

Market Design Newsletter

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In this issue we focus on our upcoming international conference in which we will discuss ways to achieve the EU's goal of a single decarbonised, reliable and affordable electricity market, and we present Market Design's recently published report on capacity markets.



EVENTS

MARKET DESIGN EUROPE 2011 INTERNATIONAL CONFERENCE European electricity markets at a crossroads

How can electricity market regulation be improved or redesigned to facilitate the achievement of European climate change targets more effectively? Are the necessary policy instruments compatible with the functioning of competitive electricity markets?

These and other subjects will be discussed at Market Design's upcoming two-day international conference. Major steps have been taken towards integrating Europe's national electricity markets into a single market by 2014. However, the objective of creating a single European market dates from the

late 80s. Since then, growing concern over climate change has resulted in ambitious decarbonisation targets. The share of low carbon technologies in the electricity mix is estimated to increase from around 45% today to around 60% in 2020, to 75-80% in 2030 and to nearly 100% in 2050.

Decarbonisation on such a large scale will have a profound effect in energy policy and electricity sector investment. As the share of low carbon generation increases, the potential for market distortions will increase, as support mechanisms for renewable energy and capacity

mechanisms being discussed in several countries are national in nature.

Europe 2011 will be organized into three sessions. All presentations will be 20 minutes long and will be followed by 10 minutes of discussions. There will be plenty of breaks and networking time as well!

**Day 1
Session I
EUROPEAN ELECTRICITY MARKET
REFORM AT A CROSSROADS**

Chair: [Lars Bergman](#), President, Stockholm School of Economics.

Owen Wilson, Chair of EURELECTRIC Environment & Sustainable Development Policy Committee, will talk about strategic decisions necessary to achieve European long-term energy and climate goals.

Under the banner "*Political Dreams vs Reality: Do governments ever learn from the past*", **Alex Henney**, a long-time critic of politicians will discuss the upcoming reform to the British electricity market.

Mr. Henney is the author of the book [The British Electric Industry 1990-2010](#):



The conference will take place on the water's edge at Nacka Strand, Stockholm

[The Rise and Demise of Competition](#), a caustic account of the British Government's attempt to adopt a market-based approach to electricity regulation, an approach the author believes is now being surrendered in favour of central planning and subsidies that will deliver the expensive decarbonisation targets the Government has adopted. Often highly critical of the British Government's choices, Mr. Henney ends his book with the prediction that in 10-year's time, someone will write "The British electric industry 2011-2010: the rise and demise of greenery".

Karsten Neuhoff, Head of the Climate Policy Department at the German Institute for Economic Research (DIW Berlin) will discuss market design as a tool to support climate policy. Mr. Neuhoff and his colleagues use empirical analysis and international comparisons to evaluate the design and effectiveness of policies that governments use to achieve low-carbon growth. The analysis aims to facilitate international knowledge transfer and support stakeholders and policy makers to fast-track best practices.

Session II

EXPANDING AND INTEGRATING THE EUROPEAN WHOLESALE MARKET

Chair: Mats Nilsson, Head of Market Design Unit, Vattenfall R&D, Sweden

Progress has been made towards a single European electricity market through market coupling and the integration of regional markets. Discussing issues related to market integration will be:

Christophe Gence-Creux, former French regulator and at present Head of the Electricity Department of the [Agency for the Cooperation of Energy Regulators \(ACER\)](#). Mr. Gence-Creux will be discussing whether a single European electricity market will require a new market design.

Cecilia Hellner, Head of European Affairs at Vattenfall, will be talking about the opportunities and challenges in expanding the European transmission network. Ms. Hellner is the former Manager of the Market ENTSO-E Secretariat.

Jörg Jasper from the German utility EnBW will be talking about Germany's



Dr Christophe Gence-Creux is Head of the Electricity Department of the newly created, Ljubljana-based Agency for the Cooperation of Energy Regulators (ACER)

decision to phase out nuclear power by 2022 and whether this decision will imply more policy or more market. The European Commission has recently published a document making the case for strengthening interconnections in the face of Germany's decision.

Satu Viljainen and **Mari Makkonen** from the Laboratory of Electricity Markets and Power Systems at Lappeenranta University of Technology in Finland will be discussing electricity market liberalisation and the competitive landscape in the Russian electricity market.

DAY 2

Session III

OTHER CURRENT ASPECTS OF MARKET DESIGN

Chair: Johan Linnarsson, Chief Analyst, Fortum Generation / Portfolio Management and Trading

In this session we will focus on issues that are important for the decarbonisation and market integration agendas.

Demand Response, which can help reduce electricity price volatility, mitigate market power and enhance security of supply, is becoming attainable reality in many European countries as smart meters are rolled-out. The speakers are:

Per Olof Granström, Secretary General, EDSO for Smart Grids will discuss whether Demand Response will be driven by the electricity industry or whether it will have to come about as a result of regulation.

Jessica Strömbäck, senior partner at the

Helsinki-based energy think tank Vaa-saEtt and executive director of the Smart Energy Demand Coalition, a pan-European organization whose purpose is to "Create a community of expertise on demand side programs and their role in creating efficient electricity markets."

Transmission pricing and locational pricing: nodal or zonal electricity market design? Many electricity markets provide at least some locational signals reflecting the marginal costs that consumers place on the transmission system, in order to encourage economic efficiency in the siting of generation and its operation. At the far end of the spectrum is nodal pricing. But is the burden of the thousands of different prices worth the trouble? And what happens when markets applying different models of transmission pricing are coupled?

Tomasz Sikorski, PSE Operator, Warsaw will be presenting Poland's electricity market redesign project: from zonal till nodal pricing, and will discuss integration models to combine nodal pricing with European zonal markets.

Håkan Feuk, Director of Market Rules at E.ON Energy Trading Sweden.

Energy-only or energy-and-capacity markets?

Why have a capacity mechanism? And which designs can it adopt? To look at these issues as well as listen to experience from an existing capacity market, Market Design has lined up:

Niclas Damsgaard, Sweco Energuide, Sweden

Simon-Erik Ollus, Fortum, Finland

Åke Almgren, Member of PJM Board, Chair PJM Reliability Committee, USA. Mr. Almgren will be briefing us on the [Reliability Pricing Model](#), PJM's capacity market model implemented in 2007. PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia.

For more information about Market Design Europe 2011 and to register please visit [the Conference's dedicated website](#).

FINAL REPORT

A RAW MODEL FOR A NORTH EUROPEAN CAPACITY MARKET

Multinational team outlines two ways forward

Setting aside the question of whether northern Europe will need some sort of regulatory intervention in the form of a capacity mechanism in the future, Market Design's team of experts from Germany, Holland and Sweden set out to investigate the form such a mechanism could take.

In its final report, the team puts forward two alternatives for a capacity mechanism: an easy-to-implement light option that does not address all problems but makes sure that "the lights stay on" and a more complex solution involving all actors that the team calls a "Mandatory Reliability Contract Market".

THE LIGHT OPTION

Under the light option, current energy-only market design is retained but supplemented by a strategic reserve, or in other words a centrally-determined amount of reliable capacity which is held outside the market except for under exceptional circumstances.

The team uses the Swedish capacity reserve to illustrate how a strategic reserve might operate. Swedish legislation requires the transmission system operator Svenska Kraftnät to each year tender for a capacity reserve to be used between November 16 and March 15, when Swedish demand peaks. The reserve can be in the form of either generation capacity or demand reductions.

It should be noted that the Swedish capacity reserve was implemented as a temporary measure following the liberalisation of the Swedish market, on fears that the market on its own would not be able to manage extreme situations that can arise as a result of extremely cold weather. Legislation has at most allowed a 2000 MW reserve, but that amount is going down: 1750 MW for the 2011/2012 winter (1 726 MW were procured, of which 362 were demand reductions) and 750 MW for the 2017/2018 winter and successive winters until the 2020 phase-out.

THE HEAVY OPTION

The heavy option is a market-wide capacity mechanism in which balance responsible parties are required to purchase capacity, thus introducing a market for capacity in addition to existing energy-only markets. The team calls their proposal "A Mandatory Reliability Contract Market". Its design includes a centralised back-bone reliability contracts marketplace as well as the possibility to trade capacity through bilateral agreements. TSOs would be responsible for organizing the marketplace, which could be operated by a different party such as an established exchange.

By a "reliability contracts framework" the team means a financial call option—the reliability contract - with a requirement of physical backing. The writers of the options would be the capacity providers and the obligation to purchase the options would be placed on the balance responsible parties. The desired volumes of capacity would be determined centrally by the TSOs or the regulators and based on the current actual peak demand of the balance responsible parties, e.g. 15% over peak demand.

Being a call option, a reliability contract has a "strike price", i.e. a fixed price at which the holder of the call option has the right, but not the obligation, to purchase the underlying commodity, in this case electricity. For balance responsible parties the reliability contract is a hedge against high prices, whereas for the capacity providers, who receive a payment for the call option, the option provides a more reliable source of income on which to base an investment decisions.

Call options would be exercised when a commonly agreed price in a reference market climbs above the strike price.

STRATEGIC RESERVE IN EUROPE CHANGES TO THE SWEDISH STRATEGIC RESERVE

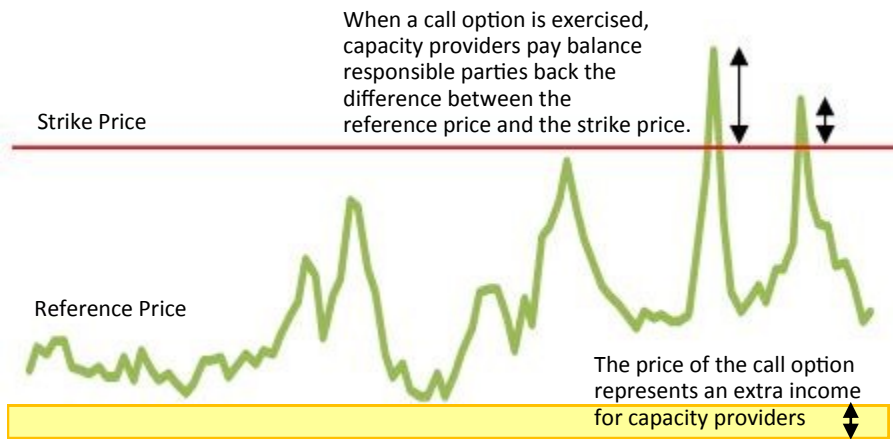
Sweden's capacity reserve will be phased out by 2020. To prepare the market for the phase-out, and to address issues that arose during last winter's extreme price peaks, the rules for managing the reserve have changed.

To start with, the share of demand side resources that make up the reserve will increase until the reserve is only made up of demand side resources. Starting this coming winter, Svenska Kraftnät will also be able to contract with suppliers and not just with producers and consumers.

Up until now the Swedish capacity reserve has not contributed to price formation on the spot market. The reserve has been dispatched after all commercial bids at Nordpool's day-ahead spot market Elspot (or in the balancing mechanism) have been used and at the same price as the last accepted commercial bid. This has proven to be less than optimal in situations of severe shortage, as very small volumes can have a disproportionate effect on the electricity price. NordPool and Svenska Kraftnät are therefore of the opinion that such a large capacity volume as the capacity reserve is, should not be withheld from the market and should contribute to price formation.

Therefore, demand reductions will be allowed to bid directly on Elspot and contribute to price formation. If the resource is not activated it has to be made available to the balancing mechanism, where it will be used after all commercial resources have been used up.

Generation resources will continue to be managed by Svenska Kraftnät as it is not considered appropriate that these resources can be offered directly on Elspot. The reason is that these resources are not considered equivalent, as they would probably not be available without support, whereas demand reductions probably would.



The reliability contract - a call option - is exercised when the reference price rises above the contract's strike price.

Under the team's proposal, the strike price would be set by a regulatory body, preferably multinational, in order to prevent undesired cross-border effects. Furthermore, the team believes that given that European markets are evolving towards market coupling, it will be possible to agree on a market price index that could be used to provide the reference price.

Examples of electricity markets in which reliability contracts have been introduced are [Colombia](#) and [New England](#).

PROBLEM DEFINITION

Even though the report does not present an analysis as to whether northern Europe will be needing capacity markets in the future, general reasons as to why capacity markets might be desirable are laid out.

Basically, following liberalization, Europe focused on introducing efficient, cost-reflective and competitive electricity markets. Energy-only market was the preferred market design. More recently, climate change fears have resulted in the introduction of ambitious targets for renewable energy sources. Energy-only markets were not designed to operate with large volumes of subsidized wind simultaneously generating high volumes of zero (or negative) marginal cost electricity. Renewable energy will therefore distort the markets and increase the risk that the wholesale price for electricity is driven down, making it more difficult to

recover fixed costs. At the same time, the distribution of the spot price will become more extreme, with short periods of very low prices when wind dominates the market to periods of very high prices when wind output is low. Lower spot prices will make investment in new capacity less attractive and increased spot price volatility will make investment in conventional technologies riskier.

EXISTING CAPACITY MARKETS

In the US, forward capacity markets have been established in the New England and PJM electricity markets. From the start, the goal of these markets was not to facilitate the integration of large volumes of renewable electricity but to provide a strong price signal for new investment to meet system peak demand, particularly marginal gas plants. In the case of Colombia, a capacity market was introduced due to Colombia's large dependency on hydropower whose availability is greatly affected by seasonal climate patterns and phenomena like El Niño, and the need to take away risk from investment in alternative capacity. Capacity markets were thus introduced as a way of ensuring resource adequacy at reasonable costs to electricity consumers.

In recent years, interest in tapping the potential of dispatchable demand response to offset an increasing percentage of intermittent generation is growing. New England's forward capacity market, established in 2006, allows en-

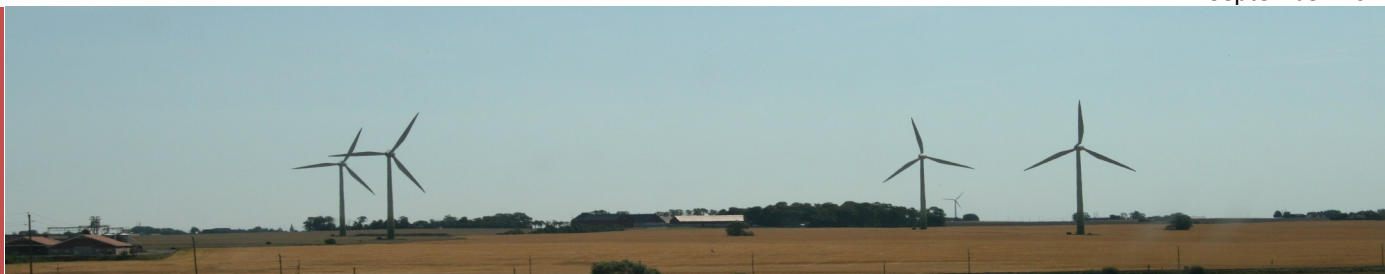
ergy efficiency, demand response, and distributed generation to compete with generation on an equivalent basis. PJM's current capacity market, implemented in 2007, recently added energy efficiency as an eligible demand resource, joining demand response and distributed generation. In France, failure to agree on how to value demand reductions within the framework of energy-only markets is one of the main reasons for the introduction of a capacity market (see separate box).

EUROPEAN MARKET INTEGRATION

The issue of how the introduction of capacity markets will affect European market integration has been outside the scope of this report. The European Council has set 2014 as the target date by which the Internal Energy Market should have been completed.

As mentioned before, national support mechanisms for renewable energy, providing more additional income over and above that obtained from energy sales have the potential to influence energy prices. According to Germany's Federal Network Agency, in 2009, 38,328 GWh of wind energy fed into the grid and receiving feed-in tariffs under the Renewable Energy Sources Act (EEG), received a total of 3,373m euro, i.e. approximately [88 euro/MWh](#). During the same year, the average green certificate price in Sweden was [393 SEK/MWh](#). As the amount of renewable energy increases, lack of harmonisation between the different schemes and the income they provide could lead to distortions in cross-border trade. According to the European Wind Energy Association's report on [wind energy targets for 2020 and 2030](#), electricity production from wind power is expected to increase to cover approximately a 42-46% share of national demand by 2020 in Denmark, in Germany 16-17%, in Holland 18-22%, and in Sweden 13-15%.

Markets with capacity markets coupled with energy-only markets will face simi-



lar issues. Generation receiving capacity payments could benefit from extreme peak prices in neighbouring energy-only markets. The issue of reserving interconnector capacity should also be considered when connecting energy-only and energy-and-capacity markets, as the inability to reserve interconnector capacity day-ahead or intraday may prevent generation from offering capacity on the adjacent market, as offerings

need to be backed by firm capacity.

The report ends by listing different criteria to evaluate different capacity mechanisms against each other and uses this list to compare the pros and cons of the light and the heavy options. The team points out that there is not universal agreement as to the relative importance of each criterion, and that before considering if any of the two options it proposes should be implemented, improving

the functioning of the existing energy-

[Elforsk report 11:30 A Raw Model for a North European Capacity Market](#) was co-written by Gert Brunekreeft and Roland Meyer from Jacobs University Bremen / Bremer Energie Institut, Germany, Laurens de Vries from Delft University, the Netherlands and Niclas Damsgaard, and Peter Fritz from Sweco, Sweden.

CAPACITY MARKETS IN EUROPE: OPENING FOR DISPATCHABLE DEMAND RESPONSE IN FRANCE

Concerns over the rise in peak demand, the need to replace coal-and oil-fired units that do not meet environmental standards, and the need for a more appropriate mechanism for the valuation of demand reductions have lead French authorities to legislate on a capacity obligation for suppliers to be introduced by 2015-2016. Under the New Organization of the Electricity Market Act (NOME Act), suppliers will have *“to provide direct or indirect guarantees of demand response or electricity generation capacity that can be activated to create a balance between demand and generation in continental France, especially at times when the combined demand of all consumers is the highest”*.

Exactly how the mechanism will be implemented will be described in guidelines that will be published in 2012. Nevertheless, the NOME Act anticipates that all capacities connected to the public electricity networks, either generation or load shifting, will have to be certified by the TSO and made available to suppliers, either directly or indirectly. These capacity guarantees will be tradable. A penalty will be applied if the capacity made available is less than the certified—and guaranteed—capacity.

To comply with their obligation, suppliers either invest in own capacity or acquire generating capacity and/or load shifting guarantees from third parties. Suppliers that fail to acquire enough capacity to meet their obligation face a penalty. Suppliers with guarantees in excess of their obligations have to make these available to the market.

Every year, the Ministry of Energy will determine how much capacity each supplier must guarantee three years ahead of the actual year of obligation. The level of generation adequacy is determined by the TSO.

According to the French TSO, the supplier obligation will, at least in theory, favour *“the development of solutions that notably enable a reduction of power demand during peak periods through*



load shifting”. Demand respond has been a feature of the French electricity market since the 80’s. France currently accomplishes overall reductions of approximately 2 800 MW through regulated dynamic tariff structures under which consumers are exposed to higher prices at times of high demand. Furthermore, France has been carrying out trials in which the load shedding actions of residential customers are aggregated and offered to the balancing mechanism. Disputes over how to pay for demand reductions have delayed final implementation and a substantial effort in planning for the coming capacity obligation has therefore gone into investigating France’s demand reduction potential and how best to value these reductions. Consensus exists in France that this cannot be properly done within the framework of an energy-only electricity market.

It should be noted that even though the NOME law seeks to increase competition in all markets, a major aim of the French electricity market reform is to ensure that French consumers continue benefiting from the low cost of French nuclear power. At present, the high scarcity rents enjoyed by nuclear generation due to high German prices are pocketed by French consumers through regulated tariffs that will be lifted to comply with EU rules.

EVENTS & PROJECTS

ELFORSK DAY

November 1, 2011

Björn Hagman and Håkan Heden, former Director General of the Energy Markets Inspectorate have received funding from Market Design to look at almost twenty years of electricity market reform.

The project is broken into three parts. The first part will introduce us to the first two Electricity Market Directives and to the key building blocks of Swedish electricity market reform: the definitions, arrangements, regulations and institutions created to support the restructuring of the Swedish electricity market. The authors will also analyze why restructuring happened the way it did by looking back at the reality, wisdom and condi-

tions of the time.

The second part will look at the emergence of new realities and acquired wisdom, and the resulting revised energy policies and additional sets of parameters for electricity market design.

The third and final part will include recommendations for the future.

Preliminary results from the project will be presented during Elforsk's Day. The final report will be concluded shortly thereafter.

Electricity market reform – is there a need for revising the reform's key building blocks as a result of current and future challenges?

To attend the presentation (in Swedish) please visit [Elforsk's website](#).

NEW PROJECTS ADDED TO MARKET DESIGN'S WEBSITE

Below we provide links to all currently running Market Design projects. Unfortunately some projects will only be reporting in Swedish.

- [Security of supply in multinational markets](#) (in Swedish)
- [Price spike or price cap? An experimental investigation of the electricity market.](#)
- [Norra Djurgårdsstaden, Market Concept](#) (in Swedish)
- [Alternative market models and general adaptive systems for power control in residential housing.](#) (in Swedish)
- [Linking together electricity markets with different market designs: case study of the future use of the Finnish-Russian interconnection.](#)
- [Nordic-Baltic electricity markets: challenges to integration](#)
- [Electricity market reform – is there a need for revising the reform's key building blocks as a result of current and future challenges?](#)



MARKET DESIGN EUROPE 2011

European electricity markets at a crossroads

Hotel J Nacka Strand, Stockholm, Sweden
6-7 October 2011



If you would like more information on the Market Design program, please do get in touch with us. Our contact details are available on our website. If you have feedback that you'd like to share or ideas for future editions of this newsletter, we'd love to hear from you – please contact andrea.badano@sweco.se