs include more accurate wind forecasting, better production of a price reference and reduction of system costs (such as through lower balancing costs and decreased use of reserve capacity). With respect to conventional generation, it was stated that a closer to real-time gate closure is also beneficial as there is more knowledge when planning and scheduling the production. However, the adverse consequences of closer GCTs, which were highlighted, include a risk to system security, additional operational complexity and the requirement for TSOs to collaborate more closely. It was also stated that closer to GCT would increase the efforts for operational security assessment and that "the solution is an adequate balancing between financial benefit and operational risk". However, one of the respondents did not appear to see this as an important point and described it as "an administrative measure" that can be "relatively easily tackled".</p> <p>With respect to the specific GCT, many stated that one hour (or less) is the most appropriate for intraday. It was also suggested that current technology should probably allow for GCTs of 30 minutes or less. For day ahead, respondents suggested that this should close at 12am (CET).</p>	<p>In light of the feedback received, CEER reiterates its support for shorter GCTs and argue that, in general, it is good practice for market designs to have shorter GCTs. Indeed, CEER urges NRAs and market participants to consider shorter GCTs in developing the design of national market arrangements, particularly where wind generation is or has the potential to play a significant role in the market's generation mix. However, CEER also recognises that the benefits of shorter GCTs should be considered within the context of the overall market and network arrangements.</p> <p>Further consideration of the role shorter GCTs could play in cross-border issues is an issues for the framework guidelines on network codes for balancing.</p>
<p>Harmonisation of GCTs</p>	<p>Certain respondents stated that efforts should be made to harmonise GCTs across Europe. One respondents argued that different cross-border GCTs, especially among neighbouring countries, may act as a barrier to cross-border trading.</p> <p>With respect to have different GCTs for wind generation, many respondents explicitly stated that this was not a good idea and that wind generation should be subject to the same requirements as other generation types in order to encourage effective integration of wind. Three respondents point out that allowing for a closer GCT will not remove the need for more flexibility, dispatchable capacity and demand response initiatives.</p>	<p>The framework guidelines on network codes for balancing could address the case for moving towards harmonised GCTs across the EU.</p>
<p>Level of transparency</p>	<p>Many respondents highlighted the importance of the level of information that is available in the market prior to gate-closure, both for market players and for the system operator. It was pointed out that the information should be published in a timely and transparent manner prior to gate-closure. Also it was argued that the information should be provided to all market players so they</p>	<p>CEER agrees that the appropriate level of information which should be available to the market prior to gate-closure is worthy of further investigation – this will be addressed through ERGEG's Comitology Advice on</p>

Question/Issue	Respondents' feedback	CEER's developed thinking
	can act on a "level playing field". Other respondents highlighted the importance associated with providing the system operator with the requisite knowledge and suggested setting up information flows to the grid operator to help manage imbalance risks.	electricity fundamental data transparency which is due to completed by the end of the year.
Cross-border capacity	Some respondents stated that developing liquid and integrated cross-border intraday markets, based on continuous trading platforms, is "even more important" than shortening GCTs and should be the top priority for European electricity markets. Similarly, it was said that effective operation of fully integrated continuous intraday markets with adequate liquidity levels are a more important achievement than shorter GCTs. However, two respondents point to the importance of liquid and reliable day-ahead markets – one argued that bringing GCT closer to real-time does not take away from the importance of (preferably coupled) day ahead markets with harmonised day ahead market GCT; the other stated that moving the focus from day-ahead towards intraday would significantly increase the trading complexity, especially for small actors and threatens the liquidity in the day ahead market.	CEER recognises the importance of addressing cross-border capacity. Indeed, this is addressed in further detail under Question 4. It is also addressed in considerable detail in the forthcoming Public Consultation on ERGEG's draft framework guidelines on cross-border capacity allocation and congestion management.
Question 4: Are emerging cross-border congestion management models compatible with wind generation? Should further attention or priority be given to intraday capacity allocation mechanisms and markets, in light of the issues associated with forecasting wind generation?		
Current congestion management models	Some respondents said that the current congestion management models that are currently being developed are a step in the right direction – six respondents explicitly stated that the current models being discussed should be able to cope with intermittent wind generation. One of the respondents said they expect a continuous trading model to deal with intraday trade. Two respondents stated that coupling of day-ahead should be complemented by intraday capacity allocation.	
Intraday capacity allocation	Nearly half of all respondents identified intraday capacity allocation as a priority for congestion management models. One respondent argued for "higher priority for the development of cross border intra-day markets, where not yet existent in line with the Project Co-ordination Group target model". Another respondent considered it "important that much greater attention be paid to the issue to ensure that congestion management models are up and running in time for substantial expansion of wind capacity". It was also argued that cross-border capacity management must be changed to provide long-term cross-border capacities and that the functioning intraday market is crucial for the integration of large amounts of wind energy and for cost-efficient system operation in general.	Regulators are developing a consultation on ERGEG's draft framework guidelines for capacity allocation and congestion management. This paper will consider in detail the methods used to calculate and allocate existing interconnection capacity for the forward, day-ahead and intraday markets. The latter is of particular interest to wind generation given that it is increasingly predictable on the day. CEER recognises that these models cannot, in the absence of capacity reservation, guarantee cross-border intraday capacity and that this may become more of an issue as the proportion of wind generation increases and as we become more reliant on cross-border trades. Regulators invite respondents to the consultation on ERGEG's draft framework guidelines to consider whether this is an issue.
Capacity allocation models	With respect to how capacity is allocated, several respondents, mainly those representing the interests of wind generation, stated that this should be implicit. For example, one argued that	As above.

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>“only an implicit capacity allocation is capable of coping with the problems caused by wind generation”. Another respondent stated that there is a need “for regulators, TSOs and power exchanges to establish an implicit intraday trading platform which allows a continuous trading from one market area to another in one step”. It also holds that the more efficiently day-ahead and intra-day markets are linked across borders by implicit mechanisms, the better hourly surplus and deficit situations can be countertraded, hence leading to price convergence in Europe. They hold that the most important goal is to ensure correct signals for all stakeholders. One of the respondents stated that implicit auction capacity “should be given free of charge to intraday markets”. Another respondent said that “either explicit or implicit auction should...be able to cope with intermittent wind generation, as indeed they should be able to cope with any other form of generation”.</p> <p>However, many respondents state that they favour continuous allocation of intra-day capacity. For example, one respondent said they urged “regulators, TSOs and power exchanges to set up cross-border trading platforms that allow a continuous trading until close to real time”. Another respondent said that “continuous intraday markets would be beneficial for wind integration, in a country-wide scope... as well as in a cross border situation”. Finally it was stated that the “main priority is therefore to develop continuous intraday market mechanisms aiming at creating a transnational liquid and simple to use market platform”.</p>	
Reservation of capacity	Regarding reservation of capacity at the intraday stage, four explicitly stated that this should not be permitted. One argued that other tools can be used to increase the flexibility of the TSOs. One respondent stated that capacity (for balancing) should be reserved “provided market participants or TSOs are willing to pay market value for it”.	See above.
Question 5: Should wind generation be subject to the same balancing obligations and types of charges as other types of generation?		
Obligation to balance	Twenty-six respondents stated that wind generation should be subject to the same balancing obligations as other types of generation. They stated that allocating balancing costs to wind generation helps solve congestion, limits the risk of gaming, and improves forecasting and behaviour and increases the usability of wind. They also argued that not allocating balancing costs to wind generation leads to market distortions, a sub-optimal allocation of resources, creates volatility and less credible market outcomes. One of the respondents argued that generators, and wind generators in particular, are best placed to manage and hedge their balancing position. Another respondent argued that, “within the operational hour” (i.e. after gate-closure), imposing uniform balancing costs on all generators is an essential component of a fair and transparent energy market. It also argued that all participants should face the same balancing costs that their actions impose on the system. However, four respondents do not agree that wind generation should be subject to the same balancing charges as other types of generation. It was argued by one of the respondents that it is not appropriate given “the envisaged increase of wind power generation”, at least while “a truly integrated internal energy	In light of the feedback received through the Public Consultation, CEER sees strong evidence that wind generation should be subject to the same balancing obligations as other types of generation on the grounds that this encourages the integration of wind generation. CEER remains of the view that treating wind generation separate from the rest of the market, as occurs when wind generation is not subject to balancing obligations, does not assist in integrating into the market. The feedback received on this issue as part of the Public Consultation should feed into the framework guidelines on electricity balancing.

Question/Issue	Respondents' feedback	CEER's developed thinking
	market is not yet established with balanced and fair market rules for all players". Two of the respondents argue that the infrastructure and system management rules are not currently suited to wind generation and it is therefore inappropriate to have them subject to the same obligations. Finally it was argued that having wind generation subject to the same balancing obligations as conventional generation can damage liquidity and trade.	
Balancing costs	Many respondents pointed out those balancing costs should be transparent and fairly allocated. For example, it was stated that, where balancing costs must be borne by wind generation, regulators should ensure that the costs are transparent and represent only the real cost of balancing.	CEER agrees that the balancing obligations faced by all generation, where this is the case, should be cost-reflective. The feedback received on this issue as part of the Public Consultation should feed into the framework guidelines on electricity balancing.
Role of market players in balancing	<p>With respect to the role and responsibilities of the TSO/DSO, one respondent argues that TSOs should provide adequate services, such as reserve capacity, and operational rules which enable wind generation to integrate into the electricity market. Another respondent says that DSOs can have a role in forecasting as it has good knowledge of local consumption and generation.</p> <p>Three of the respondents, argue that, with respect to ancillary services, existing wind generation should be incentivised to participate according to their technical characteristics (flexibility, grid control, voltage dips etc). Other three all suggest that it could be profitable for wind generation to present together their offers to the market though, for example, the use of balance areas, in order to compensate for individual errors in generation forecasts.</p>	<p>In light of the feedback received, CEER continues to maintain that network operators should be incentivised to manage reserves and to consider the use of more innovative ways in which to do this. This could include, but is not limited to, forecasting. The feedback received from the Public Consultation on the role of the TSO in balancing should feed into the framework guidelines on balancing.</p> <p>CEER agrees that wind generation should be incentivised to provide ancillary services, where this is necessary and appropriate. This is being taken up as part of ERGEG's draft framework guidelines on electricity grid connection.</p>
Question 6: Should TSOs engage in research and development (R&D) to address issues associated with a large share of wind generation included in the network? If so, how should the regulatory framework require or support this?		
Overview	Almost all respondents stated that R&D in the field is necessary to address network integration of wind generation. Three of the respondent argued that wind integration is not the only issue to be covered by R&D.	
Role of market players in R&D	<p>Almost all respondents were in favour of direct TSO engagement in R&D. Benefits cited included the maintenance of security of supply, the facilitation of the European 2020 targets, contribution to the development of the European grid evolution and reduction of system costs. Other benefits cited include the development of technical and innovative solutions.</p> <p>However, two respondents highlighted that R&D for wind integration should be handled by the industry as a whole and not by individual TSO/DSO companies. One respondent stated that support should be given by governments for projects covering such issues, regardless of whether this research is conducted by TSOs or other parties.</p> <p>Closer cooperation among TSOs and between the TSOs and other stakeholders is recognised as</p>	<p>CEER recommends that NRAs should require network operators to disseminate results where the R&D is funded or part-funded by consumers.</p> <p>CEER agrees that European regulators should support network operators' efforts in R&D, while recognising that this should not be done to such an extent that it crowds out market-led R&D. Similarly, any role which the NRA and/or the future ACER has in TSO-led R&D should not act to crowd out the market.</p>

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>important by a number of respondents. One respondent stated that NRAs or ERGEG/ACER could have a role on the project boards overseeing the R&D effort. Another respondent argued that R&D efforts should be made in coordination with research projects led by other stakeholders, such as public authorities and industry. Two respondents stated that they do not support extensive research departments in TSO companies and that cooperation in this field is necessary to lower overall costs and to benefit from benchmarking. Other advantaged cited include avoiding unnecessary duplication and exchange of best-practice. However, a couple of respondents state that while cooperation at a European level is efficient, many of the potential solutions will be specific to individual markets and individual TSOs should be able to undertake R&D for their own market. One respondent suggested an institutional format for closer cooperation between TSOs and the wind energy sector. They argue that TSOs' R&D plans should be closely coordinated with the Strategic Energy Technologies (SET) plan of the European Commission and remind us that the 3rd package requires ENTSO-E to adopt R&D plans and include these plans in their annual work programme. One respondent expressed the need for coordination between TSOs and of a pan European approach to coordination of the future electricity system including R&D. It argues that TSOs can work together on certain aspects of R&D where issues are shared across borders, potentially through ENTSO-E. It was also stated that it will prepare a R&D plan for prioritised research fields, as announced in the work programme for 2010 and the 10 year development plan ENTSO-E.</p> <p>Three respondents argued that DSOs should be involved in R&D. One of them suggested that the impact of wind generation, with its intermittent nature, more embedded renewable generation and domestic micro-generation, make it necessary that distribution grids evolve towards Smart Grids (including Smart Meters as a key tool).</p>	
Funding of R&D	<p>Some respondents argued that the regulatory framework to support R&D should be primarily via incentive based payments for running the network more optimally and also via specific R&D and innovation funding schemes. Two of the respondents argued that the investment costs for R&D have to be fully covered by regulatory frameworks (tariffs, national and European research funding). One respondent suggested that the regulatory framework should set a cap on losses for which each TSO can charge based on their existing transmission infrastructure, with improvement targets. Any TSOs that fail to innovate in new technology, and/or to invest in cables or storage will fail commercially and should then be taken over by successful TSOs that do have the necessary technology and management systems. That is how a Common Market for Goods and Services should work, it argues.</p> <p>One respondent argued that if R&D costs, or a part of them, are covered within grid tariffs, they must be transparently declared to the consumers and that a great share of the costs should be borne by industry and service providers. It should be left to NRAs to decide if, and which, R&D</p>	NRAs must ensure that R&D which is undertaken by network operators and which is funded by consumers is economic and efficient. How this is funded is a decision for each NRA but there should be a framework in place to judge how cost-effective the R&D has been in order to ensure that costs are economic.

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>costs should be considered within regulated tariffs. One respondent says that R&D should be correctly funded and the related expenditure should be supervised a priori by an independent body. Any liquid benefits derived from R&D initiatives should be funded by its beneficiaries. These benefits should be partly passed through to the beneficiaries (e.g. consumers) and to the TSO or DSO as an R&D incentive. Additionally, network congestion mitigation incentives based on rewards and penalties for the TSO and for the DSO may be designed in order to promote efficient investment.</p> <p>However, there is a question of how TSOs can be encouraged to invest in R&D activities if there are no economical incentives to do so. In this respect it is important to take into consideration the existing organisational differences between European TSOs ranging from profit oriented companies to state owned monopolies. One respondent, for example, suggested that economic incentives that drive TSOs to reduce their operational costs of balancing the system could give incentives to increase R&D activity on the subject.</p>	
<p>Question 7: Should wind generators face the same types of network charges as other new generators, calculated using the same methodology? What is needed to provide a sufficient incentive for generation in choosing where to locate? What is needed to provide an appropriate balance of risk among market players? When should this not be the case?</p>		
Network charges	<p>Most respondents generally agreed that access to electricity networks should operate in a transparent, non-discriminatory manner. Respondents stated that it is important that all technologies are exposed to the same price signals to minimise market distortions and hence the overall cost to consumers. One respondent pointed out that for network operators there are no economic differences, but rather technical differences, among types of generation. Two respondents said that uniform network charges promote a level-playing field. Another respondent said that it is appropriate "if wind is to be integrated successfully into the overall energy mix". However, one respondent stated that there is no general answer to this issue and that it depends on a range of issues, such as the regime for network charges, the goal for wind generation and the current state of the transmission grid. It was also argued that the charging regime should "take account of the peculiarities of wind generation".</p>	<p>Given the support for the principles set out here, CEER reiterates the charging system should be transparent, cost-reflective and non-discriminatory charging system and urges NRAs to consider their system against these principles. At the same time, however, CEER recognises that no one model is perfect and that the context of the overall arrangements should be taken account of in considering the charging model. Indeed, a stable, predictable and transparent system is also of utmost importance to the users of the system.</p> <p>Further consideration on how the access regime should look will be addressed in the framework guidelines on grid access, which the Agency is due to produce in 2012. It will also be considered as part of the framework guidelines for tariffs, which the Agency is due to produce by 2012 and which European regulators will play an important role in developing.</p>
Locational incentives	<p>Support for locational signal in the charging regime is mixed. Five respondents supported the use of a locational element on the grounds that it ensures developers consider the cost implications when selecting a location and that it leads to more equal distribution of renewable generation.</p>	<p>Locational signals provide an important incentive for generation in choosing where to locate and ensuring that the transmission infrastructure built at the expense of the</p>

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>One respondent, however, argues that wind generation should face the same locational charges but these should be reconsidered if they lead to unduly high charges. Similarly, another respondent state that NRAs should be "mindful" of the practical outcome of a particular type of charging methodology that means wind is unfairly disadvantaged. Five respondents say they do not support locational charging on the grounds that it is discriminatory to wind and that wind generation should locate where resources exist and that transmission lines should be built to transport to load centers.</p>	<p>consumer is economic and efficient. At the same time, however, CEER recognises the challenges associated with the use of a locational element in the charging regime and consider that its use is one for NRAs to address within the context of their market and network arrangements and their own generation mix.</p>
<p>Question 8: Broadly, what is the appropriate allocation of responsibilities, risk and cost among market players in developing new network infrastructure (e.g. ahead of or in response to new generation connections)? Should this be different for wind generation? Where is harmonization required?</p>		
<p>Role of the TSO</p>	<p>There was general agreement among respondents about requiring a proactive investment policy from TSOs. This includes considering the needs of the network on both a short- and long-term basis (given that it takes longer to build transmission than it does generation). In doing this, respondents argued that TSOs should take account of scenarios for renewable generation, the appropriate locations with existing infrastructure, the interests of relevant network owners and stakeholders and the development of technical standards and grids codes for both on- and off-shore in an integrated manner.</p>	<p>CEER recognises that the regulatory regime can play an important role in incentivising TSOs to deliver anticipatory investment. CEER will give further consideration to how it can best contribute to progressing this issue.</p>
<p>Anticipatory investment</p>	<p>One respondent argued that regulators have been traditionally reluctant to allow TSOs to take more risky decisions and suggested that, in future, it is crucial they take a more positive approach. Another respondent supported the consumer (i.e. the TSO) taking some form of risk in delivering anticipatory investment. It was argued that, should the TSO investment become stranded, NRAs should socialise its cost. To address the difficulty associated with delivering network infrastructure, a couple of respondents suggest some form of strategic decision-making for accessing key resource areas. One respondent argues that the planning of network expansion should take into account existing scenarios regarding both expected renewable energy system and conventional generation. Moreover, it argues the investment and licensing timing of RES installations and grid development projects should be aligned. One of the respondents recommended a monitoring of the TSO's activities of planning and project reporting in order to remove information asymmetry and highlighted the need to impose an obligation on TSOs to publish in their Grid Development Plans an Appendix completely dedicated to renewable energy, which gives the priority of works based on a transparent and in-depth cost/benefit analysis. Another respondent stated that TSOs should publish an exhaustive annual progress report which assesses the state of the art of the planned projects, the causes of delay, the corrective actions put in place, and all information on the actions taken during the permitting process in order to speed them up. It was also highlighted at both European and national level, that TSOs should launch a 10 year development plan for their grids, including extensions, reinforcements and equipment replacements, able to satisfy the evolution forecast of demand and generation and to secure the harmonious development of Europe and its member states, approved by NRAs.</p>	<p>See above.</p>
<p>Role of the NRA</p>	<p>Three respondents stated that the NRA's role in network development should be to ensure that</p>	<p>The role of NRAs in network development is to</p>

Question/Issue	Respondents' feedback	CEER's developed thinking
	risks are minimised. One respondent suggested that regulators and governments together should share investment risk as much as possible. Another respondent argued that regulators should judge the social and economic welfare of the project. A strategic role for regulators in planning the development of the network is identified by two respondents.	appropriately incentivise TSOs to develop the network. In considering proposed investments by the TSOs, regulators have a responsibility to consider the overall benefit of any proposed project. It is not a role of NRAs to bear the risk of TSO investment.
Question 9: Do you agree that the supergrid issues for regulators identified in 5.1 are relevant? Is there anything else that European regulators should be considering?		
Overview of issue identified	<p>Many respondents explicitly supported the idea of a supergrid and welcomed the attention given to this issue. A significant number of respondents agreed that the issues identified are relevant. Two respondents argued that consideration should be given to who pays and who benefits. Regarding other issues to be addressed, one respondent highlighted the importance of assessing the impact of national regulatory regimes alongside political institutions and the need for regulators to liaise to ensure a common approach where possible. Two of the respondents stated that consideration should also be given to investment in the onshore continental grid to manage intermittency. Another respondent stated that the issues identified are not priority ones and argue that cross-border capacity is “the first step”. Two respondents stated that these issues are also relevant for onshore grids. It was also argued that consideration should also be given to balancing, reserve capacities, functioning regulation on balancing and responsibilities of TSOs.</p> <p>Two respondents question whether there should be a more focused work programme feeding into the legislative and formal processes given that CEER is not a statutory organisation. Instead of and/or as well as addressing the issues through the Regional Initiatives, some respondents state that the issues should be addressed at a pan-European or cross-regional basis. For example, one respondent proposes “an overarching structure” to coordinate the projects. It was stated by one respondent that it supports ERGEG’s “pan-European work” and cites the success it has had in the 10-year electricity network development plan. Five respondents say that national governments should be involved in the process. One of them argued that national governments are better able to deal with the complex international legal matters. Two argued that it supports the North Seas Grid Initiative. Another respondent calls for stronger participation of the European Commission and argue that there is a potential role for ACER, once it becomes established. One respondent suggested having a “supervisory body” in addition to the Regional Initiatives. ENTSO-E suggests a case-by-case approach so that regions are defined in function of the subject. A specific group to look at each regional project was proposed and it was suggested that each Regional Initiative should be coordinated simultaneously according to the topics involved.</p>	<p>CEER reiterates that the issues associated with the building of a supergrid are challenging. However, regulators have a responsibility to address this and, in attempting to move this forward, CEER will continue to consider together how we can address these issues. To do this, CEER has established a specific work stream within CEER to consider further this issue.</p> <p>CEER will also continue to monitor the development of regional projects and, where necessary, consider any particular regulatory issues associated with them.</p> <p>CEER will also continue to input into the work of other initiatives considering these issues.</p>
Modular development	Three respondents stated that the focus should continue to be on modular development of a supergrid. One respondent argued that this ensures stranded costs are avoided and the benefits of applying new technologies and improvements in existing technologies can be maximised. Another respondent suggested, however, that point-to-point connection of large offshore wind	As above.

Question/Issue	Respondents' feedback	CEER's developed thinking
	farms clusters is "probably not an optimum solution".	
Investment costs	In considering the investment costs of developing a supergrid, it was argued, by one of the respondents, that this should be judged on the social welfare benefits. It was also argued that it should be considered "within the framework of [a] defined economic model" that pays due attention to costs, efficiency and cost-effectiveness. One respondent states that it is essential that the social and economic benefits are proven before a final commitment is made. Another of the respondents argues that the "long-term economic benefits of improved transmission" (as demonstrated in the European transmission studies such as TradeWind and EWIS) should be taken account of.	As above.
Degree of coordination	With respect to the degree of coordination, six respondents stated that should regional markets integrate, harmonisation of market rules may be necessary. These rules would include a common framework for technical rules. It was argued by one respondent that increased harmonisation would avoid distortions and enable efficient transportation of power around the network. However, at a minimum, two respondents stated that existing rules should be analysed to ensure they are compatible with a "supergrid". One respondent stated that it supports a "common framework".	As above.
Question 10: Is the current ownership structure of the offshore lines or their regulatory framework a potential issue for the integration of offshore networks? Are there other considerations affecting their ownership structure?		
	Five respondents stated that TSOs (or entities that comply with the requirements on TSOs) should develop offshore lines. One respondent stated that the entity could be a subsidiary of the wind generator but act as an independent system operator (ISO) or a subsidiary of the concerned TSO. Two respondents, on the other hand, argued that generators or so-called merchant lines should be allowed. One respondent argued that a developer led offshore industry will deliver the best economies of scale. Four respondents however, argue that the question of who owns the offshore networks is less relevant so long as full third party access is guaranteed. One respondent argued that actual ownership of offshore networks should be decided by each Member State. However, five respondents highlighted the problem of having different ownership regimes across the EU. They stated that, in order to have an integrated European market, it is necessary to have an ownership structure that is suited to its purpose and has the same scope which avoids "national peculiarities". Some respondents highlighted the problem of authorisations in the context of this question and argued that these processes must be speeded-up.	This issue will partly be addressed through regulators' ongoing work in this area. Indeed, it is worth considering further whether different ownership models for offshore networks pose issues for the development of the network. In the meantime, NRAs must ensure that the ownership of the offshore lines is compliant with the 3 rd Package unbundling arrangements.
Question 11: Do you agree that the Regional Initiatives should be used to address the issues associated with the development of the regional projects? What challenges does this present?		
	Many respondents said that there is some merit in the Regional Initiatives being used to address the issues associated with the development of the regional projects. Four respondents recognised the importance of its' "bottom-up approach" in the development of new interconnections across Europe. Respondents argued it offers a "unique opportunity to rely on a	CEER welcomes support for the Regional Initiatives and agree that it can play an important role in considering some of the issues associated with the development of a supergrid. At the same time, however, CEER recognises

Question/Issue	Respondents' feedback	CEER's developed thinking
	<p>close involvement of stakeholders who have a deep understanding of market dynamics” and that it is a “key tool” from an organisational perspective. However, a significant number of respondents raise concerns over using the Regional Initiatives in the development of regional projects. They argued that the Regional Initiatives do not have an adequate geographical size and cite the example of the North Sea offshore grid which does not fit easily with CWE or FUI initiatives. Respondents argue that the issues at stake are broader than a “regional” basis. They also argue that the Regional Initiatives has other priorities (e.g. congestion management, transparency, etc.), that its work should not be overloaded and that focus should remain on these issues.</p>	<p>that it is not, in practice, a perfect fit to consider all these issues and that the work strand on this and regulators' involvement in both the North Seas Offshore Grids Initiative and in the Adamowitsch WG can serve to consider these issues.</p>
<p>Question 12: What other issues should European regulators consider in relation to the integration of wind generation?</p>		
<p>These are addressed in Q1 and Q2 above.</p>		

Annex 1 – CEER

The Council of European Energy Regulators (CEER) is a not-for-profit association in which Europe's independent national regulators of electricity and gas voluntarily cooperate to protect consumers' interests and to facilitate the creation of a single, competitive, efficient and sustainable internal market for gas and electricity in Europe.

CEER acts as a preparatory body for the European Regulators' Group for Electricity and Gas (ERGEG). ERGEG is the European Commission's formal advisory group of energy regulators. ERGEG was established by the European Commission, in November 2003, to assist the Commission in creating a single-EU market for electricity and gas. ERGEG's members are the heads of the national energy regulatory authorities in the 27 EU Member States.

This report was prepared by the Sustainable Development Task Force of the Electricity Working Group.

Annex 2 – List of abbreviations

Term	Definition
ACER	Agency for the Cooperation of Energy Regulators
CEER	Council of European Energy Regulators
CWE	Central West Europe (Regional Initiatives region)
DSO	Distribution System Operator
ENTSO-E	European Network of Transmission System Operators for Electricity
ERGEG	European Regulators Group for Electricity and Gas
FUI	France-UK-Ireland (Regional Initiatives region)
GCT	Gate-closure time
ISO	Independent System Operator
NRA	National Regulatory Authority
MS	Member State
R&D	Research and Development
SEM	Single Electricity Market (Ireland)
TSO	Transmission System Operator

Annex 3 – List of Respondents

	Respondent name	Member State	Respondent interest/activity
1.	Association of Electricity Producers (AEP)	UK	Represents large, medium and small generators, including coal, gas, nuclear and the range of renewable energies.
2.	Associazione Produttori Energia da Fonti Rinnovabili (APER)	Italy	Represents electricity producers from renewable sources.
3.	Bundesverband Neuer Energieanbieter (BNE)	Germany	Represents the interests of producers and suppliers which predominately use third parties' networks to supply their customers with electricity or gas
4.	BDEW	Germany	Represents the interests of gas, electricity and water industries in Germany.
5.	European Chemical Industry Council (CEFIC)	European	Represents the chemical industry at European level.
6.	Centrica	UK	Generation and supply interests in GB and Europe. It has interests in wind generation.
7.	CEZ	Czech republic	Producer of (mainly coal-sourced) electricity and supplier.
8.	Dong	Denmark	Integrated electricity company. It has interests in wind generation.
9.	EDF (UK)	UK	Integrated energy company. It has interests in wind generation.
10.	EDF (FR)	France	It has interests in wind generation.
11.	Edison	Italy	Electricity producer. It has interests in wind generation.
12.	EDP	Portugal/Spain	Generator. It has interests in wind generation.
13.	European Federation of Energy Traders (EFET)	European	Represents over 90 trading companies in more than 20 countries.
14.	Eirgrid	Ireland	The electricity TSO in Ireland and the market operator for the SEM in Ireland.
15.	ELCOM	Switzerland	NRA for electricity in Switzerland.

16.	EnBW	Germany	Integrated energy company. It has interests in wind generation.
17.	Energy Norway	Norway	Represents about 260 generators, distributors, contractors and suppliers in Norway.
18.	Electricity Network Transmission System Operators for Electricity (ENTSO-E)	European	Represents electricity TSOs in Europe.
19.	E.ON	Germany	Integrated energy company. It has interests in wind generation.
20.	ERDF	France	French DSO.
21.	Eurelectric	European	Represents the common interests of the electricity industry at European level.
22.	European Wind Energy Association (EWEA)	European	Represents the wind industry at European level.
23.	GABE	Belgium	Represents industries and large electricity consumers, including those equipped with local cogeneration units.
24.	GEODE	European	Represents the interests of energy distribution companies at European level.
25.	Greenpeace	International	International environmental activist network.
26.	Highlands and Islands Enterprise	UK	Scottish Government's agency responsible for economic and community development across the northern half of Scotland.
27.	Iberdrola	Spain	Electricity generator, network owner and supplier in Spain and rest of Europe. It has gas network and supply interests. It also has interests in wind generation.
28.1	International Federation of Industrial Energy Consumers (IFIIEC)	International	Represents companies in energy intensive industries at a European level.
29.	Irish Wind Energy Association (IWEA)	Ireland	Irish wind energy association.
30.	Netbeheer Nederland (NBNIS)	The Netherlands	Represents the interests of national (TSO) and regional electricity and gas network operators in the Netherlands.
31.	PSE Operator	Poland	TSO in Poland.
32.	Renewable Energy Systems (RES) LTD	UK	Wind farm developer in GB, Ireland, France and Sweden. Also has interests outside of Europe, mainly in the US.

33.	RWE	Germany	Generator, trading, network owner and supplier in many MSs in Europe.
34.	Scottish and Southern Energy (SSE)	UK	Generator, network owner and supplier interests in GB, Ireland, Sweden, Portugal and the Netherlands. It has interests in wind generation.
35.	Statoil	Norway	Has electricity generation and supply interests in Norway and Denmark. Has gas production interests in Europe.
36.	Swedenergy	Sweden	Represents companies involved in the production, distribution and trading of electricity in Sweden.
37.	Swissgrid	Switzerland	The electricity TSO in Switzerland.
38.	Vattenfall	Germany	Integrated energy company. Has interests in wind generation.
39.	Verband der Elektrizitätsunternehmen Österreichs (VEO)	Austria	Represents the interests of Austrian electricity companies.
40.	Verbund	Austria	Electricity producer and network owner.
41.	VIK	Germany	Represents the interests of energy intensive consumers in Germany.
42.	Yellow Wood Energy	UK	Consultancy specialising in electricity and carbon capture.