APX ENERGY TRADING SYMPOSIUM
Brussels, 22 April 2009

MAKING ENERGY MARKETS WORK

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Welcome and Introduction

Making Energy Markets Work

Dear Guest,

Welcome to the third APX sponsored energy trading symposium, at a time when the global credit crunch and economic recession is having a depressing effect on wholesale market energy prices and general market liquidity.

The EU's Third Energy Package promises further progress towards market liberalisation, but in the current climate there is a danger that political intervention to secure energy supplies and stable prices could undermine the development of open markets. In the current climate, Governments need to avoid pushing the panic button.

Now more than ever we need the co-operation and creative input of all market participants if we are to make significant progress in meeting the objectives of greater wholesale market liquidity, more competition and choice for energy users.

Our focus for this one-day symposium is to identify and debate practical solutions and examine how all market participants – regulators, energy companies, traders, trade associations, exchanges and users – can and should work together at the regional and EU level to help make things happen.

To help lead our debate I am delighted to welcome a group of highly qualified speakers and panellists representing a variety of market participants – NERA, EU Commission, Endesa, E-Control, RWE Trading, CRE, Eurelectric, GTE, Elia, UBS, ABN Amro, GTS, E.ON, IFIEC, Gas Strategies, CNE and Merrill Lynch.

This year, as before, there will be ample opportunity for networking and I hope that you will be able to join me for a buffet reception at the end of the day. I am looking forward to a frank and open debate on how we can all help to make energy markets work better.

Best wishes

Bert den Ouden
CEO, APX Group

Debating topics, speakers and schedule

MORNING

0900 – 0915

Welcome, introduction and opening remarks
Bert den Ouden – CEO, APX

0915 – 0920

DEBATING THEME – IMPLEMENTING MARKET REGULATION
Moderator Introduction – **Graham Shuttleworth,** NERA Economic Consulting

0920 – 0935 **Session One**

How can energy market regulators ensure effective TSO unbundling and greater market transparency and how will these impact on the market?
Heinrich Hick – Policy Officer, DG TREN, European Commission

0935 – 0950 **Session Two**

What rules should govern network tariffs, grid access and market balancing in gas and power, and who should monitor compliance?
Juan José Alba Rios – Director of Regulatory Affairs, Endesa

0950 – 1030

Electronic voting and debate
Chaired by Moderator

1030 – 1050

Coffee break and networking

1050 – 1055

DEBATING THEME – DEVELOPING REGIONAL MARKETS
Moderator Introduction

1055 – 1110 **Session Three**

Are the regional market initiatives working and would a "top down" approach deliver better results?
Walter Boltz – Managing Director E-Control and Vice President, CEER

1110 – 1125 **Session Four**

What role can energy market exchanges play in encouraging market integration?

Paul Dawson – Director of Regulatory Affairs, RWE Supply and Trading

1125 – 1205

Electronic voting and debate
Chaired by Moderator

1205 – 1235

MORNING PANEL DEBATE
Chaired by Moderator

Dominique Jamme – Director, Gas Infrastructure and Networks, Commission De Regulation De L'Energie (CRE)

Anne-Malorie Geron – Head of Markets, EURELECTRIC

Nigel Sisman – Senior Adviser, GTE

Pascale Fonck – Manager, Public and Regulatory Affairs, Elia

1235 – 1355

LUNCH AND NETWORKING

AFTERNOON

1355 – 1400

DEBATING THEME – EVALUATING THE POWER MARKET
Moderator Introduction

1400 – 1415 **Session Five**

What are the key factors driving EU electricity prices?
Per Lekander – Senior Energy Analyst, UBS

1415 – 1430 **Session Six**

How will mergers and acquisitions impact on the generation, distribution and supply of power in the next five years?
Simon Wilde – Head of Power and Utilities EMEA, Royal Bank of Scotland plc

1430 – 1510

Electronic voting and debate
Chaired by Moderator

1510 – 1530

COFFEE BREAK AND NETWORKING

1530 – 1535

DEBATING THEME – BUILDING A EUROPEAN GAS MARKET
Moderator Introduction

1535 – 1550 **Session Seven**

How will the EU's dependency on imported gas impact on the future operation of EU wholesale markets?
Dr Geert Graaf – Managing Director, Gas Transport Services B.V.

1550 – 1605 **Session Eight**

Who should do what to improve the liquidity and efficiency of EU regional gas markets?

Dr Ingolf Hoven – Director of Gas & Oil Trading, E.ON Energy Trading

1605 – 1645

Electronic voting and debate

1645 – 1715

AFTERNOON PANEL DEBATE
Chaired by Moderator

Dr. Hans Grünfeld – President, IFIEC Europe

Pat Breen – Chief Executive, Gas Strategies

Rafael Gómez-Elvira González – Deputy Director for European Affairs, CNE

Rupen Tanna – Director of Commodities Trading, Merrill Lynch

1715 –1730

Closing Remarks – Looking to the Future
Bert den Ouden – CEO, APX

1730 – 1830

RECEPTION
Drinks reception

How can energy market regulators ensure effective TSO unbundling and greater market transparency and how will these impact on the market?

Heinrich Hick[1] – Policy Officer, DG TREN, European Commission

SCOPE OF THE THIRD ENERGY PACKAGE

The Package comprises a Regulation establishing the EU Agency for the co-operation of National Energy Regulators (ACER), a Gas and Electricity Directive replacing the existing ones (Directive 2003/55/EC and 2003/54/EC) and a Gas and Electricity Regulation replacing the existing ones (Regulations 1228/03/EC and 1775/05/EC).

The key objectives of the Package are fully effective market opening and the creation of a fully integrated single European gas and electricity market in the interests of consumers and industry in the European Union.

For this to happen, the Package needs to create a consistent regulatory framework based on the following building components:

– a more effective regulatory oversight by independent national regulatory agencies (NRA);

– the establishment of an Agency ("ACER") ensuring effective co-operation between NRAs and tackling all relevant cross-border issues;

– the creation of a European network of TSOs ("ENTSO") providing for compulsory co-operation between network operators to ensure harmonisation of all rules relating to the transport of energy across Europe and co-ordination of investment planning;

– the effective unbundling of the generation and supply from transmission of energy eliminating any conflict of interests and promoting network investment;

– increased transparency and better functioning of the retail market;

– increased solidarity and regional co-operation between Member States ensuring greater security of supply.

The European Council conclusions of 15-16 October 2009 call for the finalisation of the Package before the end of the legislative period (much progress was made in the Second Reading with the ITRE vote in Parliament on 31 March). If current progress in the Second Reading is maintained, the European Parliament will adopt the Second Reading Opinion at one of its last plenary sessions in May 2009, allowing for adoption of the Package by Council in the following months.

The adoption of the Package will be a key milestone in the development of European energy policy, with the focus shifting quickly from negotiations to rapid and effective implementation of the Package.

OPTIONS FOR ENSURING EFFECTIVE UNBUNDLING

If the Package is finally adopted in the form agreed in the trilogue negotiations in March 2009, the Package will provide three options for effective unbundling with the same rules applying for gas and electricity. In addition to Ownership Unbundling and Independent System Operator (ISO), a third option, the so-called Independent Transmission Operator ("ITO"), will ensure the independent and non-discriminatory operation of transmission infrastructure in the European electricity and gas market.

The ITO allows Transmission System Operators ("TSO") to remain part of an integrated undertaking but subject to far-reaching and effective rules on the TSOs autonomy and independence, including investment decisions. Minority shareholdings will be allowed under the ownership

1 The author only expresses his personal opinion.

unbundling option (together with financial rights) but without voting rights. This will ensure that no undue cross-influences are being exercised between the TSO and the integrated undertaking.

In its First Reading, the Parliament had deleted the ISO option for both gas and electricity, and retained for electricity only the ownership unbundling option. For gas, it accepted an alternative unbundling option preserving vertical integration of the network, which was very similar to the ITO option endorsed by the Common Position.

This constituted the most important gap between the positions of the European Parliament and the Council, which needed to be overcome during the Second Reading. If confirmed by the Plenary Vote of the European Parliament, the outcome of the Second Reading will codify an ITO option with the following elements ensuring effective unbundling:

– The ITO option can only apply to undertakings which are already vertically integrated upon entry into force of the new Directives (grandfathering clause).

– The TSO has to have all the budget and assets, as well as all human and material resources, to run the grid autonomously and independently from the "parent company".

– The management in charge of the day-to-day operation of the grid has to be independent from the ITO. It cannot be directly appointed by the "parent company" but has to be appointed by the ITO Supervisory Board. The management should comply with "deontology" rules prohibiting it for a number of years from coming from or returning to the "parent company" ("cooling off" period).

– A supervisory body is charged with preserving the financial interest of the parent company. It cannot be involved in the day-to-day management of the ITO and all its members need to be subject to regulatory oversight regarding termination of office. In general, strict deontology provisions and regulatory oversight need to be applied.

– A compliance officer, with far-reaching powers has to be appointed ensuring non-discrimination in practice. At the last trilogue meeting in March 2009, some strengthening of the role of the compliance officer was agreed.

– There are also important provisions regarding investment. In cases where the vertically integrated company refuses to invest in network projects, which are considered necessary by the national regulatory authority ("NRA"), the NRA can force the ITO to invest, impose tendering of the investments to third parties, or even impose a capital increase of the ITO in order to allow for third party investors to acquire shares of the ITO.

– The regulator has authority over the ITO to ensure that it meets its obligations (including the imposition of severe fines of up to 10% of the turnover of the TSO or even vertically integrated undertaking).

– A specific revision clause provides for an assessment of the ITO option regarding effective unbundling.

THE NEW REGULATORY PROVISIONS

The Package is expected to strengthen national regulators (NRA) so that they become independent from the government and have strong powers concerning both the networks and the supply markets. Member States need to guarantee the independence of NRAs making sure that they exercise their powers impartially and transparently. They need to be legally distinct and functionally independent from any other public or private entity.

The key objectives of NRAs are to promote (in close co-operation with ACER, NRAs and the Commission) a competitive, secure and environmentally sustainable internal energy market and effective market opening. Moreover, they will ensure appropriate conditions for the effective and reliable operation of networks eliminating restrictions on trade between Member States (including developing appropriate cross-border transmission capacities).

There is a comprehensive set of objectives spelt out in the Directives. Beyond the fixing or approving of regulated tariffs (or their methodologies) and ensuring compliance of transmission and distribution system operators, NRAs have a broad range of monitoring obligations. This include investment planning of the transmission system operators, compliance with and reviewing of past performance of network security and reliability rules, level of transparency (including wholesale prices) ensuring compliance with transparency obligations, level and effectiveness of market opening and competition at wholesale and retail levels including on exchanges.

ROLE OF THE ACER

The Agency for the Co-operation of Energy Regulators (ACER) is a key component of the Package since it will have rule- and decision-making powers (e.g. non-binding framework guidelines, TPA exemptions for new interconnectors if NRAs cannot agree) and will provide advice and opinions on a wide range of issues, which are crucial for the functioning of the internal market (e.g. network codes, certification of TSOs where COM may request advice, consistency between TSOs' 10-year network development plan and the ENTSO Community-wide network plan, draft statutes, list of future members and rules of procedure of ENTSO).

"Only when the ACER is satisfied with the network codes drafted by ENTSO can these be made binding by the Commission."

The Commission understands that the ACER will have an important role in the establishment and monitoring of the network codes by setting out clear and objective principles by means of its draft non-binding framework guidelines.

Only when the ACER is satisfied with the network codes drafted by ENTSO can these be made binding by the Commission. Moreover, ACER will be responsible for monitoring the implementation of the network codes by ENTSO and reporting to the Commission.

ROLE OF ENTSO

The Commission's proposal made important amendments to Regulation 1228/2003 on cross-border trade on electricity and Regulation 1775/2005 on access to gas transmission networks. The Regulations establish two new TSO bodies; ENTSO for electricity and ENTSO for gas with a clear definition of their respective tasks.

The most important tasks are the preparation of network rules and of a 10-year network investment plan. The Regulations also codify in detail the process of how the European legislation will be developed into the form of framework guidelines prepared by the Agency and network codes drafted by ENTSO. These codes can be made legally binding through comitology. Other important provisions in the Regulations are the provisions spelling out, in detail, how the various parties need to be consulted and how the Agency need to monitor various tasks of the ENTSO.

MARKET TRANSPARENCY

The Package will bring considerable improvements in network transparency and, more specifically, physical data transparency. However, it is not meant to address directly the issue of wholesale trading transparency in a comprehensive and holistic manner. It is obvious that in traded electricity and gas markets effective surveillance can only be achieved if transactions are regularly monitored. In that case market participants would have to regularly report details of their transactions.

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Since traded energy markets have a vast range of dimensions (spot vs. forward, financial vs. physical, OTC vs. exchanges, standardised vs. non-standardised, brokered vs. non-brokered) there is a need to determine at some point (but not within the scope of the Package) what will need to be monitored, and by whom, requires detailed consideration.

Currently, the level and quality of fundamental market data made available to market participants differ considerably throughout EU energy markets. The annexes of the electricity and gas Regulations (Congestion Management Guidelines) are legally binding, though considered not sufficiently detailed.

In order to improve the situation there appears to be a good case for amending this framework by detailing the data needed and who should provide it. As for electricity, this could mean including output data of individual generation units made available timely and equally to all market participants. Such measures would force market participants to share data that they deem as proprietary. At the same time, the special characteristics of electricity markets (non-storability, zero short term elasticity of demand) needs to be considered, as does the need of the trading community to be able to make informed trading decisions.

NEXT STEPS

The European Parliament needs to adopt its formal Second Reading Opinion before the Council can formally adopt the Package. The Commission will update the APX Symposium on 22 April 2009, in Brussels, on the state of play regarding the legislative process. The Commission is committed to an effective implementation of the Package in 2009.

Such effective implementation of the Package can be expected to boost further the development of wholesale energy markets in Europe. Regarding the upcoming initiatives on transparency and integrity of energy wholesale markets, the Commission is committed to work closely with stakeholders in the coming months to take forward the ongoing work of CESR/ERGEG.

What rules should govern network tariffs, grid access and market balancing in gas and power, and who should monitor compliance?

Juan José Alba Rios – Director of Regulation and Maria Dolores Garcia Rodriguez – Deputy Director of Regulatory Affairs, Endesa

SETTING THE SCENE

The process of defining the rules that should govern network tariffs, grid access and market balancing is an ongoing process. There are several initiatives trying to foster agreement between all market participants in relation to these issues.

ERGEG launched a consultation process several months ago. The consensus of the European electricity industry is that the development of framework guidelines, on which the European network codes should be based, will play a key role for the attainment of effective market integration. Therefore, a common understanding of the principles and priorities underpinning the framework guidelines and European network codes is essential.

The first step is to agree on the key priorities for market development: a list of the core priority issues to facilitate the development of a well functioning European market and regional market integration.

PRIORITY ISSUES

The framework guidelines should translate agreed priorities into guiding principles as a basis for the elaboration of network codes. Framework guidelines should define, for each priority, what solutions need to be achieved through the implementation of codes. The priorities for network codes could be grouped as follows:

- Capacity allocation, congestion management, intra-day, balancing and reserve power and transparency
- Security and reliability, grid investment plan with regional perspective and integration of RES
- Grid connection and access rules and data exchange;
- Inter-TSO compensation and tariff harmonisation

These priorities should be consistent with the next steps of the regional initiatives launched by ERGEG. In **Chart A opposite,** there is a list of key priority issues, as defined by Eurelectric, concerning the integration of electricity markets in the seven European regions established by ERGEG (North, Central West Europe, Central East Europe, French – UK interconnector, Central South Europe, South West Europe, Baltic and South East Europe).

Although the development of relevant codes should start in parallel, it is essential to take into account the logic of market design when the codes are drafted, in other words, the sequence in which they must be developed.

Moreover, in order to ensure implementation, network codes must be legally binding, directly applicable and enforceable.

THE ROLE OF STAKEHOLDERS IN THE PROCESS

Stakeholder involvement is essential to ensure that market development will be driven by market needs. Therefore, the consultation process should be extensive. It should start when guidelines and regulatory documents are first drafted and should end when the codes have been finalised, including periodical revisions and updates.

There must be an effective co-ordination of relevant National Regulatory Authorities (NRA) and consultations (both at regional and national level) under the auspices of the proposed Agency for Co-operation of European Regulators (ACER). During this process, the effective involvement of all relevant market stakeholders must be

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Chart A

	North	CWE	CEE	F-U-I	CSE	SWE	Baltic	SEE
Market Coupling	✓	2009	Next Step	2010	2010	2009	Next Step	Next Step
Continuous Intraday Platform	✓	2009	2009	2009	2009	2009	Next Step	Next Step
LT FTR + UIOSI	2009	2009	Next Step	Next Step	Next Step	2009	Next Step	Next Step
Cross-Border Balancing	Next Step	Next Step	Next Step	Next Step	Next Step	Next Step	Next Step	Next Step
Transparency	✓	2009	2009	2009	Next Step	Next Step	Next Step	Next Step
Regional Auction Office	✓	✓	To Start Operation in 2009	Next Step	2009	Next Step	Next Step	Next Step
Regional Grid Planning	2009	Next Step	Next Step	Next Step	Next Step	Next Step	Next Step	Next Step
Specific Comments	Wind intergration with CWE	Transparency further harmonisat needed	Remove exp/import fees and regt. prices Increase liquidity				Implement 2nd pckg. Define auto-plan more XB interconns.	Attract investment Develop wholesale markets, etc

SOURCE: Eurelectric

guaranteed. Apart from mechanisms normally used to take on board participant opinion (consultations, open-hearing), there are at least two additional mechanisms which should be used: the creation of a standing market panel and the establishment of "ad-hoc" expert groups.

The creation of a standing market panel would provide a balanced and efficient consultation process, since it would deliver market-based solutions and reflect stakeholders' needs. Nevertheless, setting up such a panel would require a significant amount of effort.

The option of setting up "ad hoc" expert groups to assist ACER would also improve the consultation process. The experts should be authoritative, appointed on the basis of their expertise and experience and not on the basis of their affiliations to particular groups.

> "Every relevant stakeholder should have the chance to express its view."

Finally, it is important to emphasise that neither the creation of expert groups nor the standing market panel should replace consultation arrangements. Every relevant stakeholder should have the chance to express its view.

WHAT IS THE ROLE OF THE TSOs?

The Council of Ministers stated on 9 January 2009, that transmission system operators should have a key role in regional co-operation: to publish an investment plan, to take investment decisions, to promote the development of energy exchanges…

"Transmission system operators shall establish regional co-operation within the ENTSO for Electricity to contribute to the activities […] In particular they shall publish a regional investment plan every two years, and may take investment decisions based on that regional investment plan."

"Transmission system operators shall promote operational arrangements in order to ensure the optimum management of the network and shall promote the development of energy exchanges, the allocation of cross-border capacity through non-discriminatory market based solutions, paying due attention to the specific merits of implicit auctions for short-term allocations, and the integration of balancing and reserve power mechanisms."

There are at least two mandates missing from this. First, a 10-year network development plan **focused on market integration** and, second, putting regional socio-economic welfare as an **objective for investment** planning. In this context, the role that ACER should play is fundamental, since it should deliberately favour investment in cross-border transmission networks.

At the moment, the integration process has been approached on a bottom-up basis, starting with domestic actions, decisions and regulations, and afterwards connecting neighbouring systems (countries) after

"some kind" of harmonisation between them. But real integration requires additional efforts and a different vision. It is essential regulators and TSOs start to think in European terms. A top-down perspective, which implies a common framework design, is needed.

THE CONFLICT OF INTEREST BETWEEN SYSTEM OPERATION AND TRANSMISSION AND INCENTIVES FOR TSOs

The main justification for the EU Commission's preference for the ownership unbundling of TSOs, is the conflict of interest between generation/supply activities and system operation, which usually results in problems regarding third-party access to the network and the insufficient level of network investment.

However, while accepting this argument, we would argue that the Commission does not take into account that even within an unbundled TSO, a different conflict of interest can arise (and in fact it does arise) due to the divergent objectives and different natures of the system operator and the transmission owner. Whereas the goal of the system operator is the security of supply, the goal of the transmission owner is profitability. This conflict is more obvious in the case of private TSOs where the objective is to maximize the return on shareholder investment.[1] Therefore, there is a need for monitoring and supervisory mechanisms, as well as the implementation of an adequate incentives scheme.[2]

Although ERGEG has started to work on TSO incentives, the main focus of its work so far has been on the management of interconnection capacity, mainly firmness and maximization of capacity. Obviously this is a fundamental issue, but it is not enough to foster market integration. Market participants, regulators, TSOs and Power Exchanges should stop thinking of interconnectors as distinctive parts of the network, and stop treating different price areas as different markets. New incentives should push TSOs in this direction, and should encourage common approaches to efficient operation and integration, affecting the whole network, not just international interconnections.

In this context, maximisation does not mean offering an "infinite" amount of capacity. On the contrary, a balance should be struck in order to deliver the amount of existing capacity that results in optimal social welfare. The operational incentives scheme should set targets that enable TSOs to reach a compromise between security and market integration. TSOs are the best placed entities to manage interconnection risk but, since they cannot bear the full risk, they will have to be remunerated for taking that risk.

NETWORK INVESTMENT INCENTIVES

Another aspect of the incentives scheme is the optimisation of network investment, since the development of the transmission network has not always been in line with the increase in cross-border transactions.

Future network planning faces a challenge not only to increase cross-border trade, but, even more significantly, to accommodate ambitious targets for renewable energy (see below). For these reasons, investment planning should not be a national, but a regional issue.

There are some possible regulatory tools to provide incentives for investment planning such as **(i)** adding investment costs to the asset base of the TSO involved; **(ii)** modifying standard accounting to allow accelerated returns; **(iii)** creating a separate asset base for major regional investments so that more targeted cost recovery is possible; **(iv)** prioritising regional investment projects based on the increase in European/regional socio-economic welfare.

Looking at the broader picture, the regulatory framework should provide TSOs with effective incentives to actively pursue regional integration, through the establishment of regional system operators whose scope would grow over time. These regional arrangements should include such functions as dispatching, capacity allocation, and short-term security, and extend over time to cover longer-term functions, including the production of binding regional transmission plans.

1 This conflict of interest could be less relevant in a state-owned TSO.

2 There are some examples of conflict of interest. In relation to Investment planning, the transmission network "competes" with the distribution network. Regarding operational decisions (such as maintenance disconnections), they could be taken to optimise the system or to optimise the cost of the transmission owner. In cases of security incidents, the TSO can be in charge of allocating responsibilities but also be one of the potential culprits.

It cannot be assumed that all TSOs will be enthusiastic participants in regional integration, because some TSOs may have incentives to prevent or delay measures aimed at promoting integration. The EU Commission and Regulators should create incentives for TSOs that should be financial in nature,[3] and big enough to ensure that TSOs participate quickly and fully.

As stated in Article 35 of the proposed new Third Directive, the regulatory authority should ensure that system operators and system users are granted appropriate incentives, in both the short and the long term, to increase efficiencies in system performance and foster market integration. It would be worth adding "in particular by incentivising transmission system operators to perform system operation tasks in a co-ordinated way at a regional level".

THE CHALLENGE OF INTEGRATING RENEWABLE GENERATION

The proposed Renewables Directive establishes the 20% mandatory renewable energy share in 2020 across the EU. This challenge must be seen as an opportunity for the electricity sector to re-define and update its operations. The proposed directive mandates priority of access and dispatch for renewable generation and there are good examples (e.g. Spain) which demonstrate that extensive development of renewable energy is compatible with applying the same rules on dispatch and balancing to renewable and conventional generation.

> "In relation to grid expansion, renewable energy development will help reinforce networks."

In relation to grid expansion, renewable energy development will help reinforce networks. This is the time to ensure that both investment and licensing, for renewable installations and grid development, are aligned. Regulators should recognise the need to reinforce networks, authorising investments on a timely basis and allocating the appropriate remuneration (or authorising the necessary grid tariffs) to TSOs and DSOs.

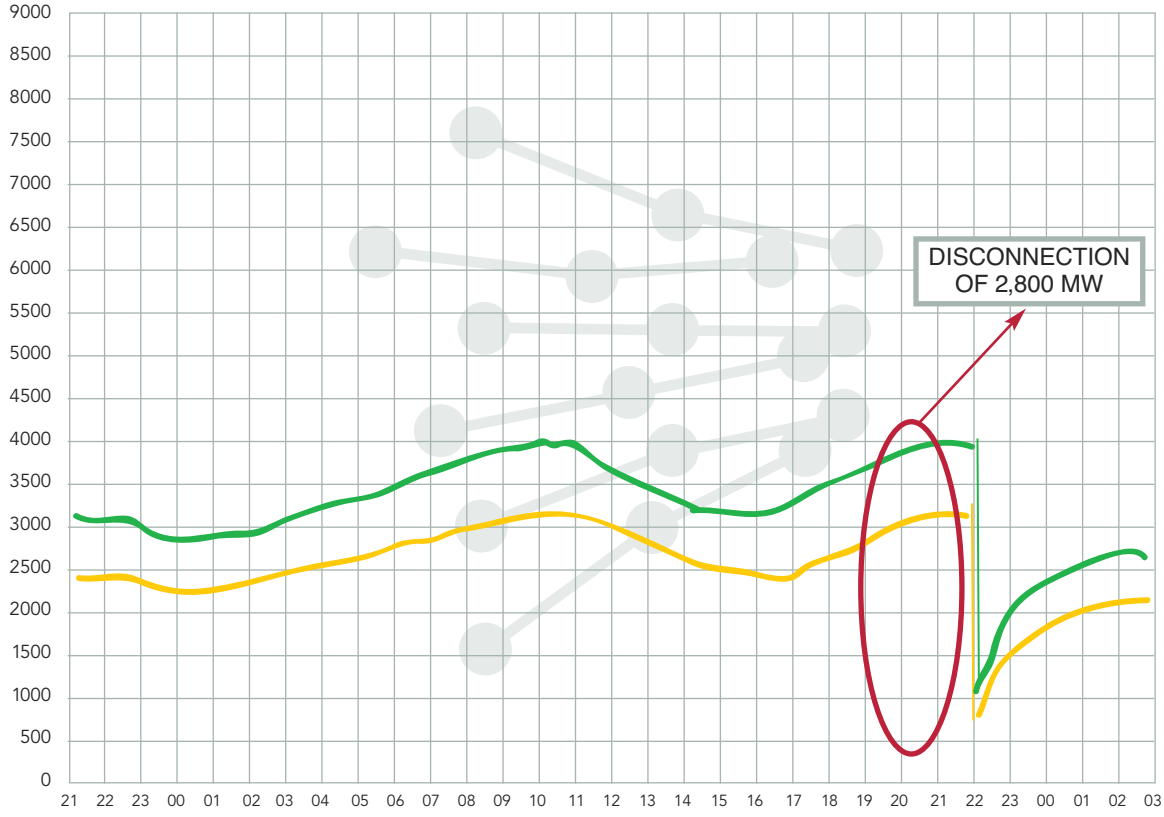
In order to have a level playing field in terms of network access, renewable and other generators should pay their share of network costs. Such costs should be transparent and fairly distributed, and should be computed for all generation technologies using the same criteria. This is independent from the support schemes for renewables, which should take into account these costs.

Additionally, renewable generators, as well as conventional units, should pay the cost of local grid connections. The decisions concerning grid connection must be based on security, quality or continuity of supply criteria, and not on the technology.

Furthermore, renewable generation should be considered an integral part of the generation portfolio and should not be treated as residual generation. The development of renewable generation is compatible with ensuring that it is subject to the same rules concerning participation in the market, and dispatch, as conventional generation. In other words, priority dispatch is not necessary and is unsustainable when renewable penetration is large. For this reason, the merit order should always be provided by the market.

3 As draft Art 36(7) of the current Directive proposal already requires.

Chart B Generacion de energia eolica – Sábado, 4 Nov 2006



Generación estimada Max. 4,025 MW a las 21:32 h. min. 1,164 MW a las 22:12 h.
Generación telemedida Max. 3,151 MW a las 21:32 h. min. 867 MW a las 22:12 h.

Red Electrica de Espana. www.ree.es

Regarding balancing, the intermittency of some renewable generation, such as wind power or solar energy, implies that fossil fired generation is often required to operate as "hot reserve." Higher balancing costs, derived from the need to keep significant amounts of stand-by generators and reserve power are inevitable as a result of large scale intermittent generation. These higher balancing costs must be recognised and should not be seen as a market malfunction.

Furthermore, significant renewable development is compatible with the same balancing and scheduling obligations as conventional plants. These obligations are the only way to introduce adequate market signals to make renewable energy manageable and to facilitate the integration of balancing and intraday markets. The integration of balancing markets is a mechanism for managing these costs, that should be complemented by the appropriate development of storage technologies.

Finally, renewable generation facilities should respect technical requirements in order to avoid risks in system security and to meet qualitative standards of supply (such as voltage, frequency, etc). One of the most notable examples of these requirements is the resistance to voltage dips or frequency disturbances. These are small disturbances in network voltage or frequency that can appear after an incident (the incident could be, for instance, a short-circuit in a line or the disconnection of a large power station or load). Conventional generators are required and usually prepared to accommodate these disturbances. However, the behaviour of wind generators in such circumstances can be affected by variety of regulatory obligations.

One of the most recent examples of the consequences of inadequate regulatory obligations took place in November 2006, when an incident in the German HV grid caused a temporary frequency fall throughout the European electricity system.

In Spain, this led to the automatic disconnection of 2,800 MW of wind generation, due to inadequate regulatory

requirements at the time, **(See Chart B opposite).** This lack of regulation resulted in a major power supply failure. Now, in Spain, all new wind generators are required to support voltage and frequency dips.

SOME CONCLUSIONS

The three main messages are the need for a well balanced governance process, the urgency of providing TSOs with effective incentives to actively pursue regional integration and the opportunity of using new renewable energy obligations as the justification to build the power system of the future.

In relation to the first issue, it is vital to find a proper equilibrium between rule making and supervision and to ensure that no entity finds itself in a position of being both judge and jury on any decision. Therefore, clarification of the roles and responsibilities of different entities is essential, as is finding a clear dividing line between ACER and ENTSO. Closer interaction between ACER and ENTSO will have a positive impact on the speed of the decision making process, coherence of the decisions at different levels and clarity of the messages to the market.

Regarding the incentives to TSOs, we should keep in mind that one EU energy market is not "the addition of 27 national energy systems plus cross-border management." First, regulatory and operational arrangements must allow for the existence of multiple transmission network owners acting under a single system operator at national or (preferably) regional level. Second, it is essential to create the necessary regulations and incentives, harmonised at regional level, to adequately address the conflict of interest within an integrated transmission owner and system operator.

"The System Operator should focus on maintaining the system's security and a high level of service."

These incentives and regulations are basically national, but must be harmonised across Europe by ACER. Finally, in the European context, it would be worth considering whether a System Operator independent from the transmission owner would not be the best solution. In this model, the System Operator should focus on maintaining the system's security and a high level of service.

Finally, in relation to renewable generation there are basically two options: to consider renewables as an excuse to be conservative and as a consequence underestimate interconnection capacity and distort generation dispatch; or to consider renewables as an excuse to re-design some critical aspects: to develop grid interconnections, to integrate markets and to make the best use of technology, providing major benefits for all power system users. Only the latter approach will ensure that renewable energy can deliver its full benefits.

Are the regional market initiatives working and would a "top down" EU approach deliver better results?

Walter Boltz – Managing Director, E-Control and Vice President, CEER

Regional initiatives are slowly but steadily delivering improvements to European energy markets, even though many impediments to an integrated market remain, and these will have to be overcome by a "top down" enforceable approach, based on EU-wide legally binding rules.

SETTING THE SCENE

Regional energy market (REM) initiatives, established by ERGEG in 2006, were at the time the only answer to the lack of progress in achieving market integration in gas and electricity markets in the EU.

The main reasons for the lack of progress on a European scale were the huge diversity of energy markets in the Member States, the conflicts of interest in vertically integrated energy companies (who feared they would lose out through integration) and the absence of enforceable rules.

Some markets already had a long track record of competition, whereas others were only at the very beginning of liberalisation and where competitive markets and regulated or monopolistic markets co-existed. Lack of physical and commercial interconnection capacity was only the consequence and not the main cause of these uncompetitive market conditions.

> "The result was stalemate."

Therefore, no one-fits-all solution could be devised and development was blocked by different priorities in respective regions. In the end, the traditional "top down" EU approach did not succeed in demonstrating a strong commercial case to force organisations to support the liberalisation process. The result was stalemate.

The main objective of the regional initiative was to enable market participants to develop profitable business cases, to put concrete pressure on individual companies blocking progress and thereby to get sufficient support for liberalisation on a regional basis.

It was clear from the beginning that there would be limits to this voluntary approach, but nonetheless regulators decided it was worth trying, especially as there was no alternative available at that time.

SOME POSITIVE RESULTS OF REGIONAL INITIATIVES

Regional initiatives have delivered positive results. Co-operation between TSOs has seen major improvements in many regions due to regular and focused contacts. This is also true for national regulatory authorities which (being set up primarily to regulate their respective national markets) traditionally have no specific mandate to look across borders in a co-ordinated way.

This semi-formal mode of co-operation has resulted in several tangible and noticeable modifications of market rules in the regions. In particular, in the field of transparency, TSOs in gas and electricity in several regions are complying more diligently with the rules set out by regulations or guidelines.

In addition, regional initiatives have resulted in a much better understanding of the issues hampering market integration, and, therefore, the process has made it easier to devise specific, focused and practical rules for the Third Package.

Another area where improvements are noticeable is in electricity, where all the regional projects to maximise commercial interconnection capacity (by calculating capacity on a regional basis) and to optimise usage

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(e.g. the trilateral market coupling, the All-Island project of Ireland and Northern Ireland, the Iberian market etc.) have made progress, even though the lack of enforceability has resulted in significant delays in many cases.

In addition, the integration of balancing markets which is important to encourage competition in national markets and as a pre-requisite for further integration of retail markets, has made progress in some regions.

Gas interoperability between TSOs has been improved and just recently new IPA (interconnection point agreements) have been concluded. Also, the harmonisation of Article 22 exemptions for gas infrastructure has been co-ordinated within some regional initiatives.

> "There are many weaknesses in the regional approach, which only new legislation can fix."

Still the question arises as to whether we can be satisfied with progress so far. This is clearly not the case. There are many weaknesses in the regional approach, which only new legislation can fix.

WEAKNESSES OF THE REGIONAL APPROACH

Although there have been improvements in transparency, we have to recognise that transparency is only a prerequisite for market players to make informed decisions and for regulators to identify weaknesses in the system. So transparency is only the first, albeit the easiest step on the road to a better market model for integrated energy markets. Why is progress elsewhere lagging behind?

First the REM process hinges upon voluntary co-operation. Progress is only possible because participants decide to forego profitable business. Because many technical problems have to be solved, it is very often difficult to point to the party responsible for delays and in many cases those causing delays change over time.

In the end, it is clear to all those involved that, under the REM framework, there is no way to guarantee consistency between regional solutions. This does not undermine the regional approach per se, but regional solutions rarely take account of the broader picture (e.g. the case of EASEE gas standards which are currently not taken up in parts of Central and Eastern Europe as they are allegedly biased towards standards operating in the North West).

Nevertheless, some consistency has still been achieved because of the involvement of some countries in several regions, which leads to a natural check for consistency. However, there are no defined criteria for assessing success. And, as progress is naturally slow, some stakeholders, including EU institutions feel – rightly or wrongly – that progress is unsatisfactory, although they themselves have no practical alternative to offer.

There is currently no external assessment of progress and of the solutions agreed upon. The pace of market integration is dependent on those market participants most unwilling to integrate – a situation which is very likely to produce undesirable results.

A second driver, in those cases where clear progress can be seen, is the legal requirement to change existing rules. For example, the establishment of regional auction offices

for co-ordinated allocation of interconnection capacity was supported by binding congestion management guidelines without which an even slower pace of change would have resulted.

A further consequence of the voluntary approach is the high degree of diversity of regional solutions. In electricity, there are, for example, some 16 different sets of auction rules for cross-border capacity across Europe.

WHAT DO WE MEAN BY "TOP DOWN" EU APPROACH AND WILL IT SOLVE THE PROBLEM?

The obvious conclusion to the aforementioned problems is to strengthen unifying elements. These could be the 11 areas where, under the Third Package, rules have to be elaborated by TSOs, based on Framework Guidelines developed by ACER and finally "approved" (the details remain to be finally agreed by legislators) by ACER/EC.

Consequently, there is a strong likelihood that there will be more consistency between regional developments. Still, even the Third Package foresees and allows for regional diversity. And, we still are not sure if the process of achieving binding, harmonised rules will be efficient and effective or if we will see a slow, bureaucratic process with many delays and infighting between the parties involved. Also, a clear distinction has to be made between areas where regional differences are necessary and others where diversity will pose major barriers to market integration.

> "Therefore, a clear mandate to promote the European market is necessary."

Market rules in most areas must not allow regional differences, if we really want to realise an integrated European market. In this respect, the draft rules by the ENTSOs will have to take into account the final goal of a European market. But will ACER or the EC be able to withstand political pressure to sustain regional differences? Pressure from within the regions to keep traditional regional freedoms will be significant. Therefore, a clear mandate to promote the European market is necessary.

This mandate has to take the form of European legislation. "Top down" in this sense depends on a firm legal basis on which the whole process can be based. The process conceived in the Third Package where European institutions more or less have to show that specific market-wide proposals impede market integration could hold up the whole liberalisation process.

To sum up, even the Third Package might be too "co-operative" and not enough "top down" as the whole idea of the package is still based on quite a high degree of self-regulation, which has proved to be insufficient to really bring market integration to fruition.

Regulators, market participants and the EC, together with the Member States in the Council will have to focus all their attention and efforts on the creation of a truly integrated EU energy market and put less priority on individual, national issues to make the new approach work successfully, in the interest of EU energy consumers.

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What role can energy market exchanges play in encouraging market integration?

Paul Dawson – Director of Regulatory Affairs, RWE Supply and Trading

"Imagine a puddle waking up one morning and thinking, 'This is an interesting world I find myself in, an interesting hole I find myself in, fits me rather neatly, doesn't it? In fact it fits me staggeringly well, must have been made to have me in it.' This is such a powerful idea that as the sun rises in the sky and the air heats up and as, gradually, the puddle gets smaller and smaller, it's still frantically hanging on to the notion that everything's going to be alright, because this world was meant to have him in it, was built to have him in it; so the moment he disappears catches him rather by surprise. I think this may be something we need to be on the watch out for."
Douglas Adams, Author, 1998

In terms of their evolution, traded power markets are in their relative infancy and, while the debate on their future development is still rumbling, there is no doubt that exchanges will continue to play an invaluable role in the market as competitive trading and risk-management providers. Recent developments in the wider financial markets have also increased interest in the role that exchanges can play in reducing counterparty credit risk via clearing and in policing market conduct and promoting trade transparency.

> "So how did we get to the stage where Regulators promote monopoly exchanges in the name of competition?"

Extrapolating the evolutionary benefits of exchanges, Regulators are increasingly looking to exchanges to be hard-wired as part of an "intelligent design" for power markets as a means of accelerating market integration and liberalisation. Despite the many advantages of exchanges, the shift from exchanges as voluntary, competing service providers to mandatory, monopolised parts of the market architecture represents a fundamental and potentially serious error. As with the puddle, while exchanges fit rather neatly into the power markets, a world in which Regulators encourage exchanges to believe that the world was meant to have them in it, and should be built to have them in it, may well be something we need to be on the watch out for.

So how did we get to the stage where Regulators promote monopoly exchanges in the name of competition? The answer is a familiar brew of a fundamental causal error and several appealing, but unsubstantiated, myths. To unravel the story we need to travel back to the beginning of liberalisation time; to the Big Bang for electricity markets.

A BRIEF HISTORY OF POWER MARKETS AND THE BIG BANG

Competitive electricity and gas markets did not simply evolve like other markets; the underlying conditions of natural monopoly in the delivery networks and associated "network externalities"[1] are insufficient to sustain competitive life. The (rather intelligent) designers of electricity markets therefore had to intervene to create two universal and mandatory elements to sustain **every** power (and gas) market:

- **Imbalance settlement.** An obligatory legal framework to ensure that every MWh is accounted and paid for in the light of the fact that network delivery is automatic - literally "at the flick of the switch" (and which would otherwise make theft quite straightforward); and

1 The ability of one person's actions to affect everyone else connected to the network.

• **System balancing.** A framework for a single system operator to balance flows over time and across the network to manage congestion and to maintain a stable frequency and voltage.

These are the **only** essential elements of wholesale power markets that need to be designed, rather than evolving in response to the market's needs.[2] A split between essential elements of market design and potentially competitive services is the rule rather than the exception in most markets including those with prominent power exchanges such as France and Germany. Even in Nordpool, where day-ahead trading and grid congestion is handled through market splitting on the spot exchange, the system operators are still responsible for determining transmission capacities and residual real-time balancing and imbalance settlement. Despite this, regulatory moves to promote EU market integration are increasingly focused, almost exclusively, on tackling congestion management (a monopoly system service) via **day-ahead** coupling of **exchanges** (a potentially competitive platform).

Aside from the blind focus on the day-ahead, the fundamental causal error here is to assume that because spot power exchanges are often closely related to the functions of balancing and settlement that they too – rather than system operators – should be part of the mandatory market design as custodians of cross-border congestion management.

> "The question is whether this really matters?"

Meanwhile, this error is in danger of being compounded as Regulators increasingly talk about forcing trade itself – rather than merely day-ahead congestion management – via exchanges. The question is whether this really matters? Even if exchanges are not a *necessary* component of market design, are they no more likely to promote market integration, more efficient, more transparent and easier to regulate than just leaving it to the market to decide? To answer this question, we must turn to some of the "received truths" which are used to promote the theory of an "Intelligent Market Design" based on exchanges at the expense of allowing markets to evolve naturally.

THE MYTHS OF "INTELLIGENT MARKET DESIGN"

THE ARGUMENT FROM INTEGRATION

Even as a non-essential element of market design, spot exchanges have presented an appealing solution to the problems of congestion management through the "implicit" coupling of day-ahead markets to "optimise" the use of cross-border transmission capacity. Aside from the question of whether day-ahead is the most optimal cut-off point, market coupling is, at best, only one element of a package of measures required to promote cross-border competition (including forward capacity sales, seamless intraday markets etc.). However, even with day-ahead market coupling as a key feature of the European market design, there is still no necessity for this (monopoly) service of day-ahead congestion management to be executed via potentially competitive exchange platforms. It could, and should, easily all be so different with the system operators providing a co-ordinated, congestion management platform on an open-source basis to a range of exchanges, multi-lateral trading facilities, OTC and bilateral markets.[3] With a common gate closure, this may ultimately end up looking like some of the existing market-coupling solutions with the crucial difference that the "implicit" coupling platform is owned and operated by the system operators rather than potentially competing trading platforms. Does this really matter though – are not exchanges just more efficient than other trading platforms and given a choice, should we just choose to trade via coupled exchanges anyway? To which question, we must turn to examine the argument from efficiency for exchanges.

THE ARGUMENT FROM EFFICIENCY

It is often thought that exchanges are an inherently more efficient way of structuring trade and, seen from a very narrow perspective, it is easy to understand the appeal of being able to consolidate collateral and credit positions on a single platform. However, with a slightly broader perspective, these platforms not only face potential competition from other platforms but also from the competitive OTC markets and bilateral transactions. The ability to net a carbon position on Nordpool might

2 Non-discriminatory third-party network access charges could be considered a third essential element, albeit not an essential feature of the wholesale markets themselves.

3 We may ultimately get dragged towards this ideal, stable solution in any case as the focus on within day trading and the integration of markets with different fundamental models gets attempted.

be attractive for a Nordic power producer, but is less useful for someone trading power on EEX or gas on ICE. Moreover, the simplicity of clearing comes at a price – in terms of fees and margin requirements - and OTC and bilateral trading can prove more flexible in that they allow market participants to take bilateral – rather than pooled – credit risk.[4]

The question of whether it is "better" to trade foreign exchange, oil, coal, interest rate derivatives, weather swaps etc. OTC or on exchange simply never arises. Unlike the power and gas markets – where there is a core, designed element – the markets and platforms in other markets just are: the net result of evolving solutions to market participants' trading, risk-management, credit and financing requirements and it is precisely the ability to **choose** the means of trade that drives innovation in platforms and competitive charging for these services.[5] Indeed the Markets in Financial Instruments Directive is *entirely* aimed at aligning financial regulation to reflect the burgeoning competition to traditional exchanges from other multi-lateral trading platforms. Attempts to restrict trading onto exchanges or to force clearing would be disastrous. To the extent that market participants always have the option of giving up OTC and bilateral transactions to the exchange for clearing in any case, restricting the potential range of trading, credit and cash-management arrangements between market participants **can only** raise barriers to entry into the wholesale, undermine market liquidity and reduce competition, increase fees and stifle innovation in the provision of trading platforms.

Given that there is no inherent efficiency advantage to trading on exchange, and even if there was one would be wise to leave it to the market to discover this, a regulatory preference for exchange trading must just lie elsewhere and the claim that exchanges are inherently more transparent is advanced as one such reason.

THE ARGUMENT FROM TRANSPARENCY

Transparency is a multi-dimensional issue often depending on the viewer's perspective. Although on the surface exchanges appear more transparent than OTC markets – with readily accessible price and volume data – market participants have comparable and routine access to price and volume data via broker platforms in the OTC market. Moreover, many market participants consider OTC markets more transparent than exchange markets because of the additional "market flavour" provided by knowing the counterparty to the trade (which also helps to explain why some trades take place OTC despite being given up for clearing). In addition to the provision of data via the broker platforms, there are no shortage of proprietary trade publications and news feeds which give ongoing trade data, market assessments, news and analysis.

CESR, ERGEG and stakeholders are also working to develop an appropriate post-trade reporting regime and to improve information on supply and demand fundamentals. Indeed, the need for better information on market fundamentals is paramount and completely independent of the ultimate means of trade. Not only are concerns about "price formation" often related to physical events rather than trading per se, but reported trade data is effectively useless without a good understanding of the underlying fundamentals at the time of the trade.

In short, there is little if any discernible difference in the practical levels of transparency between the respective OTC and exchange markets and the need to publish transparent fundamental data is essential wherever trade ultimately takes places. Moreover, work is in progress to enhance transparency further which should help to improve regulatory confidence and understanding in the operation of both the OTC and exchange markets. All told, transparency also provides no grounds for either an implicit or explicit regulatory preference for exchanges over OTC markets.

THE ARGUMENT FROM SUPERVISION

The final argument that gets rolled out in favour of exchanges is that it would be better to trade on exchanges because they are inherently easier to supervise and regulate than OTC markets. While it is true that many exchanges include market conduct rules within their contractual framework and that, traditionally, exchanges have fallen under the scope of wider financial

4 Interestingly, the financial crisis has also focused attention on the bilateral credit exposure to the clearing members of the exchanges.

5 The success of exchanges in promoting market coupling is already starting to expose some of the strains and inconsistencies in going down this route as previously competing exchanges are increasingly forced to merge, swap and share ownership to achieve greater "integration" of their functions in the name of market integration.

market conduct rules, it would be far from correct to assume that OTC energy markets are therefore free from regulatory scrutiny and oversight since:

• Most participants in the energy markets are regulated either as "physical" players subject to sector specific and competition regulation and/or financial institutions with strict compliance with financial regulation principles across all asset classes (and some institutions qualify on both counts);

• MIFID has extended the coverage of financial sector regulation to the commodity markets and OTC trading platforms in recognition of the evolving similarities between these markets and the more traditional exchange-based financial markets;

• The Third Package includes provisions for record keeping to facilitate regulatory investigations.

To the extent that differences in regulation remain, they represent fully considered, reasoned judgements on the appropriate scope of financial services regulation both in terms of the business of market participants (e.g. own account trading), the requirements for prudential reserves under the Capital Requirements Directive and the products covered (i.e. financial instruments and organised markets, rather than everyday commercial and domestic purchases and sales of physical commodities). It would be inappropriate and inefficient to adopt a regulatory approach that sought to "flatten" these differences between traded products and platforms – not least because a disproportionate approach will reduce liquidity and competition and, ultimately, force trade outside the EU. Similarly, many perceived "gaps" in the regulatory framework covering the underlying physical markets actually reflect the considered and natural boundaries on anti-trust law (i.e. intervention is limited to abuses of dominance and anti-competitive agreements).

Yet again, the "neatness" of regulatory supervision of exchanges is merely the consequence of the underlying product, market structure and evolution, rather than a determinative "cause" for attempts to force trading via exchanges rather than other market platforms.

EVOLUTION NOT REVOLUTION

Power exchanges clearly play a hugely important and growing role in the evolution of power markets as a valuable, competitive and complementary service to the OTC markets. Exchanges, however, have no pre-ordained advantages of rights in the traded market in terms of their role in promoting market integration, competition, transparency or effective regulatory scrutiny.

While we should all continue to work to improve competition, liquidity and confidence in our power markets, we should at the same time beware of regulatory attempts to impose an "intelligent design" on our markets as a substitute for the deep and subtle drivers underlying the successful evolution of the traded markets. Not only would it be deeply ironic if the quest for liberalisation actually created rather than dissipated the scope of monopoly, but attempts to second-guess the market and to "engineer" the perfect platform and solution are sure to fail.

What are the key factors driving EU electricity prices?

Per Lekander – Senior Energy Analyst, USB

I have been asked to give my personal view on a set of questions relating to the development of power prices in the EU. The views in this article are personal and do not necessarily represent those of UBS.

WHAT IS THE RELATIVE IMPORTANCE OF FUEL, CO_2 AND CAPITAL COSTS FOR POWER PRICES?

Most regional electricity markets are reasonably competitive and prices are determined by three factors:

- electricity is dispatched based on variable costs. These are essentially fuel and CO_2 costs and, therefore, these costs are critical.
- the supply/demand balance determines if there is a possibility to price marginal capacity above costs. If there is over-supply, prices will be at cost and if there is under-supply there is a potential for a margin above costs.
- in the long run, the full cost of new capacity, including capital costs, is important because it determines whether or not new lower cost capacity will enter the system.

In summary, electricity prices are set by short run marginal costs and the long run costs only have an indirect impact on prices.

Table 1 below gives an estimate for what the total generation cost is for new capacity as well as the operating cost for typical and existing European generation capacity **with commodity prices at current levels.**

For the main Central European market (i.e. Germany, Benelux, France etc.) the current baseload electricity price is determined mainly by coal. For UK and Southern Europe, gas has a bigger impact. Considering that coal and gas generation costs are currently very similar, it is not surprising to find that the price spreads in Europe are small. This has not always been the case. For instance, last year gas markets, such as the UK, traded at a significant premium to coal markets.

Table 1 Generation costs[1] (€/MWh)

	New plants			Old plants		
	Coal	Gas	Nuclear	Coal	Gas	Nuclear
Fuel	22.4	35.9	4.1	28.69	42.04	4.41
CO_2	8.8	4.1	0.0	11.33	4.82	0.00
O&M	4.8	3.1	13.8	10.95	5.65	17.42
Capital costs	19.6	14.7	46.8	–	–	–
Total	**55.6**	**57.8**	**64.8**	**50.97**	**52.51**	**21.84**

Source: UBSe

1 Main assumptions: Coal price $7/MMBTU, Uranium $45/pound, CO_2 €12/t, ROIC (pretax) 10.5%, Investment costs: Coal €1250/kW, Gas €700/kW, Nuclear €3000/kW

MY MAIN CONCLUSIONS FROM TABLE 1 ARE AS FOLLOWS:

- movements in fuel prices, mainly coal and gas, are the most important driver of electricity prices

- in a market with a large share of coal capacity, CO_2 also has a significant impact

- capital costs have a very significant impact on nuclear new build costs and, therefore, on its competitiveness. For other technologies, movements in capital costs needs to be much higher to have a significant impact.

HOW WILL CO_2 PRICES IN ETS PHASE 2 AND 3 IMPACT POWER PRICES?

The direct power price impact from ETS is easy to estimate. CO_2 is a pure variable cost and therefore the price impact equals the product of the average emissions of the marginal generation capacity and the CO_2-price. For example:

If we assume that we have a CO_2-price of €10/MWh and for 50% of the time coal generation (on average 0.9t/MWh of emissions) and 50% of the time gas (c0.4t/MWh of emissions) then the impact on the power price should be 10*(50%*0.9+50%*0.4) = €6.5/MWh of power price impact. This theoretical relationship works well in practice.

With regard to views on the CO_2-price we foresee very different price dynamics in Phases 2 and 3 of ETS:

- in Phase 2 there is no need to domestically lower emissions, and any shortage can be fully met by CDM-allowances. This is due partly to the recession which has lowered emissions. We, therefore, expect the CO_2-price to be set primarily by CER development costs in the range of €10-15/t.

- However, in Phase 3 the emissions deficit increases significantly, and we foresee a 15-20% short position, pre CERs in 2013, and there will be a significant need for fuel switching. That means that the CO_2-price is likely to be determined by the relative price of coal vs. gas. At current fuel prices, this implies a carbon price in the range of €25/t, but this level has been very volatile.

There is, therefore, a positive correlation between gas prices and CO_2-prices. If the gas price increases, the CO_2-price should also increase meaning that the impact on the electricity price multiplies. Thus, emissions trading is leading to increased power price volatility.

DO CURRENT POWER PRICES REFLECT FUNDAMENTAL DEMAND AND SUPPLY CONDITIONS?

We would argue that most regional European wholesale power markets are efficient and as a consequence prices generally reflect the current supply/demand situation.

As spark and dark spreads typically are below the levels required to make new capacity investment profitable, this implies that the capacity margins are sufficient. Obviously the economic recession has further increased supply margins and thus compressed spreads. A question mark hangs over the long lead-times for investment, which means that the investment signals may come too late.

However, at this stage I remain sceptical about this argument. I think the opposite is more likely to be true. The industry is going ahead with investments, even if the market price is below what is required. This is consistent with the general experience from capital intensive industries and we have not seen many cancellations of projects due to the lower power prices, at least not from the larger utilities.

WILL GENERATION SUPPLY CAPACITY FALL SHORT OF DEMAND IE POTENTIAL OUTAGES IN THE NEXT 5/10 YEARS?

As mentioned previously, I remain sceptical on this issue. In particular, in the UK, there is a lot of capacity to be shut around 2015 due to the LCPD-directive. However, if there are emergency situations, then decisions are likely to change.

I also think that the German phase out of nuclear power will proceed slowly. At the same time, we are likely to see rapidly expanding wind power capacity and accelerated energy efficiency measures. European utilities are also moving ahead with new capacity plans, in particular concerning CCGTs. Thus, I do not see capacity as a major problem. The problem is more the EU's increasing dependency on gas as a fuel.

WHAT IMPACT WILL THE EU'S DEPENDENCY ON IMPORTED GAS FOR POWER GENERATION HAVE ON POWER PRICES?

Our analyses indicate that Europe's future dependence on gas is still underestimated. We estimate that Phase 3 of the emissions trading scheme will lead to an additional incremental need of c70 BCM pa of gas, i.e. about 15% of extra demand. This additional gas is unlikely to come from pipeline sources and this means that Europe will become increasingly dependent on imported LNG. This is likely to lead to a 30% higher gas price as LNG typically is priced at calorific equivalence to crude whereas the historic long term pipeline contracts are priced at around 70% of the implied oil price.

In addition to this, we have mentioned above the multiplier effect via the CO_2-price. If gas prices increase, with no movement in the coal price we are likely to see higher CO_2-prices. Bringing these factors together we estimate that wholesale power prices could increase by around 40%, excluding any other upward influence on commodity prices

WHAT IS THE LIKELY IMPACT OF THE CREDIT CRUNCH/RECESSION ON SHORT AND LONGER TERM POWER PRICES?

In the near term, the credit crunch has reduced power prices for two reasons. The crunch has depressed commodities prices (lower demand, limited freight financing) and it has also lowered power demand by around 5%, thus creating an overcapacity situation, limiting spreads. This situation is likely to prevail until demand picks up.

Longer term, I think the impact will be limited. We have seen over the last months that financing is available for utilities, and in fact, interest costs are now lower than they were before, debt spreads have increased but the underlying interest rates have come down even more. The only difference we currently see is that some smaller and highly levered companies have problems with financing so that power plant investment will become even more a game for the largest utilities.

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How will mergers and acquisitions impact on the generation, distribution and supply of power in the next five years?

Simon Wilde – Head of Power & Utilities, EMEA, Royal Bank of Scotland plc

INTRODUCTION

The transition from public to private ownership and the creation of integrated power utilities has been driving consolidation in the generation, distribution and supply space since the late 1990s. As European governments embraced the trend toward privatisation and unbundling of their national electricity monopolies, opportunities were created for utilities to capture economies of scale, diversify risks, and optimise their balance sheets via a range of M&A activity.

POWER SECTOR M&A IN EUROPE IN RECENT YEARS

Today's European power sector has been created through a series of mergers and acquisitions carried out over the last ten years. Since 2002, there have been over EUR 370bn transactions in the sector. Of these 52% have been domestic and 48% cross border.

Initially transactions were about securing strong domestic positions. These included:

1. Vertical integration moves to create what has become the dominant economic model in Europe, the vertical integrated generation/supply company, predominantly also bundling regulated distribution and/or transmission assets. Examples include:

- Acquisitions of distribution/supply RECs in the UK by Innogy and PowerGen

- Endesa's buyout of its distribution affiliates FECSA and Sevillana; and

2. Horizontal consolidation to create major players with significant scale economies at the national level. Early examples include the Viag/Veba merger which created EON in Germany along with RWE's acquisition of VEW.

Figure 1 European utility sector M&A volumes (2002-2007)

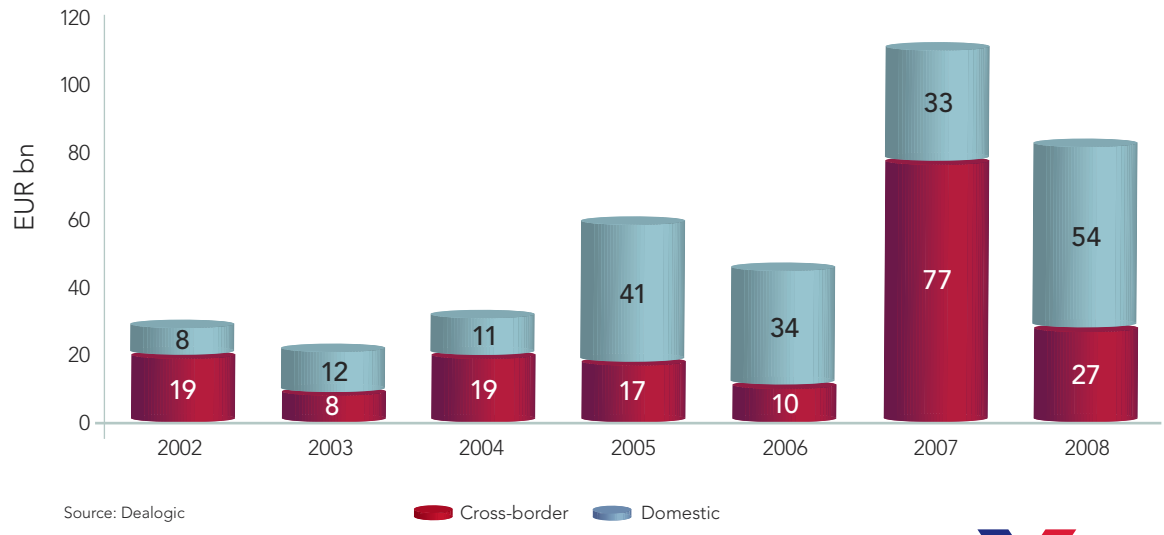


Figure 2 Selected major European utility M&A transactions

Date of launch	Target	Bidder	Deal Value(USDm)
Nov 1998	London Electricity	EDF	3,174
Aug 1999	Tractebel	Suez	7,326
Sept 1999	Viag	Veba	18,176
Oct 1999	VEW	RWE	4,605
Nov 1999	EnBW	EDF	2,485
Apr 2001	PowerGen	E.ON	13,815
Nov 2001	Birka Energi	Fortum	3,054
Nov 2001	Eastern Electricity	EDF	2,078
Mar 2002	Innogy	RWE	7,375
Apr 2002	Lattice	National Grid	17,442
Jun 2002	SEEBOARD	EDF	2,059
Jul 2004	Hidro Cantabrico	EDP	2,899
Dec 2004	Sydkraft	E.ON	2,914
Feb 2006	GdF	Suez	58,705
Nov 2006	Scottish Power	Iderdrola	22,955
Apr 2007	Endesa	Enel/Acciona	54,656
Apr 2007	Endesa Europa	E.ON AG	16,906
Jun 2007	ASM Brescia	AEM	5,721
Jul 2008	Union Fenosa	Gas Natural	35,855
Jan 2009	Essent	RWE	12,426
Feb 2009	Nuon	Vattenfall	10,789

Source: Equity Research, Dealogic

This trend has been seen in most markets from the Nordics to Italy and continues today with transactions such as Gas Natural's recent acquisition of Union Fenosa in Spain.

Increasingly though, we have seen the emergence of significant cross border acquisitions. These have been to either link up neighbouring markets such as Spain and Portugal (EDP-Hidrocantabrico) or France and Belgium (Suez/Tractebel). However, they have also often been to establish "beachheads" into geographically distinct markets (e.g. moves into the UK by EON, RWE, EDF and Iberdrola) as well as CIS/CEE investments by most of the European majors. The recently announced acquisition of Dutch generation/supply players Nuon and Essent by Vattenfall and RWE illustrate both of these trends.

European mergers have created a group of major utilities with strong domestic positions, rapidly developing international arms and ambitions to grow further as Europe continues to consolidate. It is this area that we expect to see develop further in the years to come. The potential for this can be seen by looking at the current market structures across European countries and for the EU as a whole.

Figure 3 EU-wide market shares (2007)

Utility	Power generation	Power supply	Countries
EDF	16.8%	17.4%	France, Germay, UK, Italy, CEE
Enel/Endesa	8.8%	14.5%	Italy, Spain, CEE, Ireland
RWE	5.9%	8.8%	Germany, UK, Netherlands, CEE
EON	5.5%	7.5%	Germany, UK, Nordics, CEE
Vattenfall/Nuon	4.3%	5.0%	Nordics, Netherlands, Germany, CEE
Iberdrola	3.3%	4.5%	Spain, UK
GDF Suez	2.4%	1.9%	Belgium, France
Top 7	*47.0%*	*59.6%*	

Source: Capgemini, company data, EC

STRUCTURE OF THE CURRENT EUROPEAN POWER SECTOR

Notwithstanding the substantial cross border investments to date, the European power market taken as a whole is still relatively fragmented. Many argue that the natural market structure for a competitive power industry tends towards an oligopoly, and indeed across Europe there are a large number of utilities dominant in their domestic market. However, these players typically have low market shares on a Europe wide basis. The sector as a whole is likely under-capturing the economies of scale that could be achieved by deploying expertise and capital across borders in larger economic units.

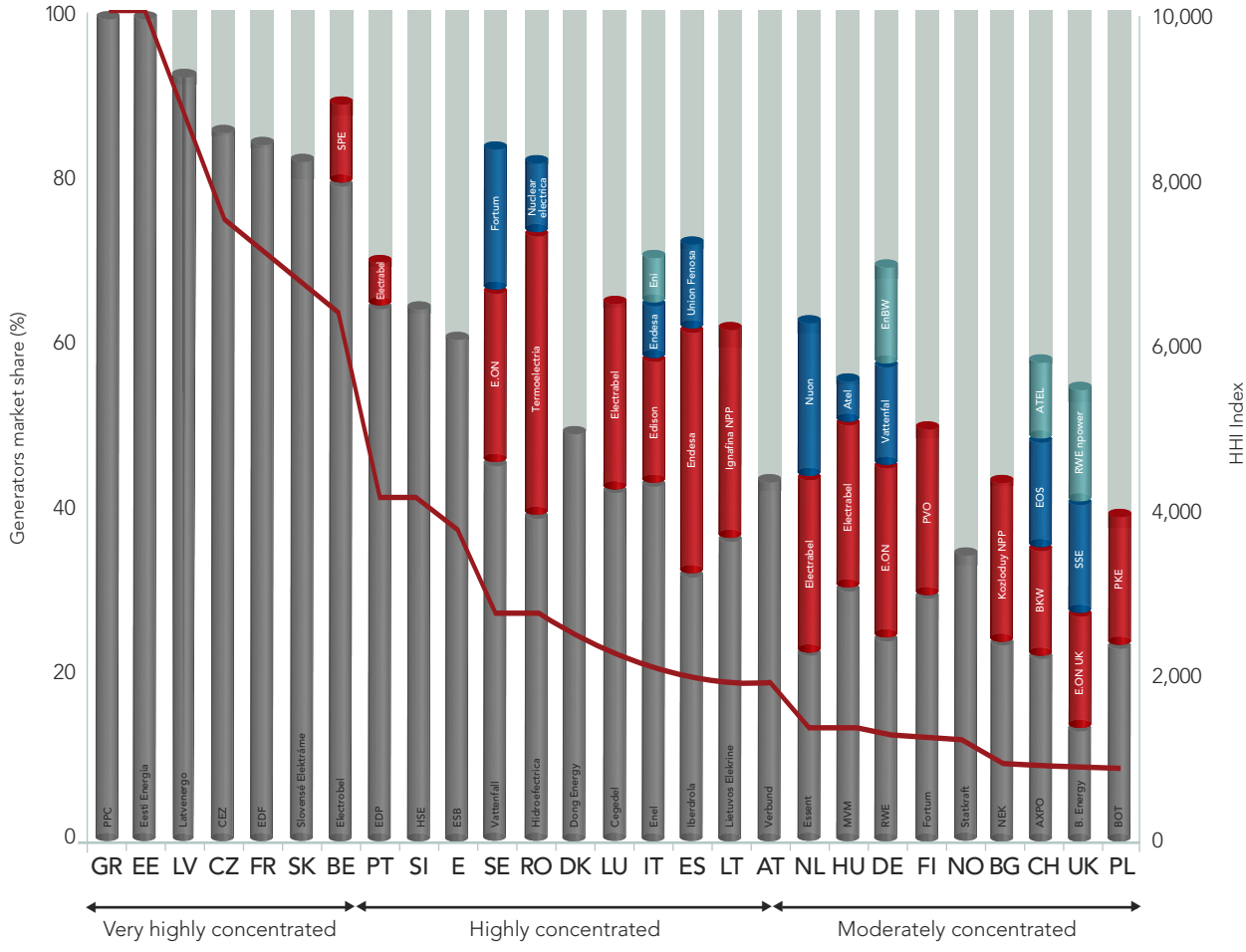
The estimated EU-wide market shares of the top tier of European utilities in both the generation and supply sectors are set out in the table below. The combined market share of the top seven players is 47% in generation and 60% in retail supply, far lower levels than in many other capital intensive industries.

Despite these low EU-wide concentration levels, when looked at on a country-by-country basis, power generation and retail supply are more highly concentrated. Most markets are dominated by 1, 2 or 3 major players. As a result the HHI indices (sum of squared market shares) for most national markets, in both generation and supply, are well in excess of the 1,800 level that regulators denote as highly concentrated.

For the generation sector, the HHI index on a national level averages 3,602 versus 478 for Europe as a whole.

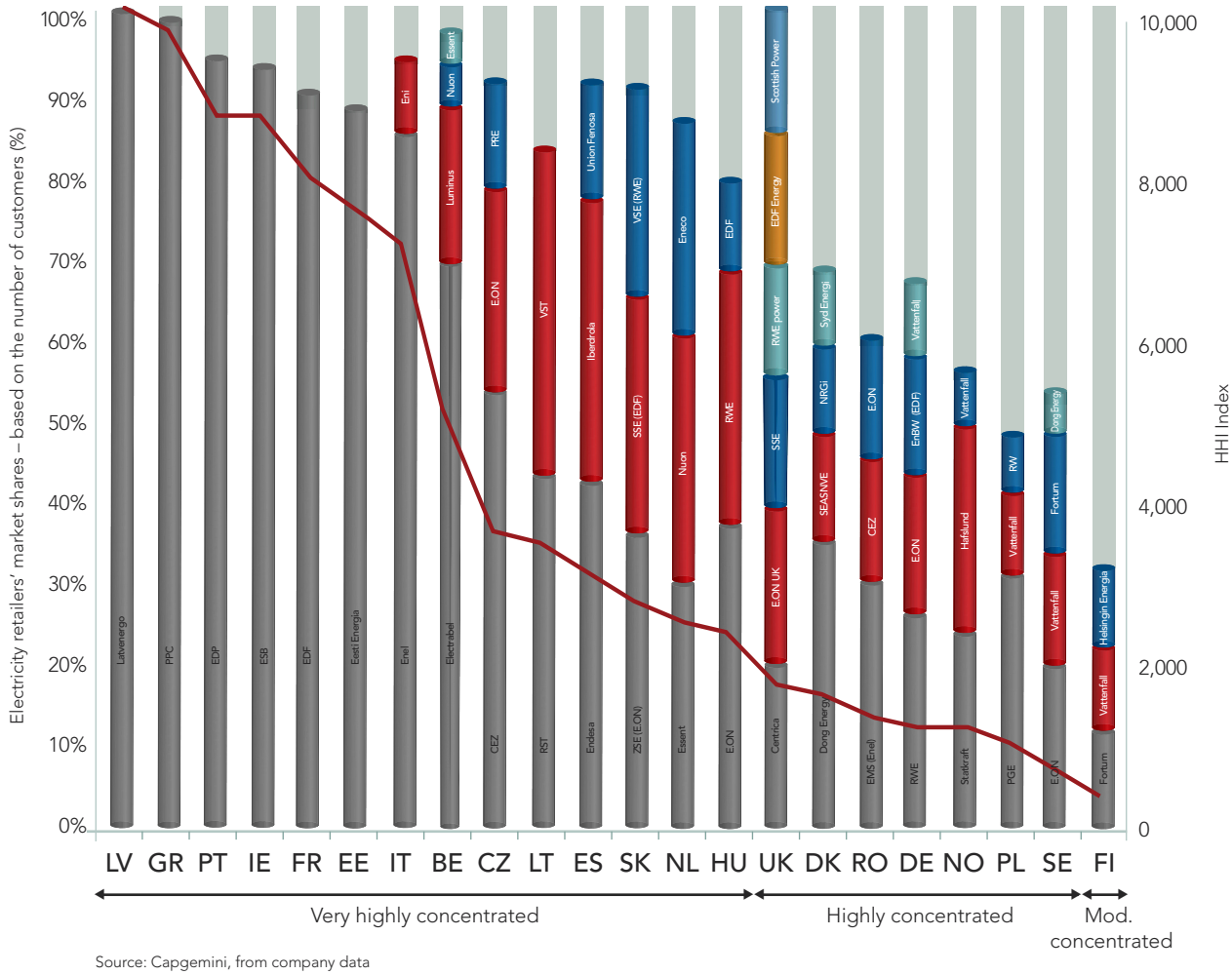
Similarly in the supply sector, the average HHI index for the national retail supply markets is 4,232 versus 722 at the European level.

Figure 4 Generation market concentration (2007)



Source: Capgemini, from company data

Figure 5 Electricity retail market concentration (2007)



Source: Capgemini, from company data

"However, major changes in the underlying structure of each country's sector are unlikely."

There are some limited moves to reduce concentration at the member state level, such as EON's current EC-mandated generation sale and the divestiture of 1000MW of Irish capacity to Endesa by ESB earlier this year. However, major changes in the underlying structure of each country's sector are unlikely.

Rather, EU-wide consolidation is likely to occur from an acceleration of large scale cross border tie-ups of players with major positions in multiple EU markets.

FUTURE POWER SECTOR M&A ACTIVITY

Despite the credit crunch, M&A activity in the European power space continued at a high level in 2008 and into this year. The underlying themes of consolidation, security of supply and growth in renewable portfolios continues to attract CEO level attention and to be supported by shareholders. Europe is still engaged in plenty of consolidation among utilities as well as increasing interest in renewable generation from financial players. Examples include the sale of Dutch utilities Nuon and Essent, announced in January and February 2009, as well as the recent completion of last year's bid for British Energy by EDF.

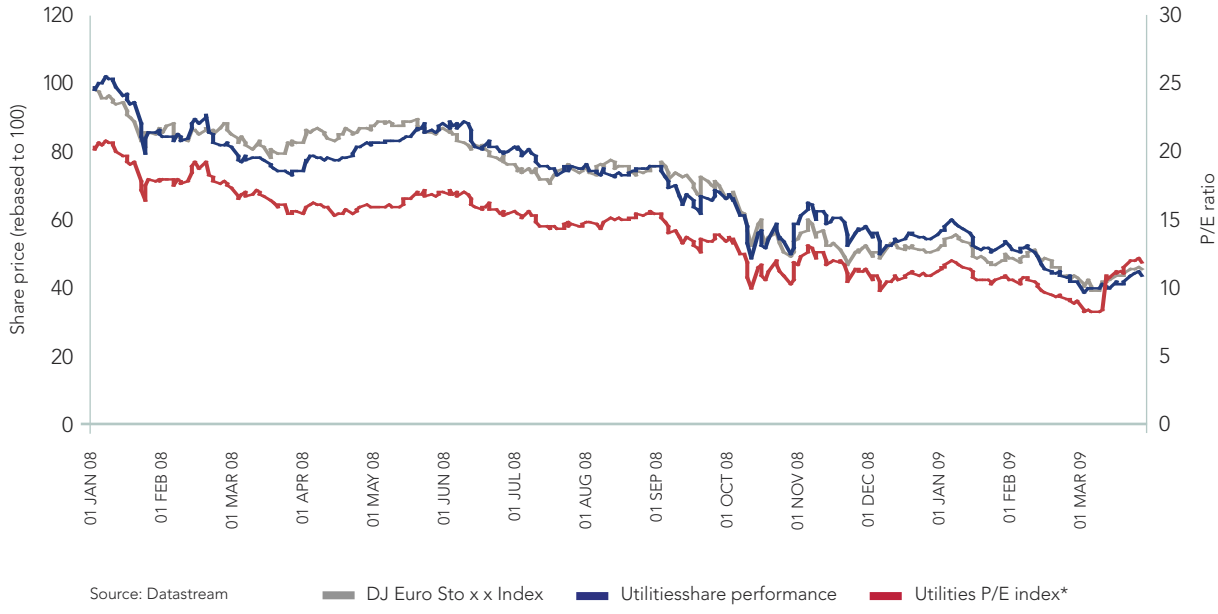
TWO NOTICEABLE CHANGES SINCE 2008 ARE:

1. an increasing shift from transformational cross border mergers to bolt-on acquisitions of individual assets and stakes; and

2. selective disposals by major utilities in order to strengthen balance sheets and, in some cases, to meet regulatory requirements.

Market conditions have opened up a range of opportunities, and while some players may be facing increasing liquidity constraints, utilities with strong cash balances will have a clear competitive advantage over their smaller competitors, which could bring further consolidation of the industry.

Figure 6 Utility sector valuations (since 1 Jan 2008)



As valuations are driven down by pessimism on the economy as a whole, power companies may face temporary displacements from their fundamental values, potentially providing a brief opportunity for companies to acquire

RENEWABLES: CONTINUED INVESTMENT COUPLED WITH ASSET SALES

With 2020 approaching, utilities have been ramping up their exposure to renewables in order to meet the targeted 20% of generation mix by 2020. This has led to increasing acquisitions by major incumbents of renewable operators and technology providers to supplement their own clean energy programmes; transitioning renewables from a niche segment to a core part of the generation landscape. Apart from utilities, sovereign wealth funds and private equity houses have been increasing activity in the renewable space, a trend that is expected to continue as government support towards clean energy, such as feed-in tariffs, provide an attractive incentive and stable foundation for the industry.

The sale of distressed projects, including renewables, are likely to be a large part of the short term picture as deteriorating credit conditions and suppressed demand for electricity continue to place pressure on available financing for power projects, particularly those backed by smaller development companies.

TRANSMISSION AND DISTRIBUTION UNBUNDLING: AN IDEA WHOSE TIME HAS COME

Following the growth in renewables, investments in transmission networks will be necessary to connect distant generation assets, particularly offshore wind farms, to the grid. However, the regulatory pressure for unbundling combined with reassessment of corporate strategies and reduced financing capacity, may see these networks designated as potential disposal assets. As power grids receive set tariffs and hence a stable revenue stream, they are less affected by market conditions compared to other parts of the power sector, making grids attractive to financial players such as infrastructure funds.

The infrastructure capital sector continues to have significant levels of equity to invest, although associated debt financing is harder to structure and more expensive than 12 months ago. Key areas of infrastructure fund activity include: high voltage grid networks, gas distribution and, increasingly, electricity distribution. The UK shows that distribution ownership is not necessary for success in the generation/supply sector and a number of major utilities are considering the sale of distribution activities previously regarded as core.

MAJOR CROSS BORDER GENERATION/SUPPLY CONSOLIDATION: TO RE-EMERGE MORE STRONGLY THAN EVER

The ongoing development of open European markets, with interconnections increasing between countries and regulatory changes to improve competition, should result in continued generation and supply consolidation. Volatility in fuel and electricity prices, as seen in the past year, favours integrated generation-supply business models that have a natural hedge. Geographical diversification and financial scale are also key to surviving and flourishing in volatile conditions. As a result, the consolidation in Europe's national power markets can be expected to mirror continued oligopoly positions in supply. New supply entrants have struggled recently (e.g. in the UK and France) and will continue to do so.

Consolidation on a European scale has accelerated in the past 2-3 years. We are likely to see a pause in the current environment as major utilities have reduced equity and debt firepower, so are conserving cash reserves, investing more in small scale and/or distressed assets.

In the mid-term, and well within our five year horizon, the impact of mergers and acquisitions in the power sector will again be felt. The credit crunch is likely to lead to perceived losers, whilst the strong will grow at their expense, strengthening core positions on a Pan-European basis. Over a five year period, there will be increased opportunities for financials and strategic players to enter and consolidate the sector as utilities reorganise their portfolios and projects are temporarily distressed due to the current market turmoil.

CONCLUSIONS

It has been a busy ten years for European utility sector M&A, accelerating particularly since 2006. We have seen major privatisations, hostile takeovers and state-sponsored mergers. The vision of an integrated European power market is slowly taking shape and we have seen the emergence of major multinational European utilities (of which there are arguably seven at present).

Looking ahead to the next five years, there will continue to be activity across all segments of the energy value chain, although at varying levels of intensity. To speculate, one might expect:

- Slower but by no means insignificant activity for the next two years, with a focus on opportunistic in-fill acquisitions.
- Major acceleration of grid spin-offs, both transmission and distribution, across power and gas.
- A slowdown in renewable build-out but a consolidation of the sector as it matures and becomes increasingly mainstream.
- The re-emergence within our five year period of transformational mergers as the EU consolidation endgame begins to play itself out and the sector shakes down into 4-5 "super-majors" who between them have 75%+ aggregate European market shares in generation and supply.

In summary, it promises to be a busy five years for all of us.

How will the EU's dependency on imported gas impact on the future operation of EU wholesale gas markets?

Dr. Geert Graaf – Managing Director, Gas Transport Services B.V.

SUMMARY

This paper describes the potential impact of the shift in the EU supply/demand balance, including the increasing dependency on gas imports on the future operation of the EU wholesale gas markets.

The conclusion is that the adequate development of new gas network infrastructure and the ability of TSOs to invest in such new infrastructure are essential prerequisites for ensuring security of supply and achieving a well-functioning internal market for gas.

WHAT IS THE EXPECTED SUPPLY AND DEMAND BALANCE IN THE EU GAS MARKET?

Demand drivers:

Natural gas is the fuel of choice for end-users. Therefore, there has been a gradual switch from other fossil fuels towards natural gas. Major underlying reasons are that natural gas is the cleanest fossil fuel and very flexible for end-users. Throughout Europe, there is increasing awareness that gas is a unique transition fuel.

Gas is able to add flexibility to power generation which enables sustainable energy forms – wind, solar – to gain share in the energy mix. Moreover, natural gas supply systems can accommodate 'green gases,' thus adding sustainability to the fuel itself. Because of these unique characteristics, natural gas performs an ideal bridging function between fossil fuels and renewable energy.

> "...natural gas performs an ideal bridging function..."

It is generally believed that these factors will lead to the demand for gas being at least stable, with probably a slight upward trend in the coming decades. Recently, the financial crisis has prompted some demand reduction, especially in the industrial sector, but so far there is no indication that this phenomenon will have a longer term or structural negative impact on demand.

Supply drivers:

The main driver on the supply side is declining gas production in the EU. The growing gap between demand and supply will thus attract new production especially from Norway, Russia and LNG-producing countries. The price of gas (and its stability) is an important factor for supply development, since it defines the business case for any new supply project. Also, the availability of adequate infrastructure is a factor of great importance.

Forecasts on how dependent the EU is likely to become on imported gas in the next 10 years and beyond show some variations, but most of these reveal a similar trend. The EU will inevitably become more and more reliant on imported gas.

Gasunie expects that by 2020, EU NW will need approximately an additional 150 bcm/yr more imported gas compared to 2005. This increasing trend will, most likely continue but at a slower pace in the period thereafter. Beyond 2030, the uncertainty of the projections increases because demand might be shifting more to renewables. However, even then a further increase in EU dependency on imported gas might result, if the decline in indigenous gas production is faster than the increase in renewable energy supply.

WILL EU GAS PRICES REFLECT SUFFICIENTLY FUNDAMENTAL SUPPLY AND DEMAND CONDITIONS?

Current gas prices in the EU are partly based on gas to gas competition (gtgc) and partly based on oil price indexation, with a gradual shift from the latter to the former. In the long run, even gtgc prices have the tendency

to follow oil price, not only in Europe but also in the US. As a rule of thumb, in periods of relative oversupply gtgc gas prices are slightly lower compared to oil-based gas prices (on average), while in periods of relative undersupply the opposite is the case. Furthermore, gtgc gas prices show seasonal influences and also reflect infrastructural constraints leading to relatively high price volatility.

Another factor which is expected to become increasingly important is the arbitrage impact of flexible LNG-supplies, resulting in a gradual movement towards a global market. Given these factors, it is expected that (future) EU gas prices will sufficiently reflect the supply/demand balance and be able to attract the necessary additional imports into the EU.

However, the gas price level is not the only important factor that will be decisive for supply development. Suppliers will also base their decisions for long term additional gas sales to the EU on the accessibility of the market. In this respect, well-functioning trading hubs and adequate network and storage infrastructure are of utmost importance.

The major risk to the EU is not being able to respond to the enormous need for extra infrastructure to bring (or attract) the new gas volumes to the market. This includes the whole spectrum of infrastructure: pipeline interconnectors, LNG-terminals, expansion and adaption of the current (midstream) transportation systems, seasonal and peak storage etc.).

Regulated TSO-businesses are vulnerable because regulatory pressure is used primarily to cut transportation tariffs as much as possible. The resulting outcome might well be that the necessary investment comes too late, leading to a lower security of supply than is desirable and a relatively high gas price for a longer period. With downstream gas marketing becoming more short term, and new investments in infrastructure needing to be based on long term scenarios, there is a threat of greater price volatility.

HOW CAN THESE RISKS BE REMOVED OR MITIGATED VIA MARKET REFORM OR POLITICAL ACTION?

One of the most important objectives for regulators is to contain transportation tariffs. It seems self-evident, but it is at the same time of paramount importance that tariffs stimulate new network investment. Logically, the process of energy market reform and liberalisation has resulted in an emphasis on reducing the cost of transportation services. The principle of market pricing of transportation services has been abandoned and the principle of cost plus pricing is now generally applied.

This shift is a major concern for Europe, because it leads (or will lead) to a transportation price level that is too low to allow for adequate investment in network expansion. Inevitably, tariff increases are necessary to stimulate the investment climate and to enable the initiation of vital infrastructure. But this is easier said than done.

For instance, in the Netherlands, we have seen that an investment related tariff increase encounters major resistance and requires intensive communication efforts to market parties. This has caused delays in new investment, and political action was needed to create a break-through. At the moment the investment projects involved, which respond to the capacity need of customers, are being executed, thus enhancing security of supply as well as market liquidity in this part of Europe. A similar process might well take place in other Member States causing delays in the development of new infrastructure. The best way to prevent such undesired developments is to adopt an accepted policy at EU level with regard to tariffs and incentives for new network investment. Such a policy should explicitly recognise that tariff setting should be based not only on cost-reflectiveness but also on the effects of the tariff level on the functioning of the market across the gas chain, and on security of supply. In fact, the Dutch example shows that independent gas infrastructure companies such as GTS/Gasunie can contribute significantly to the internal market – but only if the investment climate is adequate.

Improving gas market liquidity and efficiency at EU level is a complex and a relatively slow process. The fact that the EU is now working on the Third Energy Package is clear proof of this statement. Regional initiatives are less complex and can, therefore, accelerate the improvement process. From this perspective more emphasis should be placed on bilateral (between neighbouring Member States) improvement projects. An interesting example could be a programme to install extra cross-border capacity for bilateral interhub gas trading.

In the meantime, gas infrastructure companies are willing to create the necessary infrastructure and they are prepared to deal with all kinds of project challenges. For example, Gasunie (GTS and Gasunie Deutschland) have initiated an integrated plan for combined gas networks in Germany and The Netherlands. The response from the market has been positive and we expect that a major investment project for network expansion will result. But again, this requires a long term stable and adequate investment climate to enable the necessary infrastructure enhancements. That is what will make the EU energy market really attractive for new gas supplies.

Who should do what to improve the liquidity and efficiency of EU regional gas markets?

Dr Ingolf Hoven – Director of Oil and Gas Trading, E.ON Energy Trading

IMPORTANCE OF MARKETS

Functioning gas markets are essential because they provide transparent and reliable price signals for the efficient usage of the existing asset base (gas production/ contracts, transportation and storage capacities) and enable customers to source gas at competitive prices.

The (regional) hub prices are used by market players to optimise their portfolios. Typically, we find all players in the value chain trading at a liquid hub, i.e. upstream, midstream and downstream players as well as financial players plus TSOs to balance their gas grid.

Furthermore, hub prices across Europe are signalling whether bottlenecks exist between markets and whether investments in transportation capacities, storage capacities etc. or other measures should be undertaken.

Within a traded regional gas market, decisions by traders will involve covering the physical position in the cash market (within day/hour), optimising the assets across the curve as well as taking speculative positions based on market views.

Forward prices provide market players with the best view about future supply and demand conditions. Furthermore, prices of different future delivery periods – like Summer 09 against Q1 10 – determine the intrinsic value of seasonal storage. This, plus price volatility, form the basis for pricing storage in a liquid market.

> "Are traded markets perfect?"

Across traded regional markets, traders will exploit arbitrage opportunities and thereby push European gas markets to a higher level of efficiency. Connectivity of regional hubs is vital to deliver efficiency on a European level. Price correlation of hub prices can deliver an indication about the degree of interconnectivity.

Are traded markets perfect? This is a rhetorical question. Traded liquid gas markets typically show prices up to three years ahead but this will not cover the typical time horizon for investments in gas production, transportation, storage capacities etc. Therefore, additional procedures should be deployed in order to help TSOs as well as National Regulatory Authorities (NRAs) to determine whether potential investments would be economically viable in the long run. Open Season Procedures could be envisaged to include such economic tests. And if the investment proves to be viable, TSOs should be obliged to meet demand by investing in additional infrastructure help to integrate markets.

WHAT IS THE CURRENT STATUS OF TRADED GAS HUBS IN EUROPE?

*In this paper I want to focus on **a)** price transparency and **b)** on traded volumes.*

PRICE TRANSPARENCY

We can see traded products via broker screens and gas exchanges. There are also prices published by daily newsletters such as Argus, Platts, ICIS Heren etc. The methodology used, however, is sometimes not fully defined, and it is certainly not the same across newsletters (different time frame etc.) and therefore they can sometimes be misleading. However, these published prices are still used in gas contracts as an index; for example Heren Day Ahead or Month Ahead.

LEBA, the London Energy Brokers' Association, launched a benchmark index for gas markets such as the LEBA TTF Pricing Index. Last but not least, the gas exchanges provide reliable and transparent price information.

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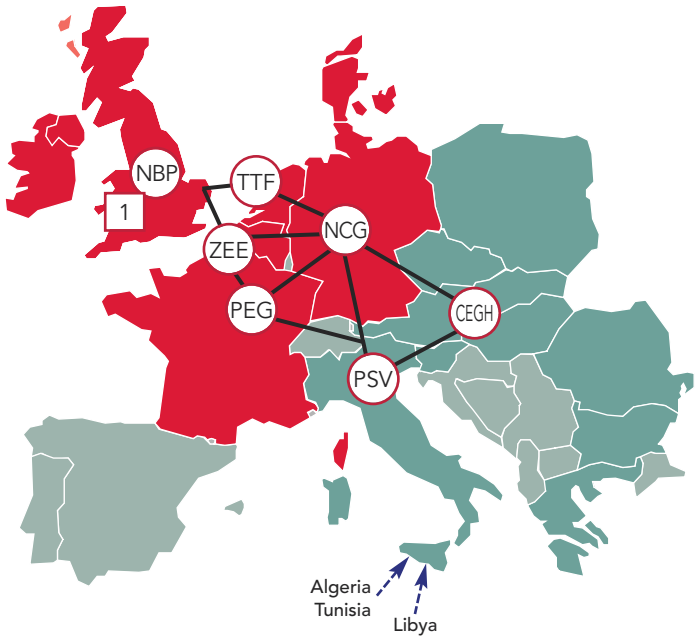
Chart A – EU Gas Trading Hubs



Indicators for a functioning gas hub.

1. Trading via broker screens and via exchanges.

2. transparent and reliable bid/ask quotations for all relevant products and tightness of spread.

3. Balancing market; exchange based.

4. Market depth; high volume traded/churn of relevant products.

Overall, several European gas hubs – NBP, TTF, ZEE, NCG, PEG, CEGH, PSV **(see Chart A above)** – provide transparent prices, but not for all relevant products and with different degrees of transparency reflecting the overall liquidity of the hub.

The markets need transparent prices for all relevant products based on a clear and transparent methodology, at best based on anonymous records of standardised products and based on the publishing of data on OTC trades near real time (and not on d+1 as in newsletters). We are moving in that direction, but there is still room for improvement.

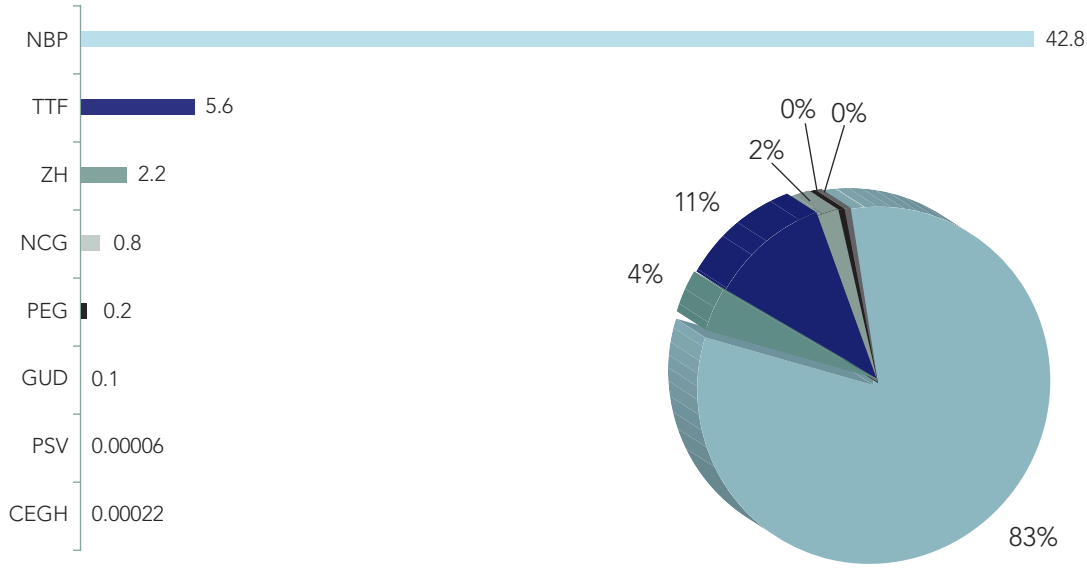
TRADED VOLUMES

Typically volumes as published by the TSO are used to assess the liquidity of a gas hub. However, there are drawbacks: TSO data reflects the nominated volumes at the respective hub for delivery in a given month but nominated volumes do not reflect all contracts, whether standard traded products or long term contracts (LTC).

Therefore, TSO figures do not give a fair reflection of traded standard products, which should be the basis for any liquidity assessment. Furthermore, TSOs use different methodologies. For example, we can find a gross and a net nomination rule. Example: if trader A sells to B 100 units April 09 and next day trader A buys from B 100 units April 09, then on a gross basis we see 200 as nominated volume and on a net basis 0. Gross nominations are used, for instance, at the NBP and net nominations at the Zeebrugge Hub.

I would recommend using trades done via broker screens and exchanges. These market channels reflect 80-95% of traded volumes for standard products. These traded volumes are a fair reflection of volumes actually traded during the reporting month. Delivery of these volumes might be in that month or in future periods. The development of the volumes also show trends in the market (e.g. Does the financial crisis have an impact on liquidity? or How are the regional hubs relative to each other developing? etc.).

Chart B – Traded volumes total in TWh/trading day – 2008



SOME OBSERVATIONS:

NBP is the unrivalled No1 gas hub in Europe in terms of trade volumes **(See chart B above),** products traded, tightness of bid/offer spread. TTF and NCG on a lower level are picking up.

Recently, PEG is improving due to the merger of market areas and introduction of gas exchange (Powernext). Roughly, TTF is trading around 15% of NBP volumes, NCG roughly 20% of TTF volumes. All other gas hubs show much lower trading volumes. Recent developments of trade volumes indicate that liquidity at continental hubs is increasing, while liquidity at NBP is stagnating/decreasing.

Correlation of Day Ahead prices across European hubs is good with the exception of the PSV. **(See chart C opposite)**

POTENTIAL IMPROVEMENTS

NBP could serve as role model throughout Europe on how to set up a gas hub. Main features are an entry/exit model encompassing the downstream market, i.e. exiting NBP provides access to end customers.

It is important to note that the connection of the hub to the regional downstream market is one important element for the successful development of a hub, as well as for the opening of the various downstream markets including access to supply and flexibility.

The hubs in Belgium and Austria, for example, do not currently encompass the respective downstream markets, i.e. the exit points of the hub are not customer exit points such as industrials, power plants, LDC etc.

OVERALL THE EUROPEAN GAS HUBS SHOW SIGNIFICANT POTENTIAL FOR IMPROVEMENT:

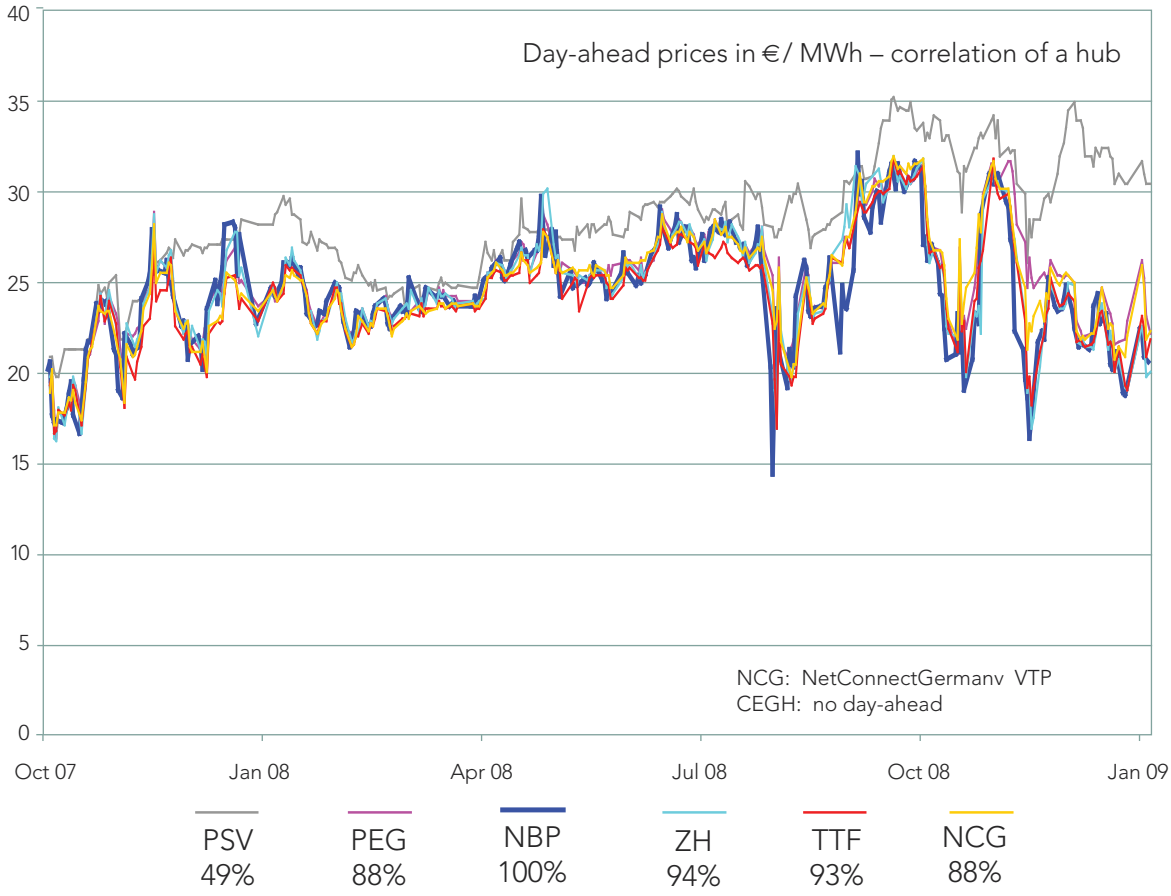
NL: Allow total Dutch downstream market accessible by TTF and investigate abolition of city gate as delivery point (as implemented in Germany). It is foreseen to expand TTF reach from currently around 25% of Dutch downstream market to 100% by 2009/10.

GER: Promote merger of further market areas in Germany.

F: Promote merger of further market areas in France.

B: Zeebrugge hub – expand the hub to a full entry/exit system with full coverage of Belgium downstream market and virtual trading point.

Chart C – Price Convergence at Market Hubs



AU: CEGH/Baumgarten hub – expand it to a "real" virtual trading point from several single flanges connected by services of hub company and connect it to the downstream market. Access to different sources of supply is/could be a potential issue, i.e. diversity of upstream players/sources.

I: PSV – entry/exit model for Italian system, but very low liquidity. Market access seems to be critical as well as access to different sources of supply.

MARKET MAKING

Market making is crucial to develop a traded market. The commitment of E.ON to undertake market making of relevant products at the NCG hub, plus the fact that other companies stepped into market making over time, was a decisive element in the development of trading and liquidity at the NCG hub.

I would recommend that in markets with relatively low liquidity strong players in the respective market take over this important function to develop trading and liquidity. Of course it is material that the bid/ask spreads are relatively tight in order to stimulate trading.

Ongoing initiatives in order to improve connectivity between markets (areas) as well as usage of capacity are important to foster the integration of European gas markets. However, trade offs between existing commercial rights and integration improvements have to be carefully analysed in order to avoid the downturns needed to outweigh potential upturns of any new regulatory regime. To honour existing rights is paramount to keep up trust in the markets.

Last, but not least, harmonisation across Europe with respect to TSO systems and processes will lower the barriers for traders to enter markets as well as encourage mergers/co-operation of exchanges. Currently, companies are facing high costs to conduct trading across Europe.

Speaker Biographies

Bert den Ouden
CEO, APX Group

Bert is Chief Executive Officer (CEO) of the APX Group, the Anglo-Dutch energy exchange. He is one of the founders of APX, which started in 1999 as a Dutch electricity market. Under his supervision, APX has grown by acquiring power and gas exchanges in the United Kingdom in 2003 and 2004, and setting up new gas exchanges in the Netherlands and Belgium. In 2008, APX acquired 100% of the shares of Endex, the Dutch energy derivatives exchange.

From 2002 to 2004, he was Chairman of EuroPEX, the European Association of Power Exchanges.

He is one of the pioneers of market integration in North-West Europe by means of market coupling. He was one of the founders of the partnership between power exchanges and transmission system operators to implement market coupling between the Netherlands, Belgium and France. The Trilateral Market Coupling started in 2006. Since 2005, Bert has also been Vice-Chairman of the Supervisory Board of Belpex, the Belgian Power Exchange.

After studying physics, he worked for the Centre for Energy Saving and Clean Technology (a consultancy in clean energy technology), the Dutch Ministry of Economic Affairs, and EnergieNed – the Federation of Energy Companies in the Netherlands – before becoming CEO of APX.

Clive Moffatt
Managing Partner, Moffatt Associates

Clive has 36 years international experience in research, consultancy and senior management.

He is a former Government economist, consultant with the Economist Intelligence Unit Ltd, merchant banker (Guinness Peat Group plc) and Business Editor of the Financial Times and Financial Editor at the BBC.

He set up MA in 1988 to specialise in market research and business strategy. Since 1992, MA has become a leading supplier of research and consultancy services to the EU energy market commercial participants, regulators and policy makers.

Recent and current clients have included Enron Europe, the Electricity Pool, BWEA, Innogy, RWE Trading, APX, E-Control and the EU Commission (DG TREN).

Clive is a regular commentator on EU energy market issues. For recent articles and research papers see www.moffatt-associates.com

Graham Shuttleworth
Director, NERA Economic Consulting

Graham Shuttleworth is head of NERA's London office and a senior member of NERA's energy team in Europe. He is an expert on the economics of network regulation, market rules and contract design in the electricity and gas sectors. Other areas of expertise include transmission pricing, network access rules, and competition in energy markets.

Graham has directed a broad range of energy sector projects, for both government agencies and energy companies, on energy sector restructuring, market and contract design, and network regulation. He has worked in countries throughout Europe, as well as in Australia, Asia, and Latin America. He has provided expert reports for regulatory hearings, contract arbitrations, and disputes over property taxes ('rates'), and has appeared as an expert witness before a number of panels, arbitrators, and tribunals.

Heinrich Hick,
Policy Officer, DG TREN, European Commission

Heinrich is a Policy Officer with the European Commission, Directorate General TREN.

Prior to this appointment he was involved in negotiations on the international fusion energy research project, ITER. He also worked as a member of the World Trade Organisation (WTO) negotiating team at the European Commission.

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apx Group

Before joining the European Commission, Heinrich worked in the private sector as energy market analyst with a German energy company.

Juan José Alba Rios
Director of Regulatory Affairs, Endesa

Juan joined Endesa in July 1997. He is currently in charge of regulatory affairs of Endesa for Spain and Portugal, where he is involved in all the aspects of the business, including design of the wholesale market, remuneration of distribution, tariffs and grid access charges, capacity payments, CO_2 allocations, as well as European legislation.

Between 2000 and 2004, he was the Managing Director of the European trading unit of Endesa, and was in charge of the Joint Venture with Morgan Stanley to develop this activity. Before 2000 he was in charge of regulatory affairs of the generation business at Endesa. Between 1986 and 1997 he was a researcher at the Instituto de Investigación Tecnológica (IIT), where he worked on regulation, modelling electricity markets and application of computer techniques to power systems and equipments.

Juan is chairman of the Working Group on Wholesale Markets and Trading at Eurelectric, as well as member of the board of directors of EFET (the European Federation of Energy Traders), and co-chairman of its Working Group on financial regulation. He has been a member of the Supervisory Boards of Powernext and Gielda Energii S.A. (Polish Power Exchange). He has a PhD in electrical engineering from Universidad Pontificia Comillas in Madrid.

Walter Boltz
Managing Director, E-Control and Vice President, CEER

After completing his studies in 1976, Walter held several positions in IT management in the banking sector before joining the Austrian branch of an international consulting group where he was subsequently appointed general manager. During the following 10 years he advised numerous large industrial companies as well as utilities in Austria, Switzerland and Germany on public policy issues.

Between 1991 and 1996, he focused his professional activities on Central and Eastern Europe where he built the consulting branch of a big Austrian commercial bank offering strategy consulting and financial advisory services to local companies as well as multinationals. Subsequently, he joined KPMG USA to work in the fields of corporate finance and policy consulting in the Czech Republic, Slovenia and Slovakia.

After returning to Austria, he became a member of the board of Pricewaterhouse Coopers Management Consulting, where he was responsible for consulting in the Energy and Utility sector. During this time, he was also an advisor to the Federal Ministry of Economic Affairs and Labour regarding the liberalisation of the Austrian power and gas markets.

Paul Dawson
Head of Regulatory Affairs, RWE Supply and Trading

Paul is Head of Regulatory Affairs for RWE Supply and Trading. He has over 18 years experience working on the design and regulation of liberalised energy and environmental markets.

Prior to joining RWE, Paul worked on energy and emissions regulation within the banking sector for Citigroup and Barclays Capital and as Head of Government and Regulatory Affairs for Enron Europe.

Paul started his career as an economic consultant at NERA advising European, US and Asian utilities on the liberalisation of energy markets.

Per Lekander
Senior Energy Analyst, UBS

Per is Managing Director and head of UBS European Utilities research team. His stock coverage includes EON, EDF, Suez, RWE and Fortum and his team covers almost all about 40 listed utilities in Europe.

Per was voted No1 utilities analyst in Europe in the recent 2008 Institutional Investor magazine survey. Per has been with UBS since 2004.

He was previously Senior Electricity Expert with McKinsey and he has also been Principal Administrator at the International Energy Agency. Per has a PhD in microeconomics and a MSc in power engineering.

Speaker Biographies

Simon Wilde
Head of Power and Utilities EMEA
Royal Bank of Scotland plc

Simon runs the power and utility sector coverage and advisory functions of RBS in Europe, Middle East and Africa. He has over 16 years investment banking experience, of which 14 has been advising on power and energy sector transactions.

RBS has long been a leading bank to the energy sector, a position strengthened by the acquisition of ABN AMRO. Simon and his team have been active in all key aspects of the sector's development in recent years. For example, advising and financing Vattenfall's EUR 10bn acquisition of Nuon, as well playing key roles in Iberdrola/Scottish Power, Gas Natural/Union Fenosa and EDF/British Energy. RBS is also a leader in the renewables area and the re-emergence of nuclear new build.

Simon joined ABN AMRO is 2001 having held energy advisory roles at JP Morgan, Credit Suisse and Creditanstalt. He holds an MA in Economics and Law from Christ's College, Cambridge.

Dr. Geert Graaf,
CEO, Gas Transport Services B.V.

Geert graduated from the University of Groningen in 1983 with a degree in chemical engineering. He obtained his post-doctorate in mathematics and physics.

In 1986, after completing his thesis, he joined N.V. Nederlandse Gasunie, where he held various posts within both the technical (transport) and commercial (trade & supply) sectors.

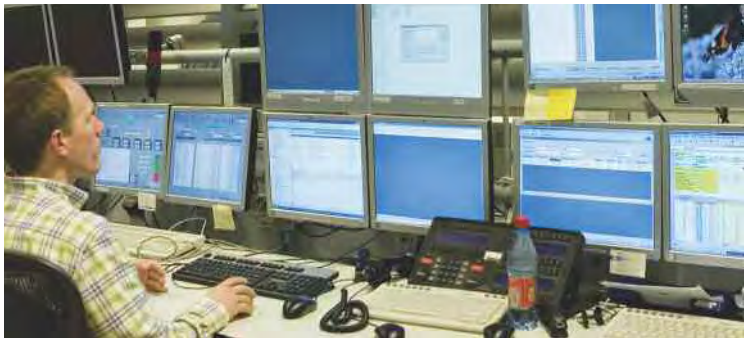
After the demerger of Gasunie in 2005, he transferred to Gasunie Trade & Supply as Director for Exports. In April 2007, Geert Graaf was appointed CEO of GTS.

Dr. Ingolf Hoven,
Director of Gas and Oil Trading, EON Energy Trading.

Ingolf Hoven joined the EON Group in 1992. From 1992 until 1999 he held various M&A positions in the E.ON Ruhrgas Group.

In 1999, he took over responsibility for the long term gas purchases from UK and Denmark. In 2000, he became Director of the Energy Trading at EON Ruhrgas.

In January 2008, he became Director of Gas and Oil Trading of EON Energy Trading AG based in Düsseldorf.



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Panel Biographies

Dominique Jamme
Director, Gas Infrastructure and Networks, Commission de Regulation de L'Energie (CRE)

Dominique Jamme has been in his current position since January 2007. He joined CRE in 2001 in the Electricity Market Directorate as Head of the Cost of Production Department.

In 2003, he became Head of the Economics and Tariffs Department in the Gas Directorate. Since 2003, he has played an active role in the opening of the French gas market and the definition of the rules of access to gas infrastructure.

Dominique graduated from Ecole Polytechnique and ENSTA Paris. He began his career as an armament engineer at Nexter and after he held various positions at the French Ministry of Defence and Ministry of Industry.

Anne Malorie Géron
Head of Markets, EURELECTRIC

Anne Malorie graduated at the College of Europe in 1995. Her field of specialisation is EC Law, energy regulation and international trade.

She started her career providing legal advice on European Commission (EC) Law and EC Funding within a Chamber of Commerce and Industry in Normandy (France).

In 1998, she joined EURELECTRIC where she worked as a lawyer from 1998 to 2001. During this period, she looked more specifically into the application of the free movement of goods and the freedom of establishment in connection with electricity markets.

In 2002, she was promoted Head of Unit, responsible for regulatory affairs. In this capacity, she has been active representing EURELECTRIC before the Commission, the Council and the Parliament in the discussions on the Third Energy Package.

Nigel Sisman
Senior Adviser, Gas Transmission Europe (GTE)

Nigel's early career was spent in operational research, corporate planning and industrial and commercial gas sales. He developed many of the core rules and processes in the network code that enabled full domestic competition. Nigel managed the evolution of the commercial framework and had operational responsibility for managing the daily balancing and capacity regimes. Nigel was a member of the core team that developed the commercial and regulatory framework that enabled the sale of National Grid's Distribution Networks. Last year Nigel joined Gas Transmission Europe to work on the establishment of the European Network of Transmission System Operators for Gas (ENTSOG).

Pascale Fonck
Manager, Public and Regulatory Affairs, Elia

Pascale has a PhD in applied mathematics (University Liège, 1993) and was involved in several academic research projects (1988-1996) in the field of decision-making methods.

She started her career in the electricity sector (Tractebel) in the field of uncertainty and risk management methods.

She has been working for ELIA since1999, and has developed the tariff model for the use of transmission networks. In 2006, she became the head of the department market mechanisms and tariff department. In July 2007, she was appointed as Head of Public and Regulatory Affairs.

Dr. Hans Grünfeld
President, IFIEC Europe

Since June 2007, Hans has been President of IFIEC-Europe, the European association of industrial energy consumers. He is also managing director of VEMW, a Dutch association of non-domestic energy and water consumers, representing companies and organisations from industry, the financial,

Panel Biographies

health care, educational and other sectors in the Netherlands.

Having served VEMW since 1999, he has extensive experience of the liberalization and integration of the European gas and electricity markets.

Before joining VEMW, he worked for McKinsey & Company (researcher) and Rand Europe (policy analyst).

Hans received a Ph.D. from Delft University of Technology and holds an MSc in International Relations from the London School of Economics and Political Science and a Masters in Political Science from the University of Amsterdam.

Pat Breen
Chief Executive, Gas Strategies

Pat has a long and broad involvement as a management consultant to the power and gas industry for over eighteen years.

He has played a leading role in the privatisation, liberalisation and commercialisation of the European energy industry in all parts of the value chain in his role leading strategy, trading and risk management, and operational change practices in two of the 'Big Four' firms.

As Chief Executive of as Strategies Group for the past three years, Pat has been responsible for the three-fold global growth of this business to its top-three position in the UK oil and gas consulting market. Pat is a Chartered Accountant and holds an MBA degree.

Rupen Tanna
Director of Commodities Trading, Merrill Lynch

Rupen joined Merrill Lynch Commodities (Europe) (MLCE) when Merrill Lynch acquired Entergy-Koch Trading, LP (EKT) on November 1, 2004. Rupen began his career in 1997 as a trading analyst with London Electricity.

In 1998, he accepted a position with Entergy Koch Trading as a trading analyst on their Power Desk. In 1999 he accepted the role of power trader where he traded the curve and set up the Continental Power Desk and Spark Spread Book. In 2003, he was promoted to the role of Head of Power and Options.

On the acquisition of Entergy Koch by Merrill Lynch, he was given additional responsibility to set up the Global Coal and Emission Desks. In 2006, he was then promoted to his current role of Co-Head of EMEA Commodities with responsibility for Trading and Analytics.

Rupen graduated from the University of London with a BSc in Economics and also holds an MPhil in Development Economics from the University of Cambridge.

Rafael Gómez-Elvira González
Deputy Director for European Affairs, Spanish National Energy Commission (CNE)

Since April 2007, Rafael has been Deputy Director for European Affaires at the Spanish National Energy Commission (CNE). An industrial engineer by training, he also holds a Ph.D. by the Polytechnic University of Madrid (UPM).

After some years as lecturer and researcher in the Energy Engineering Department of the UPM and other Spanish universities, he worked as a consultant in the field of energy before joining CNE. He has more than ten years of experience in energy regulation, and also worked as adviser on gas and electricity for the Council of European Energy Regulators (CEER).

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About The APX Group

The Anglo-Dutch APX Group is Europe's premier provider of power and gas exchange services, operating markets in the Netherlands, the United Kingdom and Belgium. The APX Group facilitates the development of liberalised and integrated energy markets in North West Europe by providing an efficient, transparent and secure electronic trading environment. Established in 1999, the company provides market data and a range of indices for use (as benchmarks) by traders, energy suppliers and energy-intensive industries.

As Europe moves closer towards realising the EU vision of an integrated internal market, the APX Group actively works together with other exchanges and transmission system operators in neighbouring countries to provide integrated power trading, such as the market coupling concept. Market coupling or implicit cross-border capacity auctioning optimises the use of the available transmission capacity.

APX is actively working on integration of the gas markets as well, for instance by means of re-trading of gas transportation capacity. Based on its position as the most experienced gas spot market in Europe, APX aims at creating an integrated gas market for Europe.

The Group extended the range of services offered to the market to include energy derivatives after a merger with ENDEX N.V. (European Energy Derivatives Exchange N.V.) which was finalised on 12 December 2008. The synergy of APX's experience in spot trading and ENDEX's experience in derivatives trading has resulted in APX Group becoming a leading integrated energy exchange and the largest European gas exchange.

APX B.V. is shareholder (10%) and service provider of Belpex, the Belgian power exchange, launched in November 2006. In addition, the APX Group provides third-party services for the clearing and delivery of energy or energy-related products. This includes APX's participation in Climex where it provides clearing and settlement services for Carbon Spot Trading on the platform.

APX B.V. shares are owned by TenneT Holding B.V., the owner of TenneT, the Dutch Transmission System Operator (TSO) of the high-voltage electricity grid (70,06%), N.V. Nederlandse Gasunie (26,10%), owner of Gas Transport Services (GTS), the Dutch Gas TSO, and Fluxys N.V., the independent operator of the natural gas transmission infrastructure in Belgium and the Zeebrugge hub (3,84%). The APX Group operates from offices in Amsterdam (headquarters), London and Nottingham.

APX GROUP COMPRISES:

APX Power NL, the Amsterdam-based power exchange for anonymous, cleared trading in day-ahead electricity, via a unique supply/demand auction providing the industry with a transparent reference price and continuous trading for intra-day and strip products up to two days ahead.

APX Power UK, the London-based integrated trading, clearing and notification service for UK spot and prompt power products.

APX Gas UK, the largest and most active gas exchange in Europe established in 1999, operates a 24 x 7 market for within-day and day-ahead gas at the UK's National Balancing Point (NBP). Additionally, it offers physical forward products up to seven days in advance of delivery, through prompt days, weekend strips, balance of week and working days next week products.

APX Gas ZEE on the Zeebrugge hub in Belgium offers a range of products for day-ahead and within-day trading.

APX Gas NL on the TTF (Title Transfer Facility), the virtual hub for gas trading in the Netherlands, is supported by Gas Transport Services (GTS). The platform offers a range of day-ahead and within-day products.

ENDEX, the Amsterdam-based European Energy Derivatives Exchange, offers trading and clearing services for Dutch and Belgian power futures and Dutch natural gas futures (TTF). ENDEX also operates daily pricing panels for these markets and recently added pricing for Bio-energy.

About Moffatt Associates

ABOUT MOFFATT ASSOCIATES

Today's APX Energy Trading Symposium is the sixth such annual event to be devised and organised by Moffatt Associates, a leading energy market research and strategy consultancy based in London.

Since 1988, Moffatt Associates has been at the forefront of many significant developments in UK and European energy markets. Some recent examples of our work include:

FORECASTING MARKET TRENDS

Every quarter MA evaluates trends in EU power and gas prices and comments on economic and regulatory issues impacting on future market developments. This bulletin is read by over a thousand leading market participants and policy-makers and it receives widespread media coverage in publications such as Commodities Now, Platts and European Energy Review.

MANAGING REGULATORY RISK

In 2005, MA were commissioned by RWE Energy in Dortmund to advise on the likely implications of price regulation for RWE's electricity distribution business in Germany. This involved carrying out a benchmarking exercise to compare and contrast the cost efficiency of German distribution system operators (DSOs) with those in other selected EU countries.

MONITORING ECONOMIC IMPACT

Since 2005, MA has conducted a regular survey of UK business energy users to monitor trends in, and canvass views on, energy costs, energy efficiency and CO_2 reductions and public policy. This research is sponsored by RWENpower in association with the Major Energy [Users Council (MEUC) and Federation of Small Businesses (FSB).

INFLUENCING PUBLIC POLICY

In March 2007, MA was asked by the EU Commission to conduct detailed research amongst market participants and assess the likely economic impact of **(a)** ownership unbundling and Independent System Operator (ISO) models for network transmission in gas and power and **(b)** measures to improve market transparency in wholesale gas and power markets.

In March 2008, MA conducted for the EU Commission the first ever review and analysis of the liquidity and efficiency wholesale electricity and gas markets across the EU and made recommendations on how market operations could be improved.

For more information on MA's bespoke research and consultancy services please contact **Clive Moffatt** on **+44 (0) 20 7317 2770** or email **clivem@moffatt associates.com**

Moffatt Associates, 241/243 Baker Street,
London, NW1 6XE
www.moffatt-associates.com

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apx Group

The Netherlands

Head Office
World Trade Center (B-Tower, 7th floor)
Strawinskylaan 729
1077 XX Amsterdam
The Netherlands

Phone: +31 20 305 4000
Fax: +31 20 305 4001

United Kingdom

London
6th Floor
21 Southampton Row
London WC1B 5HA
United Kingdom

Phone: +44 20 7841 5600
Fax: +44 20 7841 5601

Nottingham
Ergo Building
Mere Way, Ruddington Fields
Nottingham NG11 6JS
United Kingdom

Phone: +44 115 921 7421
Fax: +44 115 921 7420

Email: apx@apxgroup.com
www.apxgroup.com