Generation Adequacy Treatment in Electricity

A CEER Call for Evidence

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European Regulators' Group for Electricity and Gas
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INFORMATION PAGE

Abstract

On 3rd March 2010, CEER launched a call for evidence on generation adequacy treatment in electricity (C09-ESS-05-03). This document sets out CEER's views on generation adequacy and how generation adequacy needs to be addressed throughout the European Internal Electricity Market (IEM).

Target Audience

Energy suppliers, traders, gas/electricity customers, gas/electricity industry, consumer representative groups, network operators, Member States, academics and other interested parties.

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How to respond to this call for evidence

Deadline: **27 April 2010**

Comments should be sent by e-mail to **generation_adequacy@ceer.eu**

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Related Documents

CEER/ERGEG documents

- ERGEG Draft Advice on the Community-wide Ten-year Electricity Network Development Plan, Ref: E09-ENM-16-03, December 2009, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/OPEN%20PUBLIC%20CONSULTATIONS/electricity%2010-year%20ntwk%20dev%20plan/CD/E09-ENM-16-03%20CW-Ten%20Year%20Plan_10%20Dec%202009.pdf

- Implementing the 3rd Package: The next steps, Ref. C09-ADG-04-03, March 2009. http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Cross-Sectoral/2009/C09-GA-52-06a_Imlementing_3rdpackage_18-Jun-09.pdf

- ERGEG Status Review on Building and Construction Authorisation and Permit Process - Case Examples, Ref. E08-EFG-27-04, February 2008, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Electricity/2008/E08-EFG-27-04_BCAP_Case_Examples_06-Feb-08_0.pdf

- ERGEG Position Paper on End-user Price Regulation, Ref. E07-CPR-10-03, 18 July 2007 http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Customers/2007/E07-CPR-10-03_E-UPriceReg_0.pdf

External documents

- Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0055:0093:EN:PDF

- Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0001:0014:EN:PDF

- Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0015:0035:EN:PDF

- Directive 2005/89/EC of the European Parliament and of the Council of 18 January 2006 concerning measures to safeguard security of electricity supply and infrastructure investment (Text with EEA relevance) http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2005&nu_doc=89

- Proposal for a directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (recast) (COM(2007)0844 – C6-0002/2008 – 2007/0286(COD)) http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=EN&type_doc=COMfinal&an_doc=2007&nu_doc=0844

- Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants ("LCP Directive"), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:309:0001:0001:EN:PDF

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EXECUTIVE SUMMARY

This document sets out the CEER's views on generation adequacy and how generation adequacy needs to be addressed in the European Internal Electricity Market (IEM). The report outlines a number of key issues which relate to generation adequacy.

Definition of generation adequacy:

When sufficient generation capacity is available to meet demand, taking into account network constraints. Within that scope, all timeframes must be considered from several years ahead (investments in new generation capacity) to close to real-time (e.g. sufficient margin over peak load).

Liquid, Efficient Electricity Markets and Regulatory Framework

Risk management is needed in order to hedge the volatility of energy prices and is a key issue for the financial feasibility of an investment project. It is therefore urgent to implement all the necessary regulatory measures to facilitate the creation of efficient liquid markets for all products in all European Union Member States. This includes implementing efficient congestion management methods to ensure interconnections are used optimally, and developing interconnection capacity, so further market integration can be achieved.

Presently, electricity markets are at different degrees of maturity and prices are not always considered to be fully competitive and reliable. In that context, market monitoring by relevant authorities can play an important role in supporting the market's evolution towards more efficiency, higher liquidity and less ("unjustified") price volatility. The benefits of market monitoring include among others: comprehension of market mechanisms, detection and prevention of anti-competitive behaviour, indication of the most urgently needed transmission grid enhancements, etc.

In order to achieve market efficiency, price signals which also encourage customers to adjust their demand of the market are needed. Enhancing demand response and customer participation approaches might reduce extreme prices during tight supply situation, by decreasing (price) peaks.

Decisions to investment and decommission are dealt with by market participants. Hence there exist no precise figures on the total amount of future generation capacity and future prices. Aggregating the information on decommissioning and investments and making it available for interested parties (generators, investors) could support their decision-making.

Barriers to Investment in New Generation Capacity

There are risks resulting from an unclear or non-uniform regulatory framework which can be detrimental to investment. Moreover, risk may also stem from uncertain environmental objectives and goals. Investors need visibility on these points, in order to anticipate the costs associated with upgrading installations, or to ensure access to slots on the equipment production lines, if older and more polluting generators are to be replaced by cleaner ones. Therefore, energy and environmental policies should be as stable and sustainable (long-lasting) as possible, so that investors may be able to anticipate and mitigate the related risks.

Regarding regulated energy prices, when a regulated price level is lower than the actual costs of generation (i.e. subsidised by some other parts of the market), the investment climate might be inappropriate to convince potential investors to invest. In the medium term, this can threaten

security of supply.

Across Europe, complex authorisation procedures and local opposition to projects to build new power plants lengthen the time needed to develop new generation capacity. Shortening authorisation procedures and promoting projects to improve local acceptance would be of benefit to investments in new generation capacity and generation adequacy.

In addition, adequate grid reinforcements are essential to allow power plants to generate at maximum and to transport electricity from power plants to loads.

Additional Measures (and Criteria) for Facilitating the Provision of New Generation Capacity

European Energy Regulators clearly support the view that the well-functioning electricity market should be able to deliver security of supply and generation adequacy and that any additional mechanisms must be introduced only after a careful consideration of barriers to investment and possible adverse effects of such additional mechanisms. Furthermore, their effects on the market should be reviewed periodically.

Whereas regulators are not prescriptive in devising generation adequacy methods, there are a number of important criteria which must be considered before any such method is designed and which are elaborated in detail in Section 4 of this document.

Different countries having experienced periods of tight margins in electricity supply have found different ways of responding to those situations, from setting in place steps to improve market transparency and demand response to simply waiting for the market to respond. In particular, for any additional capacity mechanism beyond the market itself, it must be ensured that generators, as the beneficiaries of such a system, are encouraged to run in tight periods rather than to withdraw their capacity in order to increase prices further.

As different production methods have different qualities (costs, fuel, responsiveness, start-up times, etc.), diversity is needed in electricity generation to be able to meet changes in consumer behaviour. It is important that generation adequacy treatment, and potential additional measures facilitating the provision of new generation capacity, considers the fuel aspect and also ensures that the appropriate level of generation reserve capacity is available, at both the short and long-term.

Incompatible methodologies at European or regional level may lead to market distortions or incompatibilities in implementation.

1. Introduction

This document (Framework for Generation Adequacy Treatment) sets out CEER's views on generation adequacy and how generation adequacy needs to be addressed throughout the European Internal Electricity Market (IEM).

Generation adequacy refers to when sufficient generation capacity is available to meet demand, taking into account network constraints. Within that scope, all timeframes must be considered from several years ahead (investments in new generation capacity) to close to real-time (e.g. sufficient margin over peak load).

Europe faces challenges to deliver electricity in a sustainable, secure and competitive way. While it could be argued how to achieve generation adequacy by market conformant measures, generation adequacy is a precondition for the functioning of the electricity market. Since CEER is committed to the development of an effective, competitive single market for electricity across the whole of the EU, there is a need to address generation adequacy from the regulatory perspective.

Generation adequacy is not entirely the responsibility of the national energy regulators. Monitoring of generation adequacy can be either the responsibility of a relevant ministry or of the national regulatory authority (NRA). Meanwhile, setting political goals and / or introducing practical measures beyond the electricity market itself are the responsibility of the ministries.

Moreover, Article 36 of Directive 2009/72/EC states that "… *the regulatory authority shall take all reasonable measures in pursuit of the following objectives […] helping to achieve, in the most cost-effective way, the development of secure, reliable and efficient non-discriminatory systems that are consumer oriented, and promoting system adequacy*". This report addresses generation adequacy from the perspective of this legal provision .

At present, generation adequacy measures are mainly national in scope. However, measures to ensure generation adequacy may have an impact on markets across national borders, and vice versa. If measures for generation adequacy remain national, this may hinder the achievement of an effective internal electricity market across Europe.

Market and security aspects are closely linked, so for example many problems related to security of supply originate from barriers to invest. The barriers - administrative, economical and political - are investigated further in this document[1].

Based on the results in this document, CEER will work further on measures that mitigate the most important barriers, elaborating also more detailed views in that sense.

Due to concerns that energy-only markets (i.e. the markets where no extra payment exists for capacity) may not ensure generation adequacy, some alternative approaches[2] have been designed and implemented to encourage and make attractive investments in new generation capacities. However, such initiatives have remained mainly national in scope, despite their impact on cross-border trade and the objective to create a single market for electricity across whole of the EU.

Although European legislation has not been prescriptive and explicit in the way generation adequacy should be established and current practices differ largely in the Member States, the issue of generation adequacy is addressed in the following EU legal framework:

[1] Mechanisms to cope with an energy crisis are beyond the scope of this document.

[2] E.g. tendering procedures, backup reserves, (medium term) capacity markets, capacity payments, reliability options, etc.

- In Directive 2009/72/EC of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC, Article 4 specifies the need for Member States to monitor security of supply, with a possibility to delegate this task to an authority like a national regulator; Article 8 introduces a provision for backup mechanisms such as tendering procedures, to ensure generation adequacy if authorisation procedures, demand-side management or energy efficiency measures are insufficient.
- Directive 2005/89/EC of 18 January 2006, concerning measures to safeguard security of electricity supply and infrastructure investment points to:
    - the importance of transparent and stable regulatory framework and investment climate;
    - the importance of encouraging the establishment of liquid wholesale markets that provide suitable price signals;
    - the importance of removing administrative barriers to investments;
    - the possibility to take additional measures like provisions facilitating new generation capacity and tendering procedures or equivalent;
    - the possibility to take into account the degree of diversity in electricity generation.

These points are seen as the most significant for structuring this document. They reflect the issues that could encourage and provide the best climate for ensuring generation adequacy. The establishment of efficient liquid wholesale energy markets to provide suitable price signals and confidence in the market has met with uneven results throughout the EU Member States. Furthermore, some administrative and political measures are detrimental to the market and its ability to generate adequate investments; their consequences are highlighted in this document.

The regulators' position on how to design and implement an EU wide system adequacy forecasts is tackled in another deliverable according to the European Energy Regulators (EER) Work Programme 2009.

1.1. Questions for the call for evidence

1.) What are the key elements for ensuring generation adequacy in the competitive electricity market in EU MS and the EU as a whole?

2.) Do you observe any barriers for investing in new generation capaciy? If yes, please list and explain them.

3.) In case of additional measures for ensuring generation adequacy, what would be the key issues to take into account?

2. Liquid, Efficient Electricity Markets and Regulatory Framework

2.1. Risk and Risk Management for Generation Projects

There are two key aspects which determine the volatility of the electricity price:

- In the short term: supply must meet demand at any time and since electricity cannot be stored efficiently on a larger scale, this might lead to volatility;
- In the longer term: electricity can be generated based on different primary energy sources (gas, coal, water, nuclear, wind, etc.) so the costs of these primary sources (or hydrology / availability of water in case of hydro generation) directly influence the volatility of longer-term electricity prices.
- Moreover, there is another impact to price volatility, originating from the CO_2 prices.

Price risk management is a key issue in terms of the feasibility of an investment project. It is therefore urgent to take all the necessary regulatory measures needed to facilitate the creation of efficient, liquid markets in all Member States.

This includes implementing efficient congestion management methods to ensure interconnections are used optimally, and developing interconnection capacity, so further market integration can be achieved.

Virtual Power Plants[3] (VPP) can be used as a tool to enhance market liquidity, especially in the forward market. Some VPP measures have been taken following both national and European Commission decisions.

Investors need to hedge the future cash flows of a power plant project; otherwise the risk premium on the capital engaged becomes very high. However, long-term hedging tools have not yet proven their m[4]aturity and effectiveness or are even unavailable in the range which is considered necessary by the investor. The maximum term of financial derivative products is 5 (Nordpool) or 6 (EEX) years ahead on power exchange platforms. This seems not to be sufficient compared to e.g. a 20 or 30 year average lifetime of generators[5]. However, it would also not be conducive to electricity markets to buy/sell 30 years ahead.

Long-term contracts between a generator and suppliers or big customers are one way of mitigating financials risks. Long-term contracts generally propose agreed methods (e.g. indices, relation to fuel prices, relation to power exchange prices, etc.) for the determination of prices for big volumes of electricity over long periods (over 20 years for example). They enable both generators and customers to share the energy price risk[6]. With long-term contracts, the generator's future cash flows are stabilised, hence investment decisions are more secure and

[3] VPP in this connection means: when a supplier purchases options from a power plant but without the associated capital investment. The buyer pays a base-price for the capacity and can then choose to use the energy produced in "his" power plant or to buy (if cheaper) on the market.

[4] In its decision of 7th February 2001 authorising EDF's acquisition of the German operator EnBW, the European Commission required the French company to offer part of its electricity generation capacity at the French wholesale market for a minimum period of 5 years in order to *"eliminate the strengthening of EDF's dominant position on the market for eligible customers in France*". The duration of contracts currently on sale ranges from 3 to 48 months for baseload and from 3 to 36 months for peak load products.

[5] Planned recovery of investment varies usually between 10 and 15 years.

[6] As a consequence, generators (respectively consumers) may miss opportunities to benefit from higher incomes (respectively lower prices).

the capital cost to finance the project is reduced: i.e. the generator can more easily get low-rate loans from banks. However, it is argued that long-term bilateral contracts can weaken competition in both wholesale and retail markets. This negative effect must be taken into account.

2.2. Market Monitoring

Electricity markets are at different degrees of maturity and prices are not always considered to be fully competitive and reliable. Market participants often express their distrust in the price formation mechanism as there is a potential risk for electricity prices to be manipulated, in particular in countries where generation is highly concentrated. In some Member States, the market is too illiquid to give relevant price signals. Furthermore, although well known in theory, the relationship between electricity generation fundamentals (fuel prices, CO_2 prices, generation adequacy, etc.) and the price of electricity is not well known in real markets.

Non-confidential data should be published and available to all market participants. Market monitoring by competent authorities (either competition authorities or NRAs) can play a role in improving market conditions at different levels:

- Monitoring would increase the comprehension of market mechanisms. Data about variable costs, generation capacity availability, and production scheduling could be given to authorities on a confidential basis. Consequently, authorities could be in position to identify the price determinants and to explain price levels at a specific moment. The release of this kind of information would increase trust in market price formation mechanisms. It would give a solid basis to stakeholders for their analysis. Price level information is important for investment decisions, since is the level should result from demand/supply equilibrium.
- Authorities would have the means to detect anti-competitive behaviour. For example, generators can push the price up by withdrawing capacity. On the contrary, a “price war” strategy consists in keeping prices artificially low to discourage new investments. Basically, authorities could verify that bids from generators are compliant with their costs. Even with legal power and data, anti-competitive behaviour may be difficult to prove and to ban, but published reports with results of market monitoring would put pressure on market players to improve their behaviour. As a consequence, customers and new entrants in the market would be better protected.
- Irrespective of the level of power of the authorities, market monitoring would act as a deterrent anti-competitive behaviour. Market monitoring would also allow authorities to propose necessary changes in market rules, in order to avoid market abuse. Authorities could monitor how and when capacity is used (availability, production) and from that identify mechanisms and incentives to support market liquidity.
- Market integration may be achieved through improved transmission grid infrastructure. This can include both interconnections as well as the lines within a control area. Market monitoring can deliver an important indication to determine when and where electricity is transmitted from one control area to another. This way it would be easier to identify the transmission network expansions which are most valuable for market integration. This information must be made available to all interested parties (TSOs, generators, etc.). The outcomes of market monitoring should therefore also be taken into account when regulators approve transmission system operator (TSO) grid development plans if no scheme exists to incentivise the TSO to achieve an efficient level of investment, or when considering new transmission grid projects by third parties (merchant lines).

2.3. Demand Flexibility

Demand flexibility is important to reduce price spikes and the risk of shortages. Enhancing demand response might reduce extreme prices experienced during times of tight supply, by decreasing (price) peaks.

For demand response to work, there must be price signals that encourage customers to adjust their demand to the market. Therefore, it is important to create mechanisms to make demand flexibility attractive to customers. Big customers for example might need an incentive related to costs, in order to adjust their behaviour (e.g. working processes, energy consumption, etc.), so that they can align with price signals.

Demand flexibility can only be ensured when customers have the possibility to react to prices. This means on the one hand, that the energy price customers pay should be coupled to the short-term electricity price in the wholesale market (e.g. their consumption is measured per hour and paid in accordance with hourly exchange prices). It implies that all information consumers need to react is easily available to them. On the other hand, an equivalent effect would be reached if the provisions for customer flexibility are included in the supply contract. Smart meters could also play a key role in this area.

Satisfactory measures should increase confidence that electricity markets can be used to ration capacity by price, limiting needs for peak generation units that run a very few hours each year and whose profitability is uncertain.

2.4. Availability of Information on Generation and Demand

Decisions to invest and decommission are planned and executed by market participants. Hence it is difficult to have a precise idea of total amount of future generation capacity and of future prices. Bundling the information of foreseen generation capacity and making it available for interested parties (generators, investors) could support appropriate decision-making by them.

Information on actual consumption as well as forecasts of future short and long-term energy and capacity needs would ease stakeholders' decision. This information on generation and consumption and forecasts provide is key to stakeholders, although ultimately market participants must make their decisions based on their own analysis and assessment of market opportunities.

3. Barriers to Investment in New Generation Capacity

3.1. Environmental Risks Detrimental to Investment

There are a number of risks resulting from an unclear or non-uniform regulatory framework, e.g. they occur within the legislative process, which may be detrimental to investment. There are also risks originating from uncertain environmental objectives and goals.

This is illustrated by the following examples:

- An uncertainty regarding the regulatory framework is emerging from Member States' provisions to reach the 2020 targets[7]. This means that every Member State implements some measures which impact the market and which may be detrimental to investments.
- The modalities of European CO_2 emission allowance rationing for the third phase of the Emission Trading Scheme (ETS) are key factors for the competitiveness of any future fossil fuel power plants and constitute an essential source of uncertainty for investors. Implementing the Climate action and renewable energy Package ("Green Package")[8] may result in a legal framework which deters investors from investing in certain types of fossil fuel power plants and incentivises old fossil fuel power plants to shut down sooner.

  Furthermore, the amount of emission permits to be allocated from 2013 will remain uncertain until the end of 2010. Generators will pay for their emission permits which will be auctioned and that will in turn increase the financial risks borne by investors. Moreover, Member States have committed themselves to drop CO_2 emissions by as much as 30% by 2020[9] (as opposed to the 20% in the current commitment) if other countries involved in the United Nations Framework Convention on Climate Change (UNFCCC) follow this lead following the Copenhagen Conference in December 2009. This would further impact the amount of emission permits made available and imply more stringent legislation to incentivise emission reductions. Thus, investors' risks are likely to make them delay their potential investments.
- Technical standards for industrial installations are becoming more and more stringent generally. The content of Directives about polluting activities is evolving periodically, which creates uncertainty. The proposal for a Directive on industrial emissions (IED), which is currently being negotiated, recasts current Directives related to industrial emissions in a move to tighten emissions limits and simplify regulation[10].

[7] These EU targets for the year 2020 include 20% reduction in greenhouse gas emissions, 20% EU renewables share and 20% savings in consumption by improving energy efficiency

[8] The "Green Package" was finally adopted on 23 April 2009. It includes 6 legislative acts: a Directive on the promotion of the use of energy from renewable sources (2009/28/EC); a Directive amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community (2009/29/EC); a Decision on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (406/2009/EC); a Directive on the geological storage of carbon dioxide; a Directive amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions from the use of road transport fuels (2009/31/EC); and a Regulation setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO 2 emissions from light-duty vehicles (Regulation (EC) No 443/2009). http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:140:SOM:EN:HTML

[9] http://ec.europa.eu/environment/climat/copenhagen_09.htm

[10] Proposal for a directive of the European Parliament and of the Council on industrial emissions (IED) (integrated pollution prevention and control) (Recast). This Directive on industrial emissions not only relates to power stations

Investors need visibility on these points to anticipate the costs associated with upgrading installations, or the access to slots on the equipment production lines, if older and more polluting generators have to be replaced by cleaner ones.

Therefore, energy and environmental policies should be designed as much as possible for the longer term, so that investors may be able to anticipate and mitigate the related risks.

3.2. Regulated Energy Tariffs

ERGEG has proposed that regulated tariffs should be progressively ended. ERGEG[11] has stated that "*end-user price regulation in electricity (and gas) markets distorts the functioning of the market and jeopardises both security of supply and the efforts to fight climate change. Therefore end-user price regulation should be abolished, or where appropriate, brought into line with market conditions*."

ERGEG further underlined that "*if regulated end-user prices are not in line with wholesale market conditions, suppliers without significant low cost generation capacities or equivalent long-term contract will not be able to make competitive offers which cover their supply costs*."

Historically, regulated energy tariffs in retail markets have been used as a tool to reach different political objectives (customer protection, inflation containment, subsidy to some activity sectors, etc.). As a consequence, regulated tariffs generally do not reflect wholesale market conditions, which can be detrimental to generation investment.

In particular, when a regulated tariff is lower than actual costs of generation, the investment climate might not be good enough to convince potential investors to invest. In the medium term, this may threaten security of supply.

3.3. Delays to Build New Power Plants and Reinforce Grid

As previously stated, investments in new generation capacity face many uncertainties. The consequences of a lack of long-term contracts and hedging tools, and of uncertain political and regulatory frameworks over the lifespan of power plants are further exacerbated by the long period for the development of new power plants - from the identification of their necessity to their putting into operation.

This long development period results from complex authorisation procedures and local opposition to projects to build new power plants that exist all over Europe (the so-called "not in my backyard – NIMBY" phenomenon)[12]. Shortening of authorisation procedures and promoting projects to improve local acceptance would be of benefit to investments in new generation capacity and generation adequacy.

Delays to grid reinforcements are another trouble spot. Indeed, grid reinforcements might be necessary to allow power plants to generate at its maximum and to transport electricity from generators to customers. Generally, delays to build new transmission lines are often longer than delays to build power plants.

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but to all industrial emissions over a certain size. The Large Combustion Plant Directive (LCPD) (2001/80/EC) currently does not apply in the 'new' Member States – from central and eastern European, but the IED is expected to encompass those states as well.

[11] In the position paper "End-user energy price regulation".

[12] See ERGEG Status Review on Building and Construction Authorisation and Permit Process - Case Examples, Ref. E08-EFG-27-04

3.4. Price Spikes

Theoretical microeconomic analysis of power systems shows that the price resulting from a competitive market suffices to remunerate the total costs of generating units whose investment is well adapted to existing demand and to the presence of all other generation plants. Price spikes and volatility of prices emerge when generation supply situation gets tighter and more expensive generation is needed to meet the demand. These price spikes should give signals to stakeholders that more generation capacity is needed.

However, a number of conditions must be met for such an ideal situation to materialise. This is not always the case in practice for several reasons, like e.g. the existence of price caps that reduce incomes of generators, especially peaking generation units which are used only during tight supply situations. It appears therefore that any such measures in the market like price caps or other similar measures need to be minimised in order to ensure maximum possible effectiveness of the market for ensuring generation adequacy. Price spikes can be an effective investment incentive so it is important to differentiate between competitive price spikes and those which are caused by market manipulation.

4. Additional Measures (and Criteria) Facilitating the Provision of New Generation Capacity

A question might be raised whether energy-only markets can deliver security of supply and generation adequacy in a more narrow sense. A more detailed consideration could address whether a different kind of incentive might be needed for different kinds of generation capacity (e.g. base or peak units).

The relevant EU legislation (most notably Article 8 of Directive 72/2009/EC) specifies that measures facilitating the provision of new generation capacity should only be considered:

- "… *if the generation capacity was not built based on the regular authorisation procedures, or*
- *if the energy efficiency / demand-side management measures being undertaken were not sufficient to ensure security of supply*…"

Furthermore, any additional measures for generation adequacy shall be market-oriented and non-discriminatory (Directive 89/2005/EC).

European Energy Regulators clearly support the view that a well-functioning electricity market should be able to deliver security of supply and generation adequacy and that any additional mechanisms (e.g. capacity requirements and capacity markets) must be introduced after a careful consideration of barriers to investment and possible adverse effects of such additional mechanisms. Whereas regulators are not prescriptive in devising (one or more) generation adequacy methods (as this is also a task of the Member States according to the Directive mentioned above), there are a number of important criteria which must be met before any such a method is designed. These criteria are elaborated in the following chapter.

4.1. Avoiding Adverse Market Effects by National Generation Adequacy Approaches

As mentioned previously, generation adequacy measures are still mainly national in scope and therefore possible external effects on neighbouring countries and markets are often not considered. Accordingly, it may be necessary to adopt compatible methodologies at European level, or at least at regional level, since different approaches may lead to dangerous market distortions at national level. Compatibility should also be achieved as regards implementation.

National approaches nearly always have some effect on other control areas / markets, which may be either positive or negative from the point of view of the other control area / market. For example, a tender for new generation capacity near the border of a neighbouring country can (negatively) influence investment behaviour there as well (relocation of planned investments) and have an effect on cross-border trade.

In order to mitigate potential negative effects and to benefit from positive ones, different approaches are available. One fairly straightforward means would be that national approaches should be made transparent and preferably coordinated with neighbouring countries and / or regions before their implementation.

Generation adequacy approaches should not only avoid discrimination among interested undertakings but should also not discriminate against existing generators, since this could lead to further scarcities of generation capacities.

4.2. Locational Signals

As it is not desirable to achieve only a certain "installed capacity target" but also to harmonise generation and transmission development, system adequacy must be taken into account. Thus the adopted "generation adequacy" methodology should be able to provide locational signals.

Locational signals could be a way to promote the efficient use and development of the transmission network and to ensure that there is a “level playing field” for all types of generation. Locational signals would further allow the economic costs of transmission to be factored into decisions about where to locate new generation units.

Generators would then be able to weigh the costs of transmission against other costs as well as operating efficiencies which are likely to vary by location. Generators will need to consider a number of factors when they decide where to site new generation facilities:

- Cooling water availability (river, sea and lakes) for large thermal power plants;
- Fuel supply options for gas, oil and coal power plants (harbour, pipelines, etc.), different fuel costs, CO_2 storage availability and transportation costs;
- Local resources (hydro, wind) for renewables;
- Existence of heat load (for CHP plants), suitable land and land costs;
- Distance to a suitable connection point in the electrical network and different electricity transmission costs;
- Different labour costs.

Locational signals would also allow generators to trade off lower incomes (from measures implemented to facilitate the provision of new generation capacity) in one area of the country against other cost considerations (e.g. lower land, labour and fuel costs). This would allow them to make informed decisions. Thus, even though congestion occurs and it is more expensive to transport the electricity over long distances, it may still be economical to locate generation in remote locations.

Nevertheless, it should be noted that the continuity and stability of locational signals are key conditions for their success – this however has not yet been achieved in almost any case in Europe. Therefore, any application of locational signals should be carefully analysed and it should be ensured that the desired effects on right investment decisions are indeed achieved and kept in a sustainable way.

4.3. Fuel Sourcing for Electricity Generation Cooperation (Most Notably: Dependency on Gas)

Efficient and reliable fuel sourcing for generators is crucial for the production of electricity at a national and regional level. This increases the complexity of the obvious requirement on the market to be able to source fuel for the national generation of electricity. In order to ensure security of supply in the system, sourcing must be flexible and able to switch to alternative suppliers as required.

Given the number of predominantly gas-fired new generation projects planned across Europe, gas storage capacity and transmission grid become crucial. For ease of supply of gas and due to the costs of investments in gas infrastructure, it is important for gas powered generation to be close to gas network hubs and storage sites. Furthermore, technologies allowing a switch from

gas to another primary energy source (e.g. oil) should be considered because of risks of gas supply disruption.

Investment and development of new generation also require the cooperation of electricity and gas TSOs. This cooperation will be useful in order to anticipate the needs of future projects in terms of the provision of adequate network availability and storage sites.

TSOs are best placed to analyse the feasibility of a planned connection to a particular site and will have the best knowledge of any electricity or gas constraints existing on the networks. In turn, investments into new gas-fired generators would require consultation with electricity and gas TSOs.

NRAs are best placed in this regard to ensure that cooperation is carried out, that development occurs in line with the recommendations of the TSOs and that generation adequacy and resilience are developed nationally and regionally.

4.4. Incentives to Run during Tight Periods

Tight periods can result from:

- Tightness in primary energy supply (availability of fuels/fuel prices, lack of water due to low rainfall, etc.);
- Tight capacity due to increased demand (cold winter, rapid growth, etc.);
- High electricity prices in neighbouring markets;
- Delay in capacity investment.

Furthermore, generators might try to foster tight supply situations, to achieve a higher price for their product.

Different countries having experienced tight periods have found different ways to respond to these situations, from setting in place steps to improve market transparency and demand response to simply waiting for the market to respond.

Especially as regards any additional capacity mechanism beyond the market itself, it must be ensured that generators, as the beneficiaries of such a system, are encouraged to run in tight periods rather than to withdraw their capacity in order to increase the prices further.

4.5. Demand-Side Measures

When implementing additional measures for generation adequacy, the option should also be introduced for customers to participate by reducing their consumption. Indeed, enhanced demand participation in the market would:

- Lower the need for high-peak units, and thus lower prices and greenhouse gas emissions;
- Increase reliability of price signals and make market power abuse tough;
- Allow energy savings and enhanced energy efficiency.

It should be emphasised that any demand participation scheme can only be successful and contribute to the sustainable generation adequacy improvement if there are adequate and market-oriented compensation mechanisms in place for the customers.

5. Diversity in Electricity Generation

As different production methods have different qualities (costs, fuel, responsiveness, start-up times, etc.), diversity is needed in electricity generation to be able to meet changes in consumer behaviour. It is important that generation adequacy treatment, and potential additional measures facilitating the provision of new generation capacity, considers the fuel aspect and also ensures that the appropriate level of generation reserve capacity is available, at both the short and long-term.

At present, many countries rely on thermal power fuelled by coal, oil or gas and diversity is reflected mainly in the possibility to change between different kinds of fuel. Other countries are dependent on production from generators with stochastic behaviour, like hydro power, and there is a need to secure the supply when, for instance, the inflow to the water dams is failing. It is obvious that diversity in electricity generation is vital in such situations. This can be solved by some water reservoirs or by having access to other production methods, either within the country, or via interconnections to other areas with a different production portfolio. Regarding fuel, the considerations need to encompass the diversity, not only of fuel type, but also of the type and the share of the different sources, in order to limit the economic as well as the not-supplying risk.

It is also fundamental to ensure the appropriate level of generation capacity for balancing purposes. In particular, it is necessary to have available a sufficient amount of fast-spinning reserve as well as other fast reserves also within the integrated cross-border balancing markets. As soon as the fuel situation or environmental protection aspects lead energy policy to promote other sources and technologies, such as renewables and the high efficiency technologies to produce electricity, the appropriate level of generation capacity must be reconsidered, as well as the criteria to be fulfilled (types and capabilities of the ancillary services). Effective cross-border balancing arrangements can also assist with intermittent generation and decreases in thermal generation.

6. Conclusions

This report has sought to outline a number of key issues which relate to generation adequacy in electricity networks.

By examining what it hopes is a full picture of the factors and impact of generation adequacy treatment in electricity markets in Europe, CEER seeks to further the discussion on finding solutions and improving certainty for investors, generators, network planners and electricity market participants generally.

Generation adequacy treatment should also be considered within the greater context of both national and Community-wide ten-year electricity network development plans. By way of example, Article 7 of Regulation EC No 714/2009 stipulates that the ten-year network development plan shall cover the overall adequacy of the electricity system to supply current and projected demands for electricity for the next 5-year period as well as for the period between 5 and 15 years from the date of that outlook. Ahead of the implementation of the 3rd Package, and the specific obligations on TSOs and the Agency for Cooperation of Energy Regulators (ACER), European energy regulators aim to develop the work and provide advice to TSOs on the envisaged regulatory approach to these issues in future.

With this in mind, the call for evidence on the present report seeks to gather stakeholder views and experience regarding generation adequacy treatment. The feedback received from the call for evidence will serve to inform regulators' future work and understanding of the issues of electricity network planning and long-term market stability.

Annex 1 – CEER

In 2000, ten national energy regulatory authorities signed the "Memorandum of Understanding for the establishment of the Council of European Energy Regulators" (CEER). They had voluntarily formed the council to facilitate cooperation in their common interests for the promotion of the internal electricity and gas market. In order to cope with a growing number of issues and to improve cooperation at the operational level, the regulators decided in 2003 to formally establish themselves as a not-for-profit association under Belgian law and to set up a small secretariat in Brussels. The Statutes (English version, Statutes amendment) were published in the annex of the Belgian State Gazette on October 21st, 2003. The CEER now has 29 members - the energy regulators from the 27 EU-Member States plus Iceland and Norway. CEER and the European Regulators Group for Electricity and Gas (ERGEG) share similar objectives and the work and achievements of the CEER and ERGEG are intrinsically linked.

The work of the CEER and ERGEG is structured according to a number of working groups, composed of staff members of the national energy regulatory authorities. These working groups deal with different topics, according to their members' fields of expertise.

This report was prepared by the Electricity Security of Supply Task Force of the Electricity Working Group.

Annex 2 – List of abbreviations

Term	Definition
CEER	Council of European Energy Regulators
ERGEG	European Regulators Group for Electricity and Gas
GGP	Guidelines of Good Practice
CHP	Combined Heat and Power
CO_2	Carbon dioxide
ETS	Emissions Trading Scheme
IED/IPPC	Industrial Emissions Directive/Integrated Pollution Prevention and Control
IPPC	Industrial Power Plant Combustion
LCPD	Large Combustion Plant Directive (LCPD) (2001/80/EC)
NIMBY	Not In My Back Yard
NRA	National Regulatory Authority
TSO	Transmission System Operator
UNFCCC	United Nations Framework Convention on Climate Change
VPP	Virtual Power Plant

Table 1 – List of Abbreviation