

Special report

Market coupling

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Market coupling in the European power markets is a major step towards realising the European Union's vision of a single electricity market for Europe. Although market coupling can't achieve this ambitious target alone, its role in the process is vital and successful market coupling should more accurately signpost what work is still required. The latest initiatives are, therefore, being very closely watched.

In this special report we look at how well the latest projects, such as the Central Western Europe and Interim Tight Volume Coupling initiatives, are working and being received. We also take a look at what's in the pipeline, asking how realistic the next goals are and to what extent trading will benefit from the increased integration these projects promise

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The BritNed joint venture aims to form electricity trade links between Great Britain and the Netherlands. APX-ENDEX Chief Executive Officer Bert den Ouden talks about the company's role and how the project will impact positively on both markets

BRITNED PROJECT CONNECTS EUROPEAN POWERS

In 2009, APX-ENDEX increased trade volumes, reduced fees on gas spot transactions and continued with plans to further European gas and power market integration. How was 2010?

Bert den Ouden (BDO), Chief Executive Officer, APX-ENDEX:

Last year was very exciting for APX-ENDEX as a number of key milestones were achieved. The total volumes of the exchange experienced 15% growth and the memberships of the exchange also had significant growth, reaching 396.

Many products and initiatives were launched, such as the Central-West European (CWE) Market Coupling, the market coupling on the Dutch-Norwegian cable and a number of improvements on the Title Transfer Facility (TTF) gas futures market. APX-ENDEX also merged with the Belgian Power Exchange, Belpex, in October 2010.

BritNed is a joint venture between National Grid and TenneT to construct and operate an electricity link between Great Britain and the Netherlands. What is the role of APX-ENDEX?

BDO: APX-ENDEX is the designated exchange, chosen by BritNed, to implement and operate an implicit auction between our Dutch and British markets. We will provide the market coupling solution and day-ahead market on both sides of the cable. The APX-ENDEX trading platform EuroLight® provides

members with an integrated trading solution with everything from auction matching to notification, credit management and financial settlement. The trading system is already operational in both countries with more than 60 members.

In the implicit auction, traders bid into their local market without needing to purchase cross-border capacity. The market coupling algorithm then establishes the market clearing prices and volumes in each market, and the resultant flows over the cable. The British auction will run at the same time as the rest of the CWE region (12:00 Central European Time). Our members trading on the Dutch and British markets automatically have access to the auctions over the BritNed cable at no extra cost.

What does the BritNed project aim to achieve and what are the key benefits you expect it to deliver?

BDO: The coupling process will integrate the British market into the liquid CWE and Nordic markets, accessing the liquidity pool of the wider North-West Europe (NWE) market. There are many benefits for the British market as the CWE and Nordic markets act as a market-maker. It will help to create a robust and reliable price index and, most importantly, will increase liquidity and volumes traded in the British electricity wholesale market. BritNed is a significant step forward in the process of integrating Great Britain into the NWE electricity markets.

What you need to know about BritNed

- 260km long high-voltage direct-current electricity interconnector
- Capacity of 1,000MW between Great Britain and the Netherlands
- There are different options to trade over the cable: by purchasing physical transmission rights in explicit auctions; or trade on implicit day-ahead actions operated by APX-ENDEX
- Minimum 30% of capacity is reserved for implicit day-ahead auction
- APX-ENDEX runs daily implicit auctions in both Great Britain and the Netherlands while BritNed provides transmission capacity
- British market trades in sterling and the Netherlands in euro – the trading system implements the conversion
- The project will go live on March 31, 2011 for delivery on April 1, 2011
- Advantages include increased liquidity and trading volume, robust and reliable price indexes and strengthened competition



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European power market coupling

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Market coupling is widely regarded as one of the most important methods of improving efficiency in the European electricity markets. But can the various initiatives in place and in the pipeline – with their multitude of stakeholders and interests – really lead to a fully integrated European marketplace any time soon? By Stella Farrington

Market coupling initiatives, which integrate transmission allocation and energy trading across different countries or regions, have recently been springing up across the European power markets with surprising speed. In the last five months, several important market coupling initiatives have gone live and more large-scale projects are in the pipeline (see timeline in box 1). The question now is whether the latest projects have been a success and to what extent and how soon it's going to be possible to roll out the next initiatives.

While few people deny the benefits of successful market coupling and the efficiencies it brings to power

trading, there is still debate over some of the details and concern over how the target model (see timeline) now agreed on will be extended to other countries. Although day-ahead coupling is certainly an achievement, the ultimate goal of intra-day coupling is even more complex. People are now asking whether market coupling in Europe has reached the limit of what's achievable through voluntary co-ordination, whether the political will is there for further change, and whether there needs to be structural changes in governance in order to extend the model.

By integrating transmission allocations and energy trading, market coupling replaces the two-step process of a daily explicit auction

of transmission capacity followed by trading on the day-ahead energy markets. Its ultimate aim is to make cross-border trading more efficient and to handle congestion between countries more efficiently. Traders benefit from successful coupling by only needing to compete on the exchanges rather than in the more opaque world of off-exchange capacity auctioning. The market operates more efficiently by having a single price for electricity most of the time with electricity always flowing in the right direction – that is, from less expensive to more expensive regions. If there is congestion all available capacity will be used for optimal usage of the interconnection cable.

The biggest initiatives to date in Europe have been the Central Western European market coupling (CWE), linking France, Belgium, the Netherlands, Luxembourg and Germany, and the Interim Tight Volume Coupling (ITVC) project, which connects an existing coupling between Germany and the Nordic market with the CWE coupling initiative. Both went live on November 9, 2010. These couplings have been widely praised by market participants across the board.

“The results so far have been very encouraging,” says Guro Grøtterud, an analyst at the French Energy Regulation Commission (CRE). “Market actors have suggested that the CWE price coupling should be a source of inspiration to other market coupling projects,” she adds.

“I think it has been very beneficial to the market,” says a trader at a European power company. “It's extremely useful to have a common price reference and beneficial that cross-border capacities have become financial instruments.”

“The price convergence has been beyond expectations,” notes another trader at a major European utility. “The process is working well – I don't see any problems – we get the prices we need in good time and everything has been working smoothly content-wise and process-wise.”

Indeed, since the CWE coupling, prices in the five countries have

B1. Market coupling timeline

History

1996: Start up of Nord Pool and 'market splitting' between Norway and Sweden. Finland joined in 1998, Western Denmark in 1999 and Eastern Denmark in 2000

1998: The Electricity Regulatory Forum, or Florence Forum, set up to discuss the creation of an internal electricity market in Europe and a multi-stakeholder Project Coordination Group (PCG) was established to help work towards the ultimate aim of pan-European integration

2005: Nord Pool Spot opened a bidding market in Germany

2006: Trilateral coupling replaced explicit auctions in Belgium, France, and the Netherlands

2007: A pan-European power exchange, EPEX (European Power Exchange) Spot, set up as a 50/50 joint venture between the European Energy Exchange (EEX) and Paris-based Powernext.

June 2009: Price coupling was identified by regulators, TSOs and market participants as the European 'target model' at a meeting of the Florence Forum. The PCG began creating a road map. Nord Pool Spot, EPEX Spot, APX-Endex, Belpex and Iberian exchange Omel announced their intention to test the concept of a pan-European price-coupling – know as the price coupling of regions (PCR)

November 2009: Germany and Denmark began volume coupling operated by European Market Coupling Company (EMCC)

May 2010: EMCC integrated the Baltic cable between Sweden and Germany

November 9, 2010: The Central Western Europe

(CWE) initiative went live coupling Belgium, France, the Netherlands, Germany and Luxembourg

November 9, 2010: Interim Tight Volume Coupling (ITVC) linked EMCC coupling of Germany and Denmark to CWE

December 15, 2010: Polish power exchange PolPX coupled with Nordic Power exchange Nord Pool Spot

January 1, 2011: Italy and Slovenia coupled

January 12, 2011: Norway and the Netherlands

coupled via the NorNed cable
February 17, 2011: APX-Endex, Belpex and Nord Pool Spot launched a cross-border intra-day market

Coming soon

March 31, 2011: The UK and the Netherlands to be coupled via the BritNed cable

2012: The North Western Europe (NWE) initiative will couple CWE and the Nordic region

2012: The 'enduring solution' will replace the interim ITVC with full-price coupling

2015/16: The NorGer cable will couple Norway and Germany

In the pipeline

- An **intra-day market** will be run across the NorNed cable
- Coupled markets may **switch to a flow-based method** rather than available transfer capacity (ATC)
- **Other countries may be added** to the CWE/NWE with early candidates seen as Switzerland, Spain, Portugal and Slovakia

European power market coupling

converged almost 80% of the time, up from 60% before the coupling, according to Anglo-Dutch exchange APX-Endex.

The direction of flows has also improved. “The results of the CWE-ITVC coupling have been very positive so far showing a more efficient use of the interconnections with 96% correct flows between Nordic and CWE regions,” says the European Network of Transmission System Operators for Electricity

(ENTSO-E) in an email to *Energy Risk* (see figure 1). Therefore it is seen as a good intermediate step towards the eventual goal of 100% correct flows under the target model. Subsequently there has been a better price convergence of the involved markets, ENTSO-E said, although noted that price differences still remain due to congested interconnections.

The CWE pentilateral coupling comprises full-price coupling,

whereas the ITVC involves tight volume coupling, an interim solution until the ‘enduring solution’ of full price coupling can be achieved. In a price coupling all exchanges use a common price calculation algorithm and, as long as there is no congestion on the borders, the prices between countries will be the same. In volume coupling, an independent auction office computes prices and flows for all bidding areas and interconnectors while the pricing authority remains with the involved exchanges, all of which use their own algorithm. Tight volume coupling also leads to an alignment of prices. The ITVC is operated by the European Market Coupling Company (EMCC) who originally set up to couple the German and Nordic day-ahead markets and then extended its algorithm to integrate CWE price coupling with Nordic market splitting by means of tight volume coupling.

The second part of the ITVC project was completed on January 12 this year with the integration of the NorNed cable between Norway and the Netherlands into both the CWE on one side, and Norway, Sweden, Finland, Estonia and Denmark on the other.

These initiatives have created the biggest integrated power market in the world involving 17 project partners and 1,800 Terawatt hours (TWh) of day-ahead power production, according to APX-Endex.

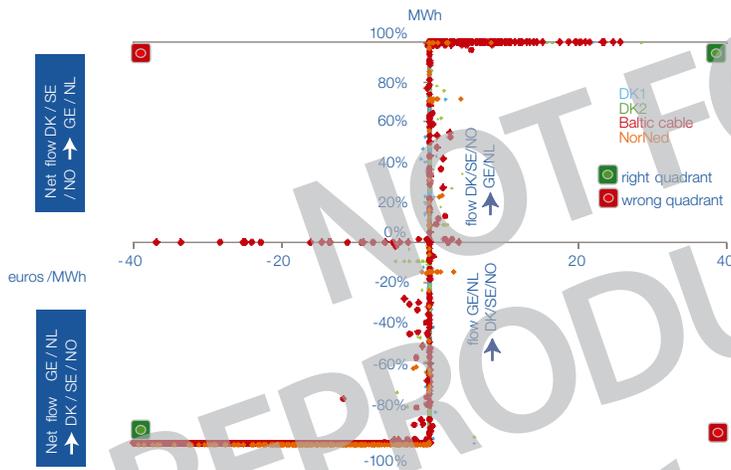
Liquidity has also risen, notably in the Netherlands and Belgium since the CWE coupling (see figure 2). Day-ahead volumes for the Netherlands on APX-Endex have risen over 100% from around 16TWh in 2005 to around 33TWh in 2010.

The NorNed coupling has also been well received. “The NorNed cable is now used in both directions at least once or twice a day,” says the trader at the major European utility. “Some days you can observe more than one change of flow direction.”

However, as a general point on all the couplings, he does note that transparency could be improved further with the introduction of a central screen displaying power price

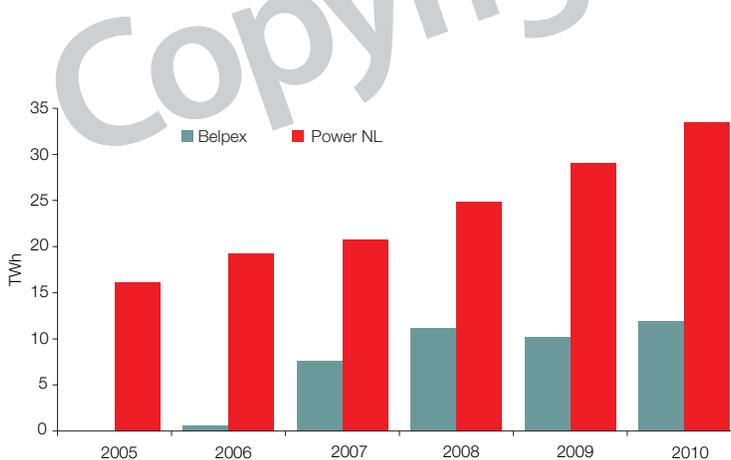
F1. Flows between CWE and Nordic

Results from November 9, 2010 to January 27, 2011; NorNed from January 12, 2011 Source: ENTSO-E



F2. Power volumes in the Netherlands and Belgium

Power NL and Belpex Power DAM – Market volumes in TWh – from 2005 to 2010 Source: APX-Endex



data gathered from each country so that price convergence could be seen at a glance. "I think this has been overlooked during the concept building process and should be improved," he says.

Still to come

The next major coupling initiative, the BritNed cable connecting the Dutch and UK markets is due to be commissioned on March 31 and will extend the day-ahead market coupling to the UK.

Beyond that there are two major initiatives in the pipeline to be developed in parallel: the North Western Europe (NWE) project and the price coupling of regions (PCR). NWE will link CWE to the Nordic region and the UK and will replace the ITVC with full price coupling (the enduring solution). There would then be one price calculation algorithm for the whole region. The enduring solution is timetabled for the end of 2012.

The PCR is a six-power exchange project involving APX-Endex, Belpex, Epex Spot, GME, Nord Pool Spot and Omel aimed at delivering a single price coupling across the Nordic, Central West and Southern European regions.

Alongside these initiatives are various projects to introduce intra-day price coupling, one of which, NorNed, has already gone live, and other important cable couplings such as NorGer (see box 2).

Obstacles ahead

While the enduring solution is timetabled for end-2012, some people feel this is unlikely to be achieved given the length of time the other initiatives have taken and the added complexity of this project. With each new country joining the coupling, the number of parties involved – transmission system operator (TSO), exchanges and regulators – increases, making co-operation and agreement more difficult.

"Full price coupling across Europe is probably possible but I think it is still quite some time away," says a spokeswoman at the EMCC. "The different power exchanges have different rules and different constraints – it seems like it has been

“NorGer will predominantly export capacity from Germany to Norway when the wind is blowing so it will be a kind of relief valve for the new renewable capacity flows

Stefan Wittwer, head business development conventional and transport, EGL

difficult just to agree on a common gate closure time – for example.”

Understandably exchanges aren't keen on making their customers adapt to too many changes. "All of us have to learn the markets in a new way," says Grzegorz Onichimowski, CEO of Poland's PolPX exchange. "Our traders are used to the day-ahead market finishing at noon, but now auction bids are collected up to 11.30am and then they have to wait until 1pm for the results. We would prefer to have this auction as part of our existing market and adding to liquidity but that may only happen once we go to intra-day. However, in general we are happy that we've joined the market," he adds.

Further co-operation from many of the exchanges outside CWE is still required though, according to Peter Styles, principal consultant at Stratos Energy Consulting and Member of the European Federation of Energy Traders (EFET) Board and Chairman of the EFET Electricity Committee. "To the extent we see



continuing problems in implementing the target model in some regions or countries, it's partly because of a limited willingness to harmonise an historic power market design. In this respect, exchanges that run more isolated or peripheral markets need to pay attention," he says. "To come within the target model parameters, some countries are quite simply going to have to change parts of their national market model," he adds.

As well as increased co-operation between national exchanges there needs to be co-operation between exchanges and TSOs, and fundamental governance

B2. Benefits for renewables – the NorGer cable

The NorGer company, owned 50% by Norwegian national grid owner Statnett and 16.67% each by Swiss energy trading company EGL, and Norwegian producers Lyse and Agder, was set up in 2006 to couple the power markets of Germany and Norway basically using the European Market Coupling Company (EMCC)'s scheme. The owners of the interconnector plan to put all of the 1,400MW capacity at the disposal of EMCC day-ahead market.

The coupling has far-reaching implications for renewables generation in the two countries as it will give Germany's oversupply of wind power a route to market in Norway where it can effectively be stored via Norway's hydropower production. In addition, due to the extended export possibilities,

Norway can efficiently add new renewable capacity to its domestic power generation.

"NorGer will predominantly export capacity from Germany to Norway when the wind is blowing so it will be a kind of relief valve for the new renewable capacity flows in the North of Germany," says Stefan Wittwer, head business development conventional and transport at EGL.

The company can imagine adding intra-day capacity at a later date. "Intra-day is very important in the context of renewable as production there is not really very predictable, so cross-border flow on an intra-day basis becomes more important," says Wittwer. "So we hope that in the future intra-day can help even further."

European power market coupling



[Flow-based] seems to be technically feasible... but the important thing will be to educate all stakeholders who will have to use new data, calculation methods and indicators

Guro Grøtterud, an analyst at the French Energy Regulation Commission

issues need to be resolved, many market participants say.

“The enduring solution is favoured by exchanges by 2012, but it is unclear for which regions and if all players can agree on that,” says the EMCC spokeswoman. “Moreover, this is also a matter that needs to be decided by the EC, regulators, and industry bodies. Everyone wants a price coupling for the integrated electricity market by 2014, but the path is uncertain. The biggest challenge will surely be the governance issue as well as the national legal transitions.”

“An adequate governance framework is essential to ensure that market coupling can be rolled out Europe-wide,” says ENTSO-E. “Robust contractual agreements are needed between TSOs and exchanges to ensure a sound implementation and operation of market coupling in any one region, and especially Europe-wide.”

Onichimowski believes there needs to be a top-down, centralised approach. “Of course from the technical point of view it’s now possible to set out the price from Morocco to Finland but it’s difficult to sort out the local interest and this is a wider problem as there’s no European-wide energy policy,” he says. “There’s a common carbon scheme but no common renewable energy policy. I hope we will have, sooner rather than later, a European regulator. Then all these issues will be addressed.”

In the meantime there are different ideas about how best to extend the target model across Europe. Some players believe adding countries to CWE/NWE one by one as they are ready will be most efficient, while others believe coupling several big regions then joining those couplings would work best.

“We believe that we should develop the Central and Eastern Europe (CEE) market coupling before joining the PCR initiative,” said David Kučera, general secretary of Prague-based Power Exchange Central Europe. “However, the solution should be compatible with the CWE project. We are of the opinion that it is better to create the CEE market and then connect it to the rest of Europe.”



B3. Flow-based or ATC?

In the current market coupling model, TSOs are responsible for the efficient allocation of available transfer capacity (ATC) across borders. Studies are now being conducted to see whether a flow-based method would be more efficient. With flow-based, instead of providing single-capacity values per border, TSOs would provide a more detailed picture of the network.

“Flow-based could potentially unleash more total capacity in Europe,” says Bert den Ouden, CEO of APX-Endex. “It takes some dedication to implement and we are starting to discuss it. It is a potential improvement.”

The Cosmos algorithm used by exchanges in CWE is ready for flow-based. “One important criteria taken into account when choosing the algorithm for the CWE market coupling was that the system should be ready for flow-based,” adds den Ouden.

At the time of writing no official data from the flow-based simulation had been published, but early results are thought to indicate that price convergence under the flow-based model would have an even higher percentage than under the current coupling method. Simulation results are expected in early March.

However, there are concerns, and calls to introduce a flow-based system into Central and Eastern Europe (CEE) have not been popular. “We’ve been critical of attempts to implement flow-based in CEE,” says Peter Styles, principal consultant in Stratos Energy Consulting and Member of the

Other steps

A longer-term goal is to offer intra-day rather than just day-ahead capacity across all of the couplings. This is particularly important due to the increase in renewable power generation, which has greater demand for trading close to delivery due to its more unpredictable nature. To that end APX-Endex, Belpex and Nord Pool Spot announced the launch of an intra-day market on the Netherlands/Belgium border on February 17.

TSOs are also voicing their support of the creation of intra-day cross-border trading. “TSOs are convinced of the need to work in parallel and to develop a truly pan-European continuous intra-day market that helps to accommodate within the market the increasing shares of renewable variable production,” ENTSO-E said.

In this respect, ENTSO-E

European Federation of Energy Traders (EFET) Board and Chairman of the EFET Electricity Committee. “It’s been planned with not enough attention to the impact it would have on cross-border power trading patterns. That impact could be to the detriment of competition and liquidity. At this stage we think flow-based is still a good aspiration for the day-ahead calculation, if there is market coupling. But for borders where market coupling has not yet come, and for all forward-capacity allocation, the benefits are extremely doubtful.”

This concern is shared. “We discussed the flow-based method with our TSOs but the results, as far as I know, were not too encouraging,” says Grzegorz Onichimowski, CEO, of Poland’s PolPX exchange. “Net capacity seemed to be even more limited than using traditional methods so flow-based may not be entirely effective. However, if the results of the simulations are positive then we should switch to it, but only as a method to set up capacities to be used in the market coupling process.”

“We’re waiting for the official results of the flow based simulation,” says Guro Grøtterud, an analyst at the French Energy Regulation Commission.

“It seems to be technically feasible and could be done quite quickly but the important thing will be to educate all stakeholders who will have to use new data, calculation methods and indicators and to keep people informed in order to ensure a smooth transition.”

launched a pilot project in May 2010 for implementing the intra-day target model in Northwestern Europe. The intention is to extend this market to the whole European area as foreseen in final Draft Framework Guideline on Capacity Allocation and Congestion Management prepared by the European Regulators' Group for Electricity and Gas (EREG).

Talks to initiate intra-day trading across NorNed are also underway. "There's no launch date for this yet but it's a very important thing to be developed," says Bert den Ouden, CEO of APX-Endex.

Technology

While the complexity of the pricing calculation increases with the size of the coupling, the technology to extend the target model across Europe is sufficient, proponents claim.

"The calculation possibilities for the ITVC have improved faster than we could make market coupling projects work," says den Ouden.

“ *I hope we will have, sooner rather than later, a European regulator. Then all these issues will be addressed*

Grzegorz Onichimowski, CEO, PolPX

"The [CWE] Cosmos algorithm has the potential to bring in other countries, other scenarios and potentially flow-based (see box 3) all in an optimisation algorithm that is lightening fast, enabling optimisations that would have been unthinkable a few years ago."

EMCC is also confident of its ability to roll out its system to other regions. "Our system is extendible to other regions and we are also open to include more shareholders as we really want transparency and neutrality," said the EMCC spokeswoman.

While there are still many issues to iron out, and full, Europe-wide market coupling may still be several years away, the template has been laid



and the spread of market coupling now seems unstoppable.

"Market coupling is now the target model for Europe and we'll have to work hard to extend the model across all of Europe," says den Ouden. "Even more co-operation will be required but now it's been demonstrated market coupling can work across such a large range of parties, other countries are keen to join in."

"We are now in the process of talking to Nord Pool and the TSOs and regulators about an intra-day solution between Poland and Nord Pool and we're hoping to have that implemented this year," says Onichimowski. "We'd be happy to start some price couplings before the PCR starts. We are ready." ■

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