RETHINKING THE EU REGULATORY STRATEGY FOR THE INTERNAL ENERGY MARKET

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This report is based on discussions in the CEPS Task Force on Rethinking the EU regulatory Strategy for the Internal Energy Market, which ran from January 2003 until October 2004. Participants in the CEPS Task Force included senior executives from a broad range of industries – including energy production and supply companies, energy-intensive industries and service companies – and representatives from business associations and non-governmental environmental organisations. A full list of members and invited guests and speakers appears in Appendix 5.

The members of the Task Force engaged in extensive debates in the course of several meetings and submitted comments on earlier drafts of this report. The views expressed are attributable to the members and the rapporteurs in a personal capacity only and do not necessarily represent the views of the institutions to which they belong.

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Preface

This CEPS Task Force was launched to identify existing and new priorities of European energy market liberalisation by *Rethinking the EU regulatory strategy for the internal energy market.* While a number of priorities have been set by the Treaties of the European Union and subsequent legislation, this CEPS Task Force has reviewed the principal concerns of stakeholders in order to identify the appropriate tools to achieve them. Accordingly, rather than advocating alternative policy or regulatory choices for the EU, this report attempts to fine-tune the policy priorities and to develop the regulatory arsenal for the EU to succeed in achieving an integrated pan-European energy market.

The Task Force met six times from January 2003 to October 2004. It involved representatives from the energy industries (e.g. energy supply, transmission, trading and retailing) and energy-intensive companies, business associations, NGOs, academia as well as from the European Commission, the European Parliament and regulators. Discussions were based on presentations by Task Force members or invited guests and speakers whose names are listed in Annex 5. The common ground reached by the Task Force members is summarised in the Executive Summary at the beginning of this report.

I want to thank the members of the Task Force for their active and positive contributions both throughout the meetings and during the editing of the final report. Although all members endorse the general content of the report, it should not be concluded that each member subscribes to every sentence of the text.

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REPORT OF A CEPS TASK FORCE

EXECUTIVE SUMMARY

This CEPS Task Force report identifies a number of priority actions that must be taken before the European Union can achieve an internal energy market and that also take into account other EU objectives, for example sustainable development and security of supply. These actions cannot be taken by a single actor but represent a shared responsibility spread across governments, their agencies from the EU or member states, as well as market participants such as energy companies or customers. The report examines the similarities and differences between the electricity and gas sectors and then identifies the essentials for a functioning electricity and gas market. The report provides a first list of priorities for action in areas that previously have not been at the centre of attention as well as a first indicative proposal for an institutional framework for electricity and gas market regulation.

Key Messages

1. Considerable progress has been made in the creation of the internal electricity and gas market on the basis of EU and national legislation and regulation [2.2].[1] The initial focus has been on the prerequisites for liberalisation, such as competition in production, unbundling, network access and cross-border trade. Continuing efforts in all these areas and notably proper implementation of the requirements in the 2003 internal energy market directives remain crucial [2.3]. The next two years will be crucial in determining how the internal electricity and gas market will develop. Three major pieces of legislation – the two new electricity and gas directives and the cross-border electricity regulation – must be implemented by and applied from 1 July 2004, and the regulation on gas cross-border trade is expected to be adopted in the near future [4].
2. Implementation of existing – including recent – pieces of legislation will be necessary to ensure a true internal market, but this will not be sufficient. In parallel, it is important to pay more attention to other, less prominent fields. This CEPS report singles out a number of areas for immediate attention to increase efficiency and confidence in electricity and gas markets.
    a. Immediate priority should be given to: i) the introduction of incentive-based network regulation [4.2] and ii) the careful design of principal elements of the wholesale market, i.e. trade of electricity and gas for resale ('wholesale market design and rules') [4.3].
    b. Other areas include the consistent application of competition rules in combination with regulation [4.1], empowerment of consumers [4.4], the creation of regional electricity markets or gas hubs [4.5] and the development of an effective market monitoring and assessment mechanism, based on common criteria and definitions and undertaken by agreed rules between the EU, member states and regulatory authorities [4.6, 6.1, 6.2]. In addition, a functioning electricity and gas market depends on market-compatible solutions to security of supply and environmental issues [5.1, 5.2].

[1] Numbers between brackets refer to the corresponding sections in the main text where the key messages and recommendations are discussed.

Main Findings (full summary)

Consistent application of competition policy and regulation

1. There are inconsistencies of approaches to competition policy and regulation across the member states, especially regarding market power. These need to be resolved eventually, but in the absence of an agreed EU-wide approach to dealing with concentration, market power can be addressed by a number of available tools. These include effective implementation of existing and forthcoming legislation, improved terms of third-party access, including an effective cross-border regime. Another necessary element is a high degree of transparency of market information about transmission, distribution, demand and supply in both electricity and gas markets [4.1, 4.2, 4.3, 4.5].

Network regulation

2. There is a need for non-discriminatory and easy access to the electricity or gas grid [3.2]. Proper implementation of the new EU electricity and gas legislation should provide this access, along with, in the case of gas, the proposed gas transmission regulation giving a legal basis to the principles agreed in the Madrid Forum [6.1]. In addition, incentive-based energy regulation is crucial to achieve efficiency gains and improved customer service notably for *distribution*, where the principal network assets are found. The objective must be to create incentives for the network operator to improve efficiency, deliver high quality of service and make additional appropriate investments. Regulation of the network business should be based on two primary principles: an appropriate rate of return must be earned on the regulated asset base and the costs passed through to network users must be efficiently incurred. Regulation must provide incentives for network companies to improve their efficiency. This is a task for the EU and the member states [4.2, 4.5].

Wholesale markets

3. Markets express scarcity through prices, which drive investment decisions (short- and long-term) by market participants. For electricity and gas, the price signal is composed of three diverse elements: the price of the commodity (i.e. electricity or gas), the transport price (i.e. the price for the use of available transport infrastructure) and finally, the price of system-specific requirements (e.g. storage, balancing, reserve or intra-day trading). Distortions in any one area not only undermine the efficiency of the whole market, but also erode market confidence, which is indispensable for maintaining the support of the public and market participants as well as for attracting new entrants. Among other things, market confidence requires that governments both watch for and redress anti-competitive practices and promote measures to improve market functioning, which underlines the importance of competition policy and regulation – in particular sufficient ex-ante regulation to create a competitive framework [3.1, 3.2, 4.3, 4.5].

4. Power exchanges and gas hubs can increase efficiency and secure transparency in wholesale markets and thereby create market confidence [3, 4.5].

    4.1 Although 80-90% of all electricity contracts within the EU are bilateral, the remaining trades on the power exchanges can ensure price discovery, including spot and term markets (i.e. futures, forward). A reliable forward price (based on a transparent, trustworthy and liquid wholesale market) is a precondition to ensure adequate long-term investment, notably in generation. Gas hubs are similar in that they facilitate the development of efficient wholesale markets with similar price signals within a gas grid or at major interconnections [3.1, 4.3].

4.2 Power exchanges and gas hubs will provide a platform for financial instruments to participants to insure against systemic risks, such as liquidity or price risks [3, 3.1, 4.3].

4.3 Power exchanges can also apply market-based instruments to address congestion management [3, 3.1].

An essential requirement for the functioning of any form of power and gas trading, such as power exchanges, gas hubs and bilateral trade, is that market participants have access to the fundamental requirements to participate in the market related to electricity and gas trade, including having access to the adjacent infrastructure. For *electricity*, this includes notably access to balancing, reserve, intra-day and day-ahead markets. In natural *gas*, these same requirements obtain in that market participants need access to long-, medium- and short-term gas supplies and transportation capacity, including within-day balancing, and flexibility services, notably access to gas storage. In addition in the case of gas, other critical elements are the maintenance of upstream gas production (i.e. keeping the overall level of production available to EU markets at a certain level) and tarification and balancing between regions. For both electricity and natural gas, forwards and futures markets are essential indicators of forthcoming demand and investment trends, which may also convey messages that cross national borders.

Empowering consumers

5. There have been structural and technical barriers preventing small consumers from fully benefiting from liberal markets. These are gradually being removed. Other preconditions for complete retail competition are full unbundling, effective TPA and regulatory certainty and simplicity. Additional progress is likely to be achieved by easing supplier switching and providing better and more accessible information and education to consumers via for example consumer councils or advisory boards within regulatory authorities [4.4].

Regional markets

6. There is considerable merit in applying the pragmatic concept of 'regional markets' or 'gas hubs' as a transitional step towards a true internal market. Regional markets would be designed in terms of geographical proximity or harmonisation of the regulatory philosophy and practice as well as trading rules and would ultimately develop into 'regional platforms'. To ensure minimum convergence of different regional markets, some kind of boundary conditions seem indispensable, such as general rules on congestion management or transmission pricing, on balancing and on the role of power exchanges or gas hubs. Such rules, for example, could be set by the European Commission and would in effect constitute a 'Standard Market Design' [4.5].

Market monitoring and assessment

7. Market monitoring and assessment can be a powerful tool to increase transparency, market confidence and public support. It should therefore be asked whether national regulatory authorities should not be more involved in market monitoring and assessment, given their detailed knowledge of the national market. Although the monitoring and assessment mechanism should be applied to the electricity and gas markets as a whole, there are a number of priority areas. These include monitoring and assessing (i.e. definitions) of concentration and market power for relevant product and geographical markets. Another area could be potential infrastructure shortcomings, which eventually could lead to a 'European interconnector plan'. Finally, there is merit to including monitoring and

assessment in order to evaluate the competitive implications of merchant lines and LNG terminals and to determine whether TSOs comply with their obligations of developing the network [4.6].

Security of supply and environmental protection

8. Security of supply and environmental protection, as central elements of EU energy policy, need to be addressed by government policy. Such policies increasingly apply market-based instruments to minimise distortions to competition and if possible to enhance the competitiveness and efficiency of the market [5, 5.1, 5.2]. However, market-based instruments will only work optimally once a robust and liquid wholesale market has been established – hence the importance of ensuring that the wholesale market works.

Institutional Framework

9. The CEPS Task Force identified a need to take a fresh look at the institutional framework for energy regulation, including the competition law that is currently in place in the EU. This extends both to the institutional design (how do organisations work?) and to their respective tasks (who does what?) [6.1, 6.2]. As to institutional design, the report analyses several options to create a more coherent institutional framework [6.3]. The preliminary analysis concludes that as long as the EU continues to adhere to the Meroni doctrine, which prohibits EU executive agencies, many of the theoretical options are not feasible. It can be expected that the outcome of the debate on the European Constitution will set (new) boundaries for the institutional framework. As for the assignment of respective tasks, the preliminary analysis points to the need for a clearer and more transparent division of labour between the different organisations responsible for regulation in the EU and the member states.

Recommendations

Consistency of regulatory frameworks and practice

1. In order to bolster market confidence and implement the solution that best supports the development of competition in EU electricity and gas markets, policy-makers and regulators at EU and member state level should remove the inconsistencies between the regulatory frameworks and practices in member states [3.2, 6.1].
2. There is an urgent need for a consistent approach across the EU with respect to the tolerable degree of market concentration so that network energy markets will not fail [6.1].
   2.1 The EU must ensure consistent approaches and definitions across the EU and member states for relevant product markets [3.2] and relevant geographical markets [4.5].

Wholesale markets

3. Regulatory frameworks in member states must allow and ideally facilitate the proper functioning of wholesale markets. If the new electricity and gas directives do not have the desired effect (in the spirit and letter of the legislation), full unbundling of distribution, including divestiture, should be considered [4.2, 4.3].
4. There should be considerable stakeholder involvement in the design of the wholesale market. The EU, its member states, regulators, TSOs and other market participants should pay more attention to the proper functioning of power exchanges, gas hubs and OTC

trading. This is indispensable for the functioning of the market and to harness the potential forces that such exchanges constitute [4.3].

4.1 For electricity, wholesale market design includes notably balancing, term, spot, reserve, day-ahead and intra-day markets, which are far from being implemented in all member state markets [4.3].

4.2 For gas this includes access to long-, medium- and short-term gas supplies (including day-ahead traded markets), storage and transportation capacity, including within-day balancing, which are still missing in many markets [4.3].

5. Harmonisation of rules in the EU preventing market manipulation, such as insider trading, and requiring segregation of accounts and reporting on trades will be needed in the absence of national rules or EU laws, which only cover derivatives but not the commodities per se [4.3].

5.1 But any new rules should reflect the level of risk and the care that needs to be given to ensure that these do not become an unfair barrier to entry and prevent liquid markets from developing [4.3].

Dialogue with external suppliers

6. The dialogue on the effects of the internal EU market and regulatory developments on the EU's external suppliers should be strengthened and include representatives from those very same external suppliers. This offers opportunities for both the EU and its external suppliers but also poses the risk of collusion [5.1].

6.1 EU policy-makers could consider involving representatives of external suppliers in relevant groupings such as the Council of European Energy Regulators (CEER), the Electricity Regulatory Forum of Florence and the Gas Regulatory Forum of Madrid [5.1].

Market monitoring and assessment

7. The EU (including the European Commission, the EU member states and regulators) should develop a market monitoring and assessment mechanism, based on common criteria and definitions and undertaken by agreed rules [4.2, 4.3].

7.1 This should include agreed rules on the assignment of responsibilities, data collection, stakeholder involvement, benchmarking methodologies and publication of results [4.5, 4.6].

7.2 The market monitoring and assessment mechanism should be kept as simple as possible avoiding unnecessary costs [4.5, 4.6].

8. Although the monitoring and assessment mechanism should be applied to the electricity and gas markets as a whole, there is merit to immediately focus on:

8.1 concentration and market power [4.1];

8.2 potential infrastructure shortcomings, including monitoring of capacity management mechanisms and demand-side measures to ensure optimal use is being made of the existing infrastructure[2] [4.5]; and

[2] To counteract such systemic deficits, market-based approaches may act to reduce demand, e.g. via the ability of customers to sell back to the network or become market participants themselves.

8.3 an evaluation of the competitive implications of gas storage facilities, merchant lines, LNG terminals and whether TSOs are complying with their obligations to develop the network [4.5].

9. Market monitoring and assessment should lead to a 'European interconnector plan' [4.6].

9.1 This plan should be supported by national regulators, the European Commission and ultimately the European Council to create political momentum in member states to overcome their reluctance to build new infrastructure.

Empowering end-consumers

10. Providing individual consumer choice is the best way to empower consumers. In order to be able to exercise their right to choose, end consumers must be empowered by being given access to information and education, via consumer councils, consumer advisory boards as well as simple procedures to switch suppliers and access to suitable metering equipment [4.4].

11. Although consumer empowerment will be a task for member states, CEER might launch a benchmarking exercise of best practice [4.4].

12. This exercise should also analyse whether harmonised standards in metering equipment could reduce costs of metering equipment across the EU.

Network regulation

13. There is a need to focus on an incentive-based regulatory framework for the monopoly network business, notably for distribution, where the principal network assets are located and by extension where major costs are incurred. The preconditions are that incentives lead to efficiency improvements, quality service delivery, costs continue to correspond to the benefits and the rate of return reflects the level of risk [4.2]. Incentives must ensure that networks are rewarded for both efficiency and quality of service (to both types of customer – end consumers and network users). Quality of service must be delivered at a reasonable cost and accompanied by efficiency improvements.

14. Best-practice should be encouraged by, for example, CEER [4.4].

15. Ideally, there should be EU legislation to avoid incompatible implementation across member states [4.2].

16. Regulation must be stable and amendments must have a long-term character and be predictable to minimise regulatory risk.

Regional markets

17. There is considerable merit in applying the pragmatic concept of 'regional markets' as a transitional step towards a true EU internal market [4.5].

17.1 To ensure a minimum convergence of 'regional markets', there is a need to set some kind of boundary conditions such as general rules on congestion management and transmission pricing, balancing and the role of power exchanges [4.5, 4.6].

17.2 The EU should develop 'regional platforms' for regional transmission planning processes, thereby allowing room for regional solutions while safeguarding the functioning of the EU market [4.5].

17.3 Such rules should be set by the European Commission as is currently done in the Draft Guidelines. In effect, this would constitute something similar to a Standard Market Design [4.5]. In line with the above, part of the conclusions of the 8th Florence Electricity Regulatory Forum cover the creation of Mini Fora on a regional basis.[3]

Market-compatible security of supply and environmental policies

18. Further work is needed to develop market-compatible instruments to deal with security of supply and environmental challenges [5]. Areas that need particular attention are:

    18.1 Reserve capacity for power generation, network liability rules and the criteria the long-term development of the electricity, and natural gas networks dealing with potential risks of gas import dependency [5.1], as well as

    18.2 Design and implementation of environmental policies such as those aiming to reduce greenhouse gas emissions and support increased utilisation of renewables [5.2].

The institutional framework of EU energy market regulation

19. There is a need to take a fresh look at the EU institutional framework for regulation including competition policy. Although coordination of national regulators appears to be the preferred option for member states and the European Commission, it is clearly second-best, because coordination can add significant complexity and reduce effectiveness [6.1, 6.2].

20. Therefore, the EU should re-evaluate the Meroni doctrine whose prohibition of EU executive agencies rules out more effective options to achieve a coherent EU institutional framework [6.3].

[3] These will be formal meetings, chaired by the European Commission, which bring two to three countries together with regulators, the ETSO and power exchanges to focus on congestion management. A main issue will be the development of a common method to allocate capacity among neighbours.

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1. Rationale for a Task Force on the Internal Energy Market

The EU internal market for electricity and gas is going through an extraordinary process of development and deepening. After a period of political hesitation at the EU level, the first-generation internal market directives of 1996 and 1998[4] initiated a period of reform, liberalisation and re-regulation, introduced competition policy to the sector, triggered permanent debate on the merits of regulation and cooperation and brought about considerable restructuring as well as consolidation in the markets themselves. The second generation of EU regulation is now emerging in both electricity and gas,[5] and it is widely viewed as a major improvement over the first generation. Nevertheless, a smooth-functioning energy market in Europe – which is in everybody's interest – will require more action from both public and private actors.

This CEPS Task Force report sets out why further action is required and specifies which areas should receive priority. It dwells on the role played by public actors, both at member state and EU level, as well as that of the market players. The report's analysis leads to a list of recommendations, which collectively form a concrete proposal for action (presented in the Executive Summary).

As the Commission's three benchmarking reports[6] have demonstrated, the internal market for electricity and gas is still highly incomplete. The aim of pursuing its completion is clear from the EC Treaty: the internal market is one means to achieve the socio-economic objectives specified in Art. 2 EC.[7] Amongst the more serious weaknesses highlighted in these reports, four warrant special mention:

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[4] Directive 96/92/EC concerning common rules for the internal market in electricity, Directive 98/30/EC concerning common rules for the internal market in natural gas.

[5] Regulation on cross-border trade in electricity (EEC) No 1228/2003 and the new electricity (2003/54/EC) and gas (2003/55/EC) directives enter into force from 1st July 2004, and the proposed Regulation on conditions for access to the gas transmission networks, COM(2003) 741 is expected to be passed early 2005.

[6] First Benchmarking Report on the Implementation of the Internal Electricity and Gas Market, Commission Staff Working Paper, SEC(2001)1957, 03/12/2001; Second Benchmarking Report on the Implementation of the Internal Electricity and Gas Market, Commission Staff Working Paper, SEC(2002)1038, 02/10/2002 – and updated version including the accession countries, Commission Staff Working Paper, SEC(2003)448, 07/04/2003; and Third Benchmarking Report on the Implementation of the Internal Electricity and Gas Market, Commission Draft Staff Working Paper, 01/03/2004.

[7] These include inter alia: 1) harmoniously balanced and sustainable development of economic activities; 2) a high level of employment and social protection; 3) sustainable and non-inflationary growth; 4) a high degree of competitiveness and convergence of economic performance; 5) a high level of protection and improvement of the quality of the environment; and 6) economic and social cohesion and solidarity among member states.

- conspicuously large price differentials which would not survive in a well-functioning and integrated internal market and insufficient response of prices to supply and demand conditions, including network capacity, mainly for electricity;
- shortcomings in infrastructure especially as regards cross-border interconnectors (including shortcomings in maximising the amount of existing capacity made available to users);
- actual and potential cross-border competition, which ought to be the hallmark of a working single market, has remained weak; and
- concentration in generation (electricity) and gas import, transit and supply is high, if not increasing – at least in some markets.

It goes without saying that these four weaknesses need to be urgently addressed. The second package is a necessary but probably insufficient condition to achieve real progress. If more has to be done, it must be spelled out and acted upon.

Moreover, one cannot speak of completing the 'internal market' without taking into account two crucial contextual policies: security of energy supply and the 'policy nexus' of energy and environmental concerns. The former has been brought to the forefront of the agenda by the recent multi-country black-outs as well as concerns about reserve capacity in electricity and long-run security of supply questions in natural gas. The latter relates to instruments for climate policy, such as the reduction of greenhouse gas emissions and other pollutants and support for renewable energies, in addition to energy efficiency and conservation. The appropriate roles of the EU and the member states and the organisation of market forces by market players within the framework of rules set by the two levels of government for the purpose of these two policies – including the use of market mechanisms to help deliver security of supply and environmental policies – are critical for the working of an (integrated) internal market. Accordingly this report attempts to incorporate strategic reflections in this respect and argues that there is considerable scope for market-based approaches to function in a publicly-designed context.

The CEPS Task Force has taken a fresh look at possible strategies to achieve a genuine and effectively functioning internal market for electricity and gas. The priority actions identified involve a whole range of actors, including private entities such as energy companies, traders or consumers and public ones such as member state governments, EU bodies and agencies at both levels of government.

This report is structured as follows: This introductory section is followed by a short assessment of the internal energy market today (section 2) and a description of market developments and regulation (section 3). Section 4 discusses EU priorities for the internal energy market, followed by section 5 on new policy instruments to achieve security of supply and environmental protection. Section 6 concludes with a first indicative proposal for an institutional framework for electricity and gas market regulation.

The report is preceded by an Executive Summary including key messages, main findings and policy recommendations.

The report also has several Appendices including a glossary of technical terms and abbreviations (Appendix 4) and a list of members of the Task Force and invited guest and speakers (Appendix 5).

2. Assessing the internal energy market today

The internal market for electricity and gas must combine basic features of any internal market with the peculiar characteristics of network markets, supplemented by the special properties of the two sectors (including similarities and differences). First we briefly inspect what it takes to combine these three aspects (section 2.1), followed by highlights of the first package of measures and shortcomings (in 2.2). Section 2.3 reviews the essentials of the second (or 'acceleration') package, against the backdrop of the major outstanding weaknesses of the internal market in energy today.

2.1 The ambition to build an internal energy market

All marketable goods and services (other than 'pure military' items) are in principle traded, actually or potentially, in the internal market. As spelled out in section 1, the internal market serves the socio-economic objectives of Art. 2, EC. The Treaty correctly imposes both the establishment *and* the proper functioning of the internal market since only when both are ensured can one reasonably expect the objectives to be effectively achieved. Therefore, a suitable definition of the internal market combines both aspects, as follows: the EU internal market is based on the free movement of goods, services, capital and workers, as well as the free establishment across intra-EU borders, combined with the necessary regulation to deal with market failures at the EU level, and competition policy to make it function properly. Note that non-discrimination, as a core principle of EU law, is also relevant.

There is no reason to expect this definition to be any different in the case of gas and electricity. Given the tradition of public utilities in all member states, however, it was long held that utilities – state-owned, monopolistic and enjoying exclusive rights in member states – were exempted from the internal market by virtue of Art. 86, EC (formerly Art. 90). Challenges to this interpretation were dismissed by the European Court of Justice (ECJ) in the Sacchi case (1974). It was only in 1990 and 1991 (in two telecoms cases) that the Court changed position. Essentially, the Court acknowledged the balance in Art. 86 (sub 1 and sub 2): it might be possible that, if free movement and free establishment were overriding, there would be no way in which the "services of general economic interest" (as Art. 86 calls such utilities) could fulfil their "particular tasks". However, exclusive rights are such a serious breach of the basics of the Treaty (e.g. free movement and freedom of establishment) that, first, such rights must be based on a legitimate national objective (and mere protection does of course not qualify), and, second, the pursuit of this legitimate objective cannot be but 'proportionate' (only when it is demonstrated that there are no ways the 'particular tasks' can be fulfilled with means less hindering free movement or not at all can they be allowed). This reversal by the ECJ went to the heart of the liberalisation debate in network markets: Are not utilities, in this case electricity and gas, more exposed to competition within and across intra-EU borders, under the legal constraint of universal or public service obligations? Progress in economics as well as a range of practical experiments showed that there was considerable scope for such approaches, even though the design of such liberalised network markets and their supervision proved anything but easy. These analyses and experiments strengthened the case for arguing that giving up the internal market in network industries was a disproportionate sacrifice, not essential – perhaps even counterproductive – for the 'particular tasks' at hand. The major question became how to ensure the accomplishments of the universal or public service obligations while allowing EU-wide free movement, establishment and competition.

Here the third element enters the picture. The characteristics of gas and electricity networks are such that competition is not suitable for transmission and distribution, as they are natural monopolies. Thus, the question was how to permit these (costly) parts of the networks to

remain monopolistic and yet to 1) act as cost-minimisers and 2) serve the internal market flows by open access for all relevant market players from all EU countries. Since an ad-hoc structure of cross-border interconnectors had been built as the basis of cooperation between incumbent monopolies, these interconnectors logically had to be considered as part of the transmission system in an integrated internal market. The subsequent issue turned out to be how to transform this ad-hoc cooperative investment from the past into an adequate set of infrastructure for the EU as a whole, as a prerequisite for unhindered actual or potential flows.

In other words, a competitive internal market in electricity or gas was about power generation and gas production or import and final supply to end-consumers. By necessity, this required access to and use of the grids in between the point of production/import and final supply, whether national or EU-wide.

Box 1. Six considerations about electricity and gas markets liberalisation in the EU

Network industry liberalisation in the EU must take into consideration the following six points when referring to electricity and gas (although it should be noted that gas is not a universal service).

First, in these energy sectors, there is scope for competition *in* the market sections of generation and final supply (including metering and billing). The natural monopoly grids should not be subjected to infrastructure competition; one might opt for competition *for* the franchise (to run the grids for a period) but what matters is the regulation which ensures seamless interconnection, grid services, sufficient capacity (hence, investment strategies) and access at proper prices, given cost minimisation. Getting all of this right is a tall order.

Second, unbundling the incumbent (from the old days of integrated utilities) is indispensable for competition (entry, to begin with) to get started, to enable proper cost calculation of the different business activities (e.g. pure generation) and to pre-empt cross-subsidisation as long as incumbents retain their generation and retail business. Unbundling must be complemented by the creation of a regulator to supervise and enforce it, for the purpose of fostering undistorted competition. The regulator (like competition authorities) has to be fully independent from formerly integrated businesses as well as from the government.

Third, what used to be the 'particular tasks', namely universal and/or public service obligations (USOs and PSOs), have to be spelled out with precision. This is due to two reasons. Firstly, multiple-actor competition requires certainty about the roles and responsibilities of different market participants in delivering them. Secondly, the regulator needs verifiable criteria to measure the fact that USOs and PSOs are being delivered. In this way, free movement and competition are fully compatible with public service ambitions.

Fourth, USOs/PSOs may be generally applicable or assigned to one firm (e.g. the incumbent), perhaps for a special region of target groups. If assigned, transparent and non-distortive rules for financing the USO/PSO 'burden' ought to be agreed.

Fifth, access and interconnection needs to be regulated either as a right or as a guarantee, following negotiations, within a reasonable period. Even more importantly, access pricing and pricing of cross-border interconnectors as well as a transparent, least-cost congestion regime have to be properly designed, which is a difficult yet crucial task.

Sixth, cross-border hindrances of any kind have to be removed in the EU since, as the ECJ has often pronounced, cross-border trade in the internal market should not, in principle, differ from 'domestic' trade.

Some annotations can be added to the points outlined in Box 1, of course. As to the absence of infrastructure competition, there are some minor exceptions. It may be economical for a generator to build its own transmission line due to specific conditions. In natural gas, the scope

for so-called 'merchant lines' also exists.[8] It should also be noted that upstream gas pipelines transporting 'raw' gas have to be distinguished from downstream pipelines transporting processed gas (but, at times, with different odorants or indeed no odorant, depending on the member state; this technical barrier requires harmonisation, which in turn calls for equivalent safety perceptions).

Like in other network markets, the access regime is vital for the proper functioning of and indeed the very emergence of sufficient competition in the internal market. As always in natural monopoly, one needs incentive-based pricing, but this is a complex process in actual practice. Can one permit the member states to come up with de facto different systems, even if the general principles are the same? Moreover, how can one find out whether cost minimisation is achieved, if cost rules differ between member states so that benchmarking might give false signals? In energy markets the term 'cost reflective pricing' has been coined with the further qualification that 'costs should be efficiently incurred'. In other network markets general terms also include 'cost based' and 'cost oriented' (e.g. telecoms). In any event, if access prices are 'too high' they tend to be anti-competitive, discouraging entry; if 'too low' they might encourage inefficient entry[9] and discourage transmission and distribution systems to invest in maintenance and capacity investments (as there would be no adequate return on investment).

It ought to be noted that parts of the natural gas business are a high risk venture. The reasons include the long-run nature of very large investments for obtaining the primary resource (unlike electricity which can be made from a range of inputs), the geographically restricted nature of markets served by gas pipelines and, not least, what is called in economics 'asset specificity' which might lead to opportunistic behaviour such as the 'hold-up' problem. Nevertheless, some parts are relatively low risk, notably local distribution networks and standard transmission.

Box 2. Asset specificity

Asset specificity means that one or both parties to the transaction make specific investments (e.g. a pipeline or a well) that would not have alternative uses (or a markedly lower value in alternative uses: a pipeline between Algeria and Spain has no alternative but to serve the Spanish market, and possibly neighbouring markets). In other words, one party to the transaction (the supply company) makes an investment that is specific to the transaction (gas supply to Spain), which is effectively lost if the transaction does not take place as planned. The party that does not make an initial investment can threaten not to continue the transaction after the other party's investment is made and issue demands for some change in the conditions that are favourable to its interests. The party that has already invested is therefore 'held up': it has to accept the new conditions because it does not want to lose its investment. Thus one party to the transaction can 'extract rent' from the other, by threatening to terminate the relationship after the investment is made unless new, more profitable conditions are accepted. Asset specificity has become the main reason for entering into long-term take or pay contracts.

Source: Egenhofer and Labory (1998).

[8] Merchant lines are privately financed interconnectors between member states or long-haul gas infrastructure that imports gas into the EU, which generally are seen as crucial for meeting the EU's expected import requirements.

[9] Inefficient entry refers to entrants with relatively high costs which nonetheless enter because of distortions permitting them to make profits. Such competition does not necessarily promote cost minimisation nor lead to the exit of the least competitive firms, both of which are welfare-improving features of well-functioning markets.

2.2 The first internal market package in energy

The liberalisation of EU electricity and gas markets was designed as a gradual process. The framework set by the electricity and gas directives of 1996 and 1998[10] fixed a minimum level of competition at member state level by way of common rules while progressively bringing down barriers to cross-border trade. It was expected that market dynamics would unleash competitive forces, which would quickly remove the last remaining barriers to the functioning of a fully competitive and integrated European market.

The 1996 electricity directive concentrated on full liberalisation of generation and introduced a six-year phased-in freedom for all large and medium-sized companies to choose their supplier as well as the freedom to construct lines. Access to the grid was tackled by unbundling the accounts of integrated companies and by promulgating a number of different access rules to be implemented by member states that should guarantee non-discriminatory access. The 1998 gas directive chose the same approach in principle, but with two modifications: first, the transition period was to be ten years to accommodate long-term investment needs, and second, the unbundling provisions were lighter to avoid undermining EU companies' bargaining powers with non-EU suppliers. The gas directive allowed each power generator to choose its own supplier.

While it is true that considerable progress has been achieved in electricity and natural gas, there are still weaknesses.[11] For example, there is a lack of effective unrestricted and non-discriminatory third-party access to networks due to vertical integration and a weak regulatory function, high and increasing concentration (and market power), limited or non-existent competition in the small consumer segment and generally, in sufficient liquidity in wholesale markets and response of prices to supply and demand conditions, including network capacity, mainly for electricity.

Many of the issues in the electricity markets can also be found in the gas markets. There are problems with access and high access charges and the independence of transmission systems operators (TSOs). There are concerns about a lack of transparency over the publication of infrastructure capacity able to dispatch both cross-border and domestic transits, and also in relation to capacity reservation procedures. Rules that govern network balancing are sometimes seen as being too stringent, to the point that they hinder the development of market competition, while at the same time they do not reflect the costs incurred. More generally, gas import levels and cross-border trade are seen as not satisfactory, with the existing incumbents dominating domestic markets and wholesale prices. Gas trading hubs are slow to develop.

2.3 The Acceleration package

To address these issues, the EU has taken by a number of initiatives aiming at further structural reform, which has been identified by the European Commission as critical for all consumers to benefit from the opening of national markets to competition and for market integration.[12] EC initiatives include the so-called 'Acceleration package' consisting of the new electricity and

[10] 96/92/EC and 98/30/EC, respectively.

[11] Both achievements and shortcomings have for example been documented in all three of the benchmarking reports on the implementation of the internal electricity and gas market (European Commission, 2001a, 2002 and 2004a) and in the EC Strategy paper Medium-Term Vision for the Internal Electricity Market (European Commission, 2004b)

[12] See second benchmarking report (European Commission, 2002).

gas directives[13] and one regulation on cross-border trade electricity.[14] This is currently complemented by a proposal for a regulation on access conditions to the gas networks, an infrastructure package, a proposal to improve security of supply and a proposal for a Directive on end-use efficiency and energy services.[15]

The Acceleration package fully opens markets to competition for non-household customers as of July 2004 and for all customers by July 2007. In addition, the package requires the legal unbundling of network activities from generation and supply, establishes regulatory authorities in all member states, mandates regulated third-party access (TPA) and published network tariffs, reinforces public service obligations especially for vulnerable customers and introduces monitoring of security of supply. For electricity it also sets up mandatory electricity labelling for fuel mix and for selected emissions data. The regulation on cross-border electricity trade provides for common tariff structures (including tariffs for cross-border trade), rules for congestion management and the requirement to provide information on interconnection capacities. The proposed regulation on access conditions to the gas networks attempts in a similar way to remove barriers to natural gas trade. It addresses partial or non-compliance with agreed guidelines for a transparent and cost-reflective system for cross-border trade. The basic philosophy is to ensure that the "Guidelines for Good TPA Practice" as agreed at the September 2003 Madrid Forum will be implemented across the EU in a consistent way and adhered to. In strengthening EU instruments to assist new infrastructure investment in electricity and gas, notably EU monitoring, the infrastructure package attempts to address the shortcomings of cross-border infrastructure.

The previously cited past and upcoming legislation should be understood as pre-requisites for liberal EU electricity and gas markets to function. The Acceleration package corrected some of the shortcomings of the initial electricity and gas directives, which were the result of the political compromise that was necessary in the light of what were then difficult negotiations in both the Council of Ministers and the European Parliament. The question, however, is whether the Acceleration package in combination with other relevant legislation (proposed and adopted) will be sufficient to complete the internal energy market and ensure its proper functioning. This report argues that it is not. There are a number of additional actions that can and should be taken to accelerate the completion of the internal energy market. Before we identify this set of additional priority actions in sections 4 and 5, we shall first have to discuss in the next section how EU electricity and gas markets work.

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[13] i) The initial 1996 Directive concerning common rules of the internal market in electricity (96/92/EC) as recently amended by 2003/54/EC; ii) The initial gas Directive of 1998 (98/30/EC) as recently amended by Directive 2003/55/EC of the European Parliament and of the Council concerning common Rules for the Internal Market in Natural Gas and Repealing Directive 98/30/EC.

[14] Regulation (EEC) No 1228/2003 on Conditions for Access to the Network for Cross-Border Exchanges in Electricity.

[15] Proposal for a Directive on energy end-use efficiency and energy services COM(2003) 739; Proposal for a directive concerning measures to safeguard security of electricity supply and infrastructure investment COM(2003) 740; proposed Regulation on conditions for access to the gas transmission networks, COM(2003) 741. Proposal for amendment of decision No. 1229/2003/EC on guidelines for Trans-European energy networks COM(2003) 742; Communication from the Commission to the European Parliament and the Council, Energy Infrastructure and Security of Supply, COM(2003) 743 final, {COM(2003) 739, 740, 741, 742, 743}.

3. How the EU electricity and gas markets work

Historically, markets develop naturally and on an ad hoc basis, with no initial universal standards. In the early trade of grain, for example, markets evolved locally and were characterised by local prices and informed by subjective analysis. As a result, these markets were highly volatile and it was impossible to manage risk or make secure investments. The development of transport led to bigger markets, which (since market participants no longer had to meet face to face) increasingly required objective standardisation to build up trust and liquidity. This was facilitated by the development of non-traditional market participants, such as speculators, who added sophistication to the market and, consequently, both confidence and expectations.

There are a number of preconditions for efficiently functioning markets, including:

1. *Liquidity.* Efficient markets require liquidity to be achieved by easy market access, full cross-border (i.e. EU-wide) trade and a broad range of market participants with no single market participant being able to control the market price.
2. *Transparency.* Markets depend on transparent information, including reliable price signals, to allow market participants to make informed decisions whether to buy or sell.
3. *Confidence and stability.* Market participants require stability and dislike frequent rule changes.
4. *Standardised operations.* In order to speed up operations and lower transaction costs, markets need standardised methods of operation, i.e. clear market rules. Market rules usually come in the form of a standard contract and standard clearing and settlement procedures.
5. *Inter-operability* is important in all markets but it assumes a special importance for network energy because of the network's essential role in energy trade.

Rules to ensure market functioning are commonly part of the general economic and legal framework of market economies, including for example guarantee of private property, contract law, competition law or consumer protection. Other rules such as clearing and settlement or inter-operability might be organised as self-regulation by market participants. See discussion in the previous section.

In electricity and gas markets, transactions among producers or importers, end-users, possible market intermediaries such as retailers, power exchanges or gas hubs, and brokers take place freely, within the 'physical' constraint imposed by the network. Nevertheless, market participants rely on access to the network to take part in the market. Hence, the need for unbundling and regulation to ensure effective and non-discriminatory third-party access to 'essential' transmission and distribution lines (see previous section).

3.1 The electricity and gas market value chain

The service of electricity and gas delivered to the customers is made up of different components: the production/importation of the commodity (electricity and gas), transportation through the grid (transmission, distribution, systems operation), related services (e.g. balancing, storage) that enable efficient trade and finally, end-use supply to small and big customers.[16] Some of these components have specific features that have a major bearing on the market.

[16] Related services, such as financial contracts or construction and maintenance, are sometimes included.

A number of the functions such as production, related services or end-use supply can be organised competitively, while others cannot and therefore remain a natural monopoly. Due to technical constraints, systems operation remains a natural monopoly. Notably distribution, in most cases, is also a natural monopoly. There is no real competition in transmission (or transit which is now classed as transmission). The existence of two pipelines covering a similar route does not mean that there is any competition. A duopoly is the most likely situation. As for natural gas, storage may also be a natural monopoly in parts of the EU gas grid, where the majority of storage facilities are controlled by one or two companies.

Both the transmission and the distribution networks are characterised by network externalities. They describe the fact that all interconnected parties for transmission and distribution alike benefit from investment in network improvement. This may discourage investment and in turn calls for regulation. In addition, networks are characterised by high sunk costs, which make them sensitive to uncertainty.

Finally, there are coordination economies at systems level for power generation. They relate to the need for a diversified portfolio of electricity generation technologies to provide the different loads of electricity at the least cost. They may but do not necessarily appear at the level of a generation company. There are no scale economies at plant level, which could, for example, be brought forward to justify a high degree of concentration in the electricity or gas sector.

Based on this short introduction to the main features of the electricity and gas sectors, we identify the critical areas in the value chain to ensure the functioning of the market. We will focus on producers, network operators, wholesale traders, suppliers and end consumers, both large and small (see Figures 1 and 2).

Producers

The role of producers in the market is to produce power or natural gas in a competitive way to ensure customer choice both in the short and long term. Because natural gas production depends on both specific sources – often in remote areas outside the EU- and long-term investment, there is a stronger emphasis on the long-term than in electricity. In order that producers can fulfil their role, three areas are critical. The first is non-discriminatory access to the transmission grid. The second is a proper long-term investment signal. The better the market works, the more robust should be price signals, especially from the wholesale market. There is an overarching goal to ensure a high degree of transparency regarding price formation. Long-term prices need to be reliable, especially if they serve the purpose of providing an investment signal. The third critical area is market power of generators or actual (or perceived) collusion of gas producers. Companies can be expected to be less willing to invest in production if it is characterised by market power.

The availability of the transportation network is critical for the working of the market for natural gas, given the long-term nature of infrastructure investment and ‘asset specificity’. In specific circumstances, however, exemptions from competition rules can be beneficial for upstream investment for source development.

Network operators

Transmission is a natural monopoly. This is why the second gas directive requires regulated TPA with ex ante published tariffs. Network operators are possibly the most critical participants in the market. It is only non-discriminatory, cost-reflective and simple access to the network that enables the other market participants to freely trade in the market. A necessary precondition and a first essential area for this is independence from generators or supply companies in the power market or from producers, importers or supply companies in the gas market, respectively (unbundling). The second vital field is effective non-discriminatory third-

party access, based on published tariffs for natural monopoly areas, i.e. transmission and distribution (and LNG facilities) and depending on the level of competition also for storage for natural gas. The third and final critical sphere is incentive-based network regulation, which needs to pursue a number of complementary objectives, which can be the result of the natural monopoly characteristic – in as far as given – of network externalities or high sunk costs. They include i) allowing for sunk cost recovery (financial sufficiency), ii) incentives for long-term investment (long-term efficiency), iii) incentives for efficient operation, notably efficient allocation of scarce network capacity (short-term efficiency),[17] iv) non-discrimination, v) simplicity and transparency and vi) quality of service. While the latter three objectives are critical for the current functioning of the market, the former two are essential to improve the overall market efficiency, since the transmission and distribution networks, where the major assets are located, are responsible for 30-50% of total costs. Network business should be regulated on the basis of two primary principles:

- the regulated asset base must yield an appropriate rate of return and
- where costs are passed through to network users, these costs must be efficiently incurred.

Regulation must provide incentives for the network companies to improve their efficiency.

Wholesale markets

Wholesale markets (i.e. trade of electricity and gas for resale to final customers via bilateral contracts or power exchanges or gas hubs) consist of two parts: over-the-counter trade of bilateral contracts and exchanges. (In gas, hubs provide suitable locations for trade via both bilateral contracts and/or exchanges.[18]) Wholesale markets are at the centre of efficient short- and long-term resource allocation in electricity and gas markets. Hence, the wholesale market's role is to i) guarantee optimal dispatch from an economic perspective (in cooperation with network operators' technical role), ii) provide investment signals to other participants, iii) offer risk management tools for systemic risks to market participants and iv) ensure clearing and settlement.

Although formal exchanges can often only trade a small fraction, they play a crucial role in the operations of the wholesale market as they fulfil three essential functions. The first is price discovery. Spot and term such as futures prices (where they exist, i.e. Nordic countries and Germany) from the power exchanges are crucial information for market participants including balancing, reserve, day ahead and intra-day markets. The second is organisation of trading in a transparent way. Exchanges create market confidence and provide a mix between free market benefits and security requirements. The third function is to prevent systemic risk. This typically includes netting, risk monitoring (margining of positions), default management, etc. There are two types of risks inherent in energy trade. The first relates to market risks such as the high price volatility that is typical for power, which cannot be stored, or, for gas and electricity, short-term supply demand imbalances – e.g. in response to severe weather and/or infrastructure failure. The second includes the transaction risks associated with clearance and settlement procedures, e.g. risks connected to credit, market, intermediation (e.g. broker default), delivery, liquidity and settlement, operation, legal issues (e.g. contract law) and manipulation.[19]

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[17] This includes notably congestion management and efficient dispatching.

[18] A gas hub is not an exchange. It is a convenient location for trade, which effectively creates a homogeneous product for trade, with some additional services to make that trade more secure. It does however make an appropriate location for a futures contract on an exchange, e.g. the IPE gas contract is based on gas delivered at the UK NBP.

[19] These are comparable to the parameters developed by the Bank for International Settlements (BIS) to measure financial stability.

Figure 1. The EU electricity market: Principal participants and issues

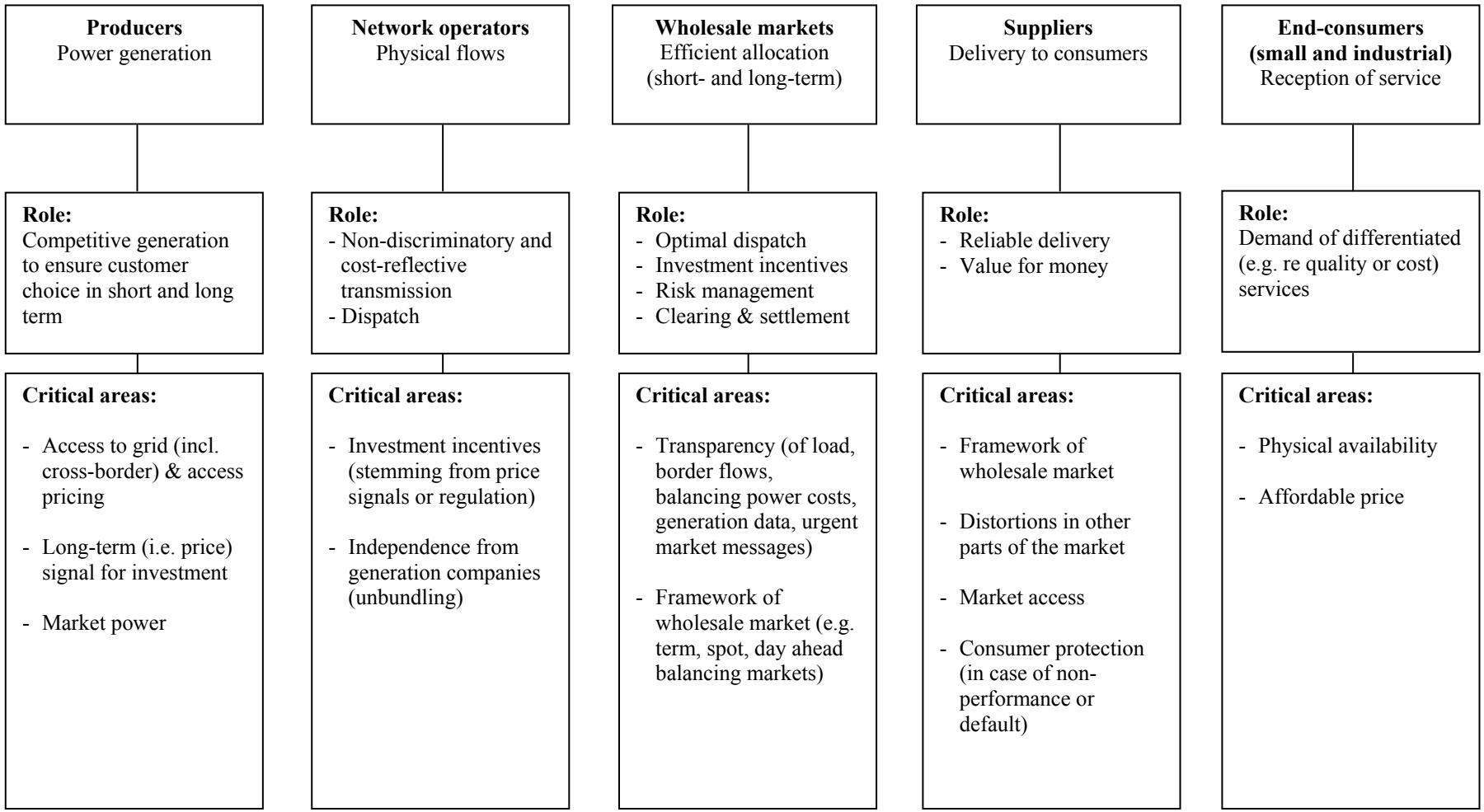
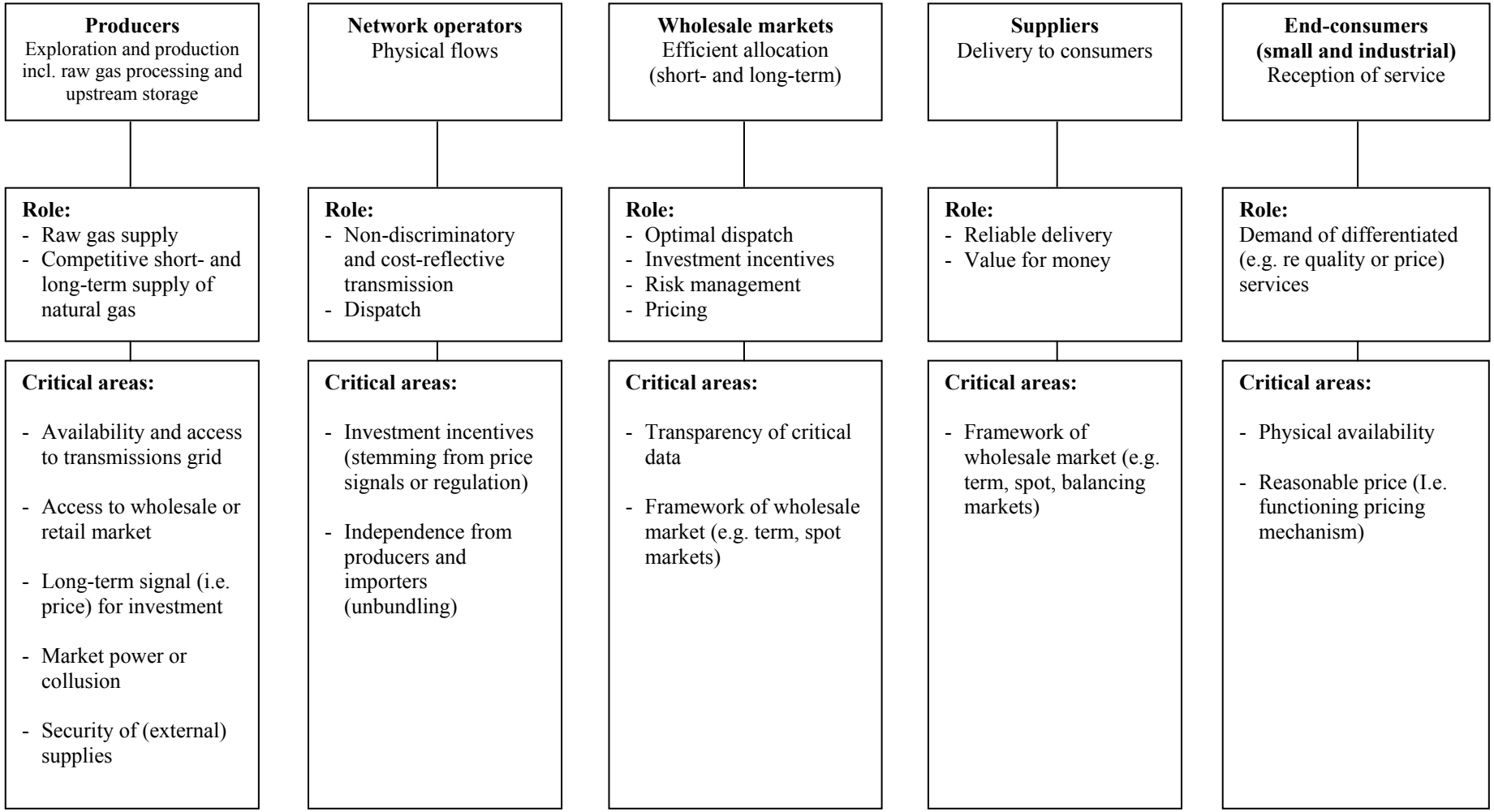


Figure 2. The EU gas market: Principal participants and issues



Box 3. Differences and similarities between gas and electricity

Although it is generally acknowledged that there are many similarities between electricity and gas, it is important to point out a number of key differences between the two sectors. Electricity is a secondary energy, using other primary energy sources (coal, natural gas, renewables, etc.) as an input to its generation. Natural gas is positioned as the source most likely to seize the biggest part of the generation market in the medium term due to technological advancement, a better environmental performance than other fossil fuels (with regard to CO_2 emissions) and physical abundance. A *second* difference is that electricity cannot be stored as can natural gas and hence needs to be produced when consumed. This raises some issues of a technical nature of how to maintain balance on grid. The *third* difference worth pointing out is that there are no universal service obligations for natural gas. This means, contrary to electricity, there is no obligation for suppliers to ensure that each customer has access to natural gas at a reasonable price. There are however public service obligations on reliability and quality once a customer has signed up. *Fourth*, gas is a non-renewable energy, found in fixed locations in geological deposits around the world. Gas imports will come from increasingly remote locations, raising transportation costs to a significant extent, which in return increases the costs and changes the relative competitive position of natural gas vis-à-vis other fuels. *Fifth*, the EU as a whole and many EU countries – although to very different degree – are, or will become in the relatively near future, importers of gas from a few, large producers. This raises issues of import dependency, the risk of collusion and how to deal with it. In contrast, electricity can be produced in any country, and from various inputs, making it more flexible and less of a concern for both supply security and dependence on other countries for supply. It can be produced close to its end use, without huge transport or storage costs. In the EU, most member states are self-sufficient in electricity. A *sixth* difference is that in the gas sector congestion 'bottlenecks' are at present not as pronounced as in the electricity market. Nevertheless, this might be changing mainly due to increasing demand, significant long-term capacity reservations by incumbents of existing capacity and the fact that local congestion is developing at certain cross-border entry points in Europe. *Seventh*, contrary to electricity, there is investment in natural gas infrastructure due to the sector's growth. Still, the density of the transmission systems is lower than in electricity. Also, infrastructure use is somewhat different in that some of it is used to bring natural gas into different member states and some of the infrastructure is used for transit. Finally *eighth,* there is an issue of different gas qualities, which at times can influence gas trade.

End-use suppliers

End-use suppliers sell energy to the customers and invoice accordingly.[20] This includes the provision of energy (physical component) and arranging its transport and other services such as metering and billing of consumption (service component). Suppliers perform two tasks. The principle task is to act as brokers that buy and sell energy, thereby assuming the risk of volatility and adjusting prices to consumption patterns and arranging for its transportation to the point of sale. In addition, they may provide added-value services to customers, such as selling differentiated energy (e.g. green power, interruptible supplies) or bundling with other utility services (e.g. telecoms, water, etc.).

Traditionally, end-use supply was bundled with distribution, but in practice the two tasks can be performed separately. The service end of supply in principle can be provided competitively. The provision and operation of the infrastructure providing physical delivery are most likely to remain a natural monopoly.

Critical areas are identical with those from other parts of the market, e.g. effective unbundling, non-discriminatory third-party access, regulated infrastructure access prices, wholesale market structure, transparency, market power and generally, distortions in other segments of the market.

[20] In most EU countries, this is done by the distribution system operator (DSO). In the UK, it is the supplier or an independent meter operator that is responsible for metering.

Customers/end-consumers

End-consumers (big and small) want to enjoy a non-distorted choice of energy commodities and associated services and, in doing so, to be able to choose from among different providers. Different customer groups and – within these groups, different customers – will require very dissimilar services in terms of the level of reliability and price, i.e. willingness to pay. Some industrial customers may choose a less reliable service such as interruptible supplies to reduce costs or produce or import their own power or gas, while other customers may be willing to pay for failure-proof supplies.

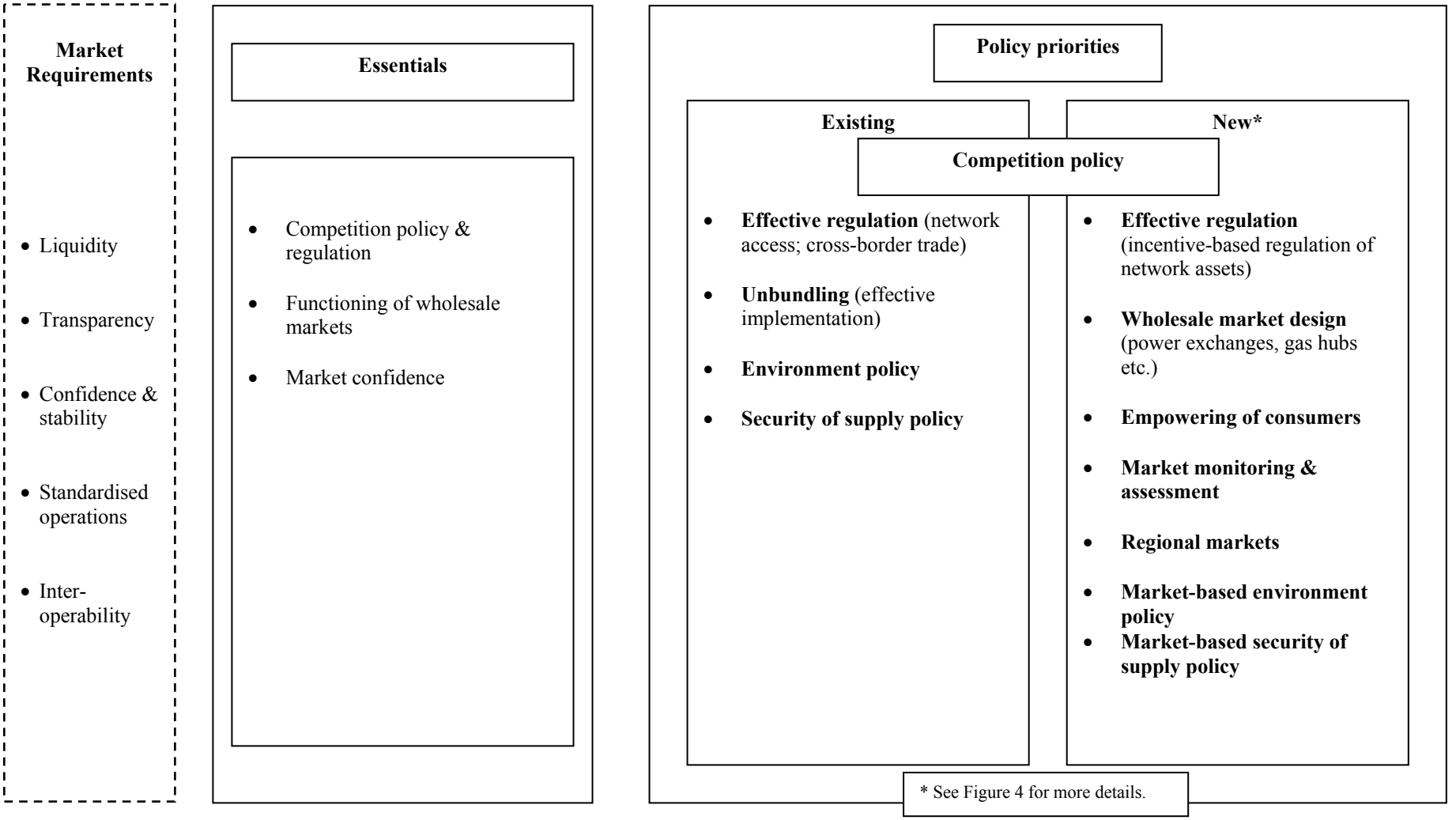
Choice depends on the existence of wholesale and supply competition. There are several critical areas. First, distortions in other parts of the market are likely to have a detrimental effect on customers' freedom of choice. These include unbundling, rules and prices for access to the grid or, customer-switching procedures. Also lack of availability of capacity or natural gas/power or sustained high prices for new entrants will prevent them from making competitive offers to consumers. Second, choice will be undermined by a lack of information on alternative supply offers or by discounting customers' right to choose (a supplier) and any complexity in switching suppliers. End-consumers not only depend on competitive markets but also on a framework that ensures long-term availability of energy.

3.2 Essential elements for electricity and gas markets

From the above descriptions, we can derive essential elements for the efficient functioning of electricity and gas markets (see Figure 3). The first is effective competition policy in combination with ex-ante and ex-post regulation. Competition policy combats anti-competitive firm behaviour via general antitrust rules restricting competition or abuses of dominant positions or mergers, state aid rules and finally deals with rules for undertakings entrusted with public service obligations. Priorities in the past have been to enhance supply competition via antitrust, state aid and merger control; to support real customer choice mainly through antitrust and merger control; and to ensure non-discriminatory network access by antitrust rules. However competition policy relies primarily on ex-post action and is not an effective way of creating a pro-competitive regulatory framework. The time and risks involved waiting for competition policy to take effect often act as a barrier for new market entrants. Competition policy is complemented by (sectoral) regulation, mainly to ensure access to the network. In addition, network access is dealt with structurally by specific legislation (i.e. unbundling provisions) backed up with regulation (i.e. specific rules to ensure non-discriminatory access). The latter is typically applied at member state level by national energy regulators on an ex-ante basis with ex-post revisions. Anti-trust rules remain complementary although they are important as some recent cases have shown (see Arana Antelo, 2003).

The second essential element is the functioning of wholesale markets. Wholesale markets for electricity and gas are most critical for both transparency and efficiency. Wholesale markets provide the necessary market signals on price, capacities, flows, etc. in a transparent and non-discriminatory manner to market participants. At the same time, they increase the efficiency of trading and associated functions such as balancing settlement and clearing and thereby reduce transaction costs. To date, wholesale market design has been largely left to general legislation overseeing all trading activities and which principally deals with financial transactions. Physical trading can take off even when no legislation is in place. A regulated model imposed from above – especially if implemented without extensive involvement of 'non-market' stakeholders such as TSOs – could be counterproductive in that it might create barriers to entry and reduce liquidity.

Figure 3. Priorities of the EU electricity and gas market



Markets need confidence by all market participants ranging from producers to customers (small and big) and including the whole value chain. This includes on the one hand confidence in the functioning of the markets (e.g. transparency and absence of distortions) and on the other, regulatory certainty (e.g. the absence of frequent rule changes). Market confidence is needed for economic reasons (e.g. to attract new entrants and investment) as well as to maintain public support for the internal electricity and gas markets, which initially was a controversial endeavour at least in some member states. But the market is not an aim in itself. Ultimately confidence in the market will only prevail if the market can prove that it is able to achieve the political objectives to provide energy at affordable or reasonable prices while protecting the environment in line with citizens' expectations. Recent incidents of power outages may undermine public support as much as inefficient markets, even when such outages were technical network failures bearing no relation to the commercial market. This makes security of supply (both short and long-term) and the environment, each of which is an objective in its own right, intimately linked to the issue of market confidence. Market confidence can be improved by increased transparency, via for example benchmarking, easy customer switching, availability of information including hard physical data, to level the playing field for market participants.

The following two sections analyse the policies and tools to support these essential requirements for electricity and gas markets. Section 4 identifies the following policy priorities: competition policy in combination with regulation, network wholesale market design, empowering of consumers, implications of regional markets and gas hubs and market monitoring and assessment. In section 5, we focus on market-compatible security of supply and environmental policies

4. Immediate EU policy priorities for the internal energy market

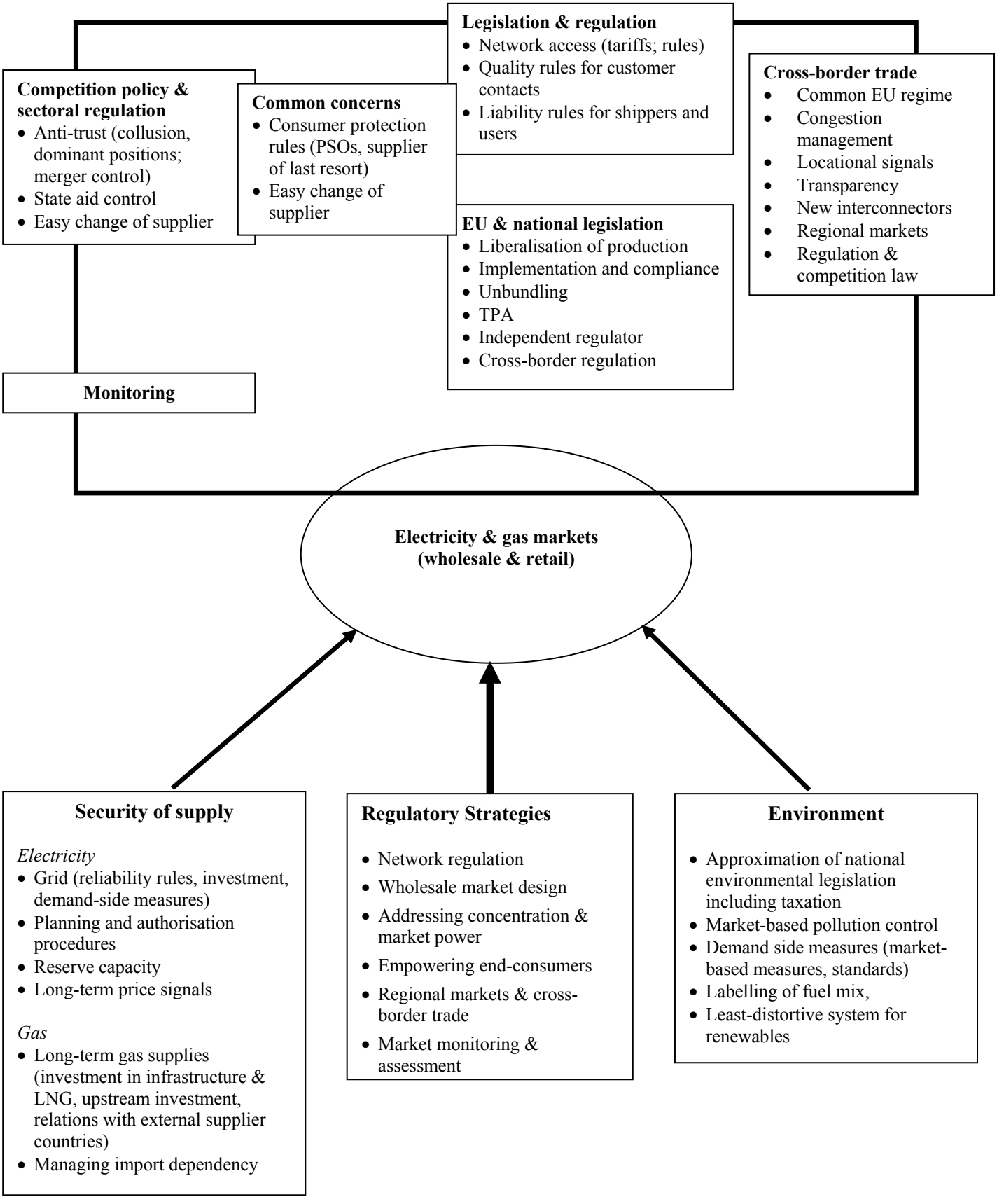
In the previous section we identified the essentials for the electricity and gas markets (see Figure 3): competition and energy regulation, the functioning of wholesale markets and market confidence. In this section, we will discuss possible actions to improve the functioning of the internal electricity and gas market and analyse their potential implications. We will tentatively undertake a 'subsidiarity test' by sketching out whether the market, the member states or the EU are best placed to ensure that policy objectives are reached. For an overview, see Figure 4.

4.1 Addressing concentration and market power

In some countries, partial electricity and gas market liberalisation has led to market consolidation and in some markets or market segments, to a considerable degree of market concentration, if not oligopolies or even monopolies for certain product markets. This creates significant risks, where consolidation is allowed to take place before proper competition has had a chance to develop. Market concentration in production, import or supply can undermine new entrants, curtail liquidity and inhibit true price disclosure. The introduction of market pricing will partly increase general price levels and partly prolong price differences where they would otherwise not have existed. This, in turn, may lead to efficiency losses both in the short- and long-term.[21] Further risks of anti-competitive behaviour exist through cross-border ownership links and cross-border contracts between incumbents. In case of links of a dominant incumbent to smaller entities in neighbouring countries, there is a risk that the effects of dominance from one market will spill over into other markets.

[21] For an analysis of the competitive situation in the Nordic market, see Nordic Competition Authorities (2003).

Figure 4. Determining factors for EU electricity and gas markets



Market power is principally addressed in the context of competition policy and law in the EU and its member states. Major EU cross-border mergers have been scrutinised by the European Commission as the EU's competition authority. The merger regulation has allowed the European Commission to examine some major European mergers and acquisitions with a view to their effects on competition. As a result, these mergers have only been approved after the companies provided evidence that the new entities would not undermine competition. Among the most notable cases were the VEBA/VIAG merger to create E-on, the RWE/HEW merger and the stake of EdF in EnBW (see Lowe, 2003). In all cases, the European Commission has asked for concessions to address market power (see e.g. Arana Antelo, 2003). However these concessions have in many cases been insufficient to mitigate against market power.

The slowing of market consolidation, however, meant that the merger regulation increasingly ceased functioning as a tool to influence market power. The European Commission is now forced to rely on other competition competencies such as general antitrust (e.g. joint sales agreements/export cartels, territorial or use restrictions or use restrictions) or state aid provisions (e.g. cross-subsidies between customer groups or activities, stranded costs, taxation regimes).

Some mergers and acquisitions, however, do not fall under European Commission scrutiny and remain a matter of member state authorities. While the European Commission has exhibited a consistent approach, there is major discrepancy between member states on what concentration is 'acceptable'. Especially in natural gas, some member states appear to be attracted by creating 'national champions' on grounds to producing the 'weight' to counter the power of an increasingly concentrated non-EU/EEA gas production and import industry, which also gradually is extending its activity to the EU/EEA market.

This inconsistency of approaches between member states need to be resolved eventually, even more so as national markets integrate, possibly in regional electricity markets or around gas hubs initially, and then possibly into an EU-wide market. This process could become part of a market monitoring and assessment mechanism, which is proposed and discussed below in section 4.6.

In the absence of EU-wide agreed approaches to market concentration, market power can be addressed by a number of existing instruments. First, effective implementation of existing and forthcoming legislation and (sectoral) regulation applied by competition and energy regulators can contain some of the effects stemming from market power. The most important areas are full unbundling and improved terms of third-party access, including an effective cross-border trading regime. Where retail prices (for certain customer groups) remain regulated, the regulators have a special responsibility to ensure that incumbents do not benefit from excessive prices, which would allow them to cross-subsidise their activities in the competitive markets. A second element is a high degree of transparency of market information about transmission, demand and generation in European electricity markets. This item will be further discussed in section 4.3 on wholesale market design.

4.2 Network regulation

Network costs for both electricity and natural gas are very substantial. For example, the electricity network notably in distribution accounts for approximately 30-50% of the costs associated with electricity prices. Similarly, gas pipelines are sensitive to scale and distance. Therefore, network regulation especially for distribution is not only important as a

precondition for competition, including cross-border trade,[22] but also an important tool to reduce the costs of energy and to increase public support if cost savings are passed on to consumers.

As regards grid access and the level of access charges, the amending legislation of the new electricity and gas directives contains further measures, notably legal unbundling, the establishment of a regulator in all member states and the publication of network tariffs. Proper implementation of these provisions by member states and their regulatory authorities, together with the technical work currently undertaken within the Florence and Madrid Fora is generally expected to overcome existing problems with network access, in so far as they existed in some member states.

Experience with incentive regulation in England and Wales and the Nordic countries suggests that the potential for cost reductions in transmission and distribution activities is considerable. The basic condition should be that notably Distribution Systems Operators (DSOs) but also Transmission Systems Operators (TSOs) are provided with incentives to improve their efficiency. There are various approaches such as efficient component pricing, in which the access price should be equal to the direct incremental cost of access plus the opportunity cost of supplying it, or the Ramsey/global price cap, which takes account of the need to cover fixed costs and of demand elasticity. Other methodologies exist, such as yardstick and benchmark pricing or sliding scale regulation. In any case, it is important that the costs of DSOs and TSOs are carefully regulated to prevent them from passing on costs irrespective of their performance.

As a priority, however, network legislation takes the form of an EC regulation so that it can have a Community character and not be subject to 'creative implementation' at the national level. Thereby cross-border congestion can be effectively met, improving the way the network in Europe is being managed. Legislation should be developed as much as possible on the basis of benchmarking and best-practice.

4.3 Wholesale market design

From the outset, a harmonised wholesale market design was never considered as an objective of subsequent electricity and gas directives. Trading was seen as an activity, which is thought to be developed on its own, once the regulatory framework for transportation, generation, distribution and supply is in place (see Figures 1 and 2 and section 3). Therefore, the directives concentrated on the *prerequisites* of the wholesale market: liberalisation of generation, non-discriminatory rules for grid access, including a functioning cross-border regime and freedom of customers to buy. Trading was subject to general EU and member state provisions that deal with trading activity.

Efficiency of wholesale markets (e.g. power exchanges, gas hubs and OTCs), however, can be improved by a number of *initiatives*. The *first* is the efficient development of the different markets related to trade. For power this includes notably balancing, term, spot, reserve, day ahead and intra-day markets while for gas within-day balancing markets and access to storage and short and long-term supplies and capacity. With one of these elements missing, market participants will not be able to participate in a non-discriminatory way and in general, efficiency is compromised.

The *second* is transparency, to provide relevant information to all market participants. In the field of electricity, relevant information contains actual and historical data on load, cross-

[22] The distribution network has especially strong characteristics of a 'natural monopoly' (see e.g. Ocana, 2002).

border flows, balancing power costs, aggregated generation data and urgent market messages such as plant or line outages as it is provided in the Nordic market. It is important that disclosure of market-sensitive information is provided in a standardised manner so that asymmetry of information is minimised or even avoided. For example, NordPool can also oblige companies to provide information. In most other markets, these data are only partially or not at all provided (Leeds, 2004). The information requirements for the gas market are virtually identical (substitute production/import data for generation). All market participants (in both gas and electricity) need transparent information on the processes for accessing the networks and information from the network operators on their individual accounts.

In natural gas it is expected that spot markets at regional or national gas hubs will emerge. Price differentials between the zones, which would reflect the demand in different zones related to the network capacity between the hubs, would lead to trade between hubs and thereby competition. The preconditions are that market participants have access to storage, a suitable tarification and balancing system for trade between the regions allowing market participants access to long-, medium- and short-term gas supplies, including for within-day balancing and the market information listed above. Finally, there is a need to maintain upstream gas production (i.e. keeping the overall level of production at a certain level).

Avoiding discrimination for market participants in electricity and gas markets is another essential feature. In the financial market sector, this has been addressed by a set of rules to deal with manipulation such as insider trading, prevention of market manipulation, segregation of accounts and reporting requirements on trades. There, the "Prospectus", an "EU passport" or a document cleared by one national regulator that is then mutually recognised by all member states' supervisory authorities allows the freedom to provide financial services across national borders (without the necessity for the firm to set up a national presence) and guarantees the freedom of establishment. This could, for example, clear the way for a single supply licence in energy. As for electricity and gas trading, in principle non-discrimination can be addressed by already-existing EU directives, such as market abuse or the recently adopted Directive on Financial Markets,[23] which deal with trading issues and commodity derivatives. Their shortcoming is, however, that they are not applicable to commodity trading but only to their derivatives.

4.4 Empowering end-consumers

To date, competition in the small consumer segment has been absent in a number of member states that had decided not to open this part to competition. This is gradually to change since as of 1 July 2004, all commercial customers, and by 1 July 2007, all consumers, will be able to freely choose their energy suppliers. But even in those member states that have already fully opened their markets, consumers have been facing both structural and technological barriers. Structural barriers describe the fact that in most markets retailers and new entrants in general found it difficult to compete against dominant incumbents. Principle impediments were obstacles to switch providers partly but not only due to the lack of effective network access and DSO switching procedures, consumer inertia but also a general actual or perceived lack of transparency of different supply contracts (i.e. consumers could not compare different offers). Technological barriers relate to the need for metering equipment, at least in the longer-term. Although cheap and simple alternatives to sophisticated metering exist, such as load profiling, and have been successfully used, real-time accurate metering should enhance small consumers' interest in retail competition.

[23] Directive 2003/6/EC on market abuse and the Directive on Financial Instruments Markets 2004/39/EC.

The precondition for complete retail competition is full unbundling, effective non-discriminatory TPA and a regulatory structure that is effective but also provides certainty and simplicity. Therefore, effective empowering of the small consumer market, which could unleash new market dynamics is most likely achieved by *regulation* rather than by competition. Full liberalisation of the small consumer market is best helped if existing legislation is effectively implemented. Nevertheless, a number of items are most likely to facilitate the process.

A first issue is to ease switching of suppliers by reducing paper work and costs. An important element would be to put basic consumer protection rules into place to assure that consumers would receive energy even if the supplier goes out of business. In addition, there might be some merit to attempt to provide better and more easily accessible information and education to consumers by for example creating consumer councils or consumer advisory boards with regulators. It can be expected that consumers are more likely to embrace the notion of energy market liberalisation if they understand and trust the market and feel represented. Most of these tasks appear to be best undertaken by member states and their regulatory authorities, although there might be a case for benchmarking and identification of best practice, for example, within the CEER processes.

Empowering consumers might also necessitate different kinds of metering equipment as for example in Italy or Sweden – possibly based on online power-measuring devices – able to bill real consumption in easy but detailed ways. That should provide better information which would assist the choice of supplier. There might be a case for harmonised standards for metering equipment, which could generate significant economies of scale, therefore making metering equipment cheaper.

The idea of an EU "single supply licence", which seeks to reduce transaction costs for suppliers by requiring that they only apply once for a licence across the EU, will facilitate the supply side by making new entrance easier. This should be pursued further.

4.5 The cross-border dimension: Cross-border trade and regional markets

The establishment of a common EU cross-border trade regime for both electricity and gas has been central to the realisation of an EU internal energy market. Cross-border trade is essential to induce competition into national markets, dominated by incumbents. Quite often the incumbent in one member state is the new entrant in another. In a legal sense, liberalisation of cross-border trade is a core task of the EU and its obligation to achieve an internal market, including energy. Cross-border trade is also a key component to achieve efficiency gains at EU level as well as a means to improve security of supply through increased flexibility.

At the same time a cross-border regime has been slow to emerge. For example to date only 8% of total electricity consumption is traded across an EU border of which 70% is accounted for structural imports of Italy from France. In natural gas, the figure is much higher and amounts to 60% although most of the EU's gas consumption is imported and therefore necessarily needs to cross borders to be transported to the designated market. This 60% is, however, controlled by a few, mostly incumbent, companies.

There are several reasons for the slow emergence of cross-border trade, notably in electricity. They include insufficient unbundling, lack of effective grid access, the absence of cross-border regime and constraints on interconnection capacity (in electricity) and a lack of congestion management. With the exception of interconnection capacity, the new electricity and gas

directives, the regulation on cross-border electricity trade and the proposed regulation on cross-border gas trade have sought to address these issues.

Interconnections and infrastructure in general have been dealt with by subsequent European Commission proposals, of which the latest is currently pending.[24] Following the blackout in Italy in September 2003, however, it has been questioned whether encouraging an increase in transmission of electricity over long distances is genuinely the best way to promote security of supply rather than by better demand management.[25]

Infrastructure constraints are less seen as an obstacle in natural gas than in electricity. In natural gas – once full unbundling is effective and the proposed regulation of cross-border trade is implemented – it is assumed that trading between regional gas hubs (and their associated trading zones) will not be inhibited by interconnection constraints. Price differentials between the hubs are likely to reflect the demand in different zones related to the network capacity between the hubs.

Interconnectors

Cross-border interconnectors can have characteristics of a public good with positive externalities. The full exploitation of the internal market depends on cross-border trade, which in return necessitates cross-border infrastructure. This applies also to electricity and gas infrastructure. This has been recognised by the Maastricht Treaty of 1992, which has added a new chapter on infrastructure, the so-called Trans-European Network (TEN) chapter in Arts. 154-156 of the current EC Treaty. The provision, however, is weak speaking merely of the Community "contributing" to the establishment and development of trans-European networks, including energy. In fact, the European Commission under its competencies of TENs sets up a list of 'priority projects of European interest', which benefit from limited financial support mechanisms. Such designation of 'European interest', even if associated with limited financial support, does not in most cases swing a project. And as the various TEN priority lists have shown, there is an inherent tendency that priority projects are designed on the basis of national rather than EU priorities. The recent discussions on transport infrastructure projects in the context of the European Growth Initiative can be seen as another pointer in this direction.

In the absence of political will for a more efficient and stronger EU involvement in infrastructure, there is still room for a more systematic monitoring and assessment of European infrastructure developments and needs. A systematic monitoring of the basis of agreed principles and definitions could be a powerful tool to identify infrastructure shortcomings and their possible implications, notably on competition and security of supply. Such a monitoring and assessment procedure could for example evaluate the competitive implications of merchant lines but also identify whether TSOs comply with their obligations of developing the network or the security of supply implications of the existing infrastructure.

Finally, monitoring and assessment for example by CEER could be instrumental in developing a credible 'European interconnector plan'. Such a plan, if supported by TSOs, national regulators, the European Commission and ultimately the European Council alike, would most likely create political momentum in member states, which could overcome their reluctance to build new infrastructure. The current problems with blackouts that Europe is experiencing may

[24] See for example, the 2001 Communication on "European Energy Infrastructures" [Com(2001)775 of 20.12.01] and the December 2003 "Infrastructure package" [Com(223), 739-742] of 10.12.2003.

[25] See e.g. paper by Claude Turmes (2003), MEP and Rapporteur for the Electricity Liberalisation Directive and Swiss Federal Office for Energy (2003).

be a good argument to bring the message home to member states that new infrastructure is not only a question for competition but after all a question of security of supply.

Another, more formalised approach would be to consider introducing a similar provision like the US power market platform on regional transmission planning process (see FERC, 2003). The regional transmission planning process is to produce technical assessments of the regional grid and support for the authorities that are responsible for citing decisions with impact studies. The purpose is to assist the states and market participants by an *independent* assessment of the transmission facilities needed by the region to reliably and economically serve load located in the region. A similar mechanism in the EU could constitute an interesting tool to establish the 'European view of infrastructure', as described above. This should be guided by the need to maximise transmission capacity in certain borders while not in others, as there is a case of setting the conditions for existing export capacity to be transmitted at least in those regions where it is critical.

Regional markets

There is considerable merit in applying the pragmatic concept of 'regional markets' as transitional steps towards a true internal market as the European Commission Strategy electricity paper has outlined.[26] Regional markets would be designed in terms of geographical proximity or harmonisation of the regulatory philosophy and practice as well as trading rules and would ultimately develop into 'regional platforms'. 'Regional platforms' would allow more room to find tailor-made regional solutions to regional problems, such as, for example, regional regulation of TSOs. Gas hubs could provide an equivalent common trading point for gas markets.

Box 4. Examples of divergence and convergence: VAT and greenhouse gas emissions trading regimes

In the context of completing the internal market, the EU attempted to introduce a step-by-step EU VAT procedure to replace those operating at national level. Towards this end, the EU created a procedure for EU transactions on top of existing national procedures and procedures for trade with non-EU countries. The objective was to merge EU with national practices and concentrate on one single EU procedure. More than 10 years later, the three procedures still co-exist with little hope to end the national procedure.

Similarly, there were calls by some member states to establish domestic greenhouse gas emissions trading schemes, which could over time be linked or merged into a common EU scheme. The result was that in the case of the UK at least the national scheme was incompatible with the proposed EU scheme, creating a requirement for lengthy transition periods. In addition, there is no common EU carbon price for this transition. In the end, it was the Commission's powers under the Treaty's internal market and notably competition laws that ensured that the UK scheme was made compatible with the EU scheme (see Egenhofer & Legge, 2002).

To ensure minimum convergence of different regional markets (see Box 4), some kind of boundary conditions – such as general rules on congestion management or transmission pricing, on balancing and other markets or on the role of power exchanges – seems indispensable. Such rules could be set for example by the European Commission and would in effect constitute a 'standard market design'. While it is unclear whether such rules could be formulated as Guidelines and therefore have legal implications, they could in any case be formulated by the European Commission as the guardian of the Treaty. If regional markets

[26] See European Commission (2004b, pp. 6-7).

indeed were to lead to divergence rather than convergence over time, the inevitable results would be an increased importance of EC competition law. At the extreme, this could mean that regulatory boundaries of regional markets are mainly set by EC competition law. Since EC competition law is effectively applied *ex post*, there is a serious risk of adding uncertainty to the regulatory framework.

4.6 Market monitoring and assessment

Market monitoring and assessment can be powerful tools to increase transparency, market confidence and public support. In the past the European Commission as guardian of the Treaty has regularly monitored market developments. To date market monitoring and assessment procedures largely leave out participation by member state governments and notably national regulatory authorities. One of the exceptions is in the area of security of supply, where the new electricity and gas directives mandate monitoring by member states.

It should therefore be asked whether national regulatory authorities should not be more involved in market monitoring and assessment, given their detailed knowledge of the national market. The fact that member states are required to establish a regulatory authority offers the possibility to introduce market monitoring and assessment at the level of regulatory authorities. Inter alia, this move could help to overcome actual or perceived problems of data accuracy and lack of consultation related to the European Commission's benchmarking reports.[27] Moreover, market monitoring and assessment undertaken at the level of national regulatory authorities, but in close collaboration with the European Commission, hold out the promise that the results are likely to be perceived as more authoritative as both national and EU levels of governance would have in-depth involvement in the process. The most likely outcome would be an agreed and authoritative diagnosis of the situation, which would lead to the identification of action. Ultimately, systematic and authoritative market monitoring and assessment are also likely to increase transparency and enhance public support.

Market monitoring and assessment should be undertaken jointly by the European Commission and regulators. It would need to be based on agreed rules on the division of responsibilities, data collection, stakeholder involvement, benchmarking methodologies and publication of results. In order to avoid unnecessary costs, the mechanism for market monitoring and assessment should be kept as simple as possible.

Although the mechanism should be applied to the electricity and gas markets as a whole, there are a number of priority areas, including the monitoring and assessment (i.e. definitions) of concentration and market power for relevant product and geographical markets. Another area could be potential infrastructure shortcomings, which eventually could lead to a 'European interconnector plan'. Finally, there is merit in applying monitoring and assessment to the evaluation of the competitive implications of merchant lines, LNG terminals and whether TSOs comply with their obligations to develop the network.

A somewhat similar idea of monitoring and assessment has been proposed by the European Commission concerning services of general interest (European Commission, 2004c). In those cases, it is proposed that the services of general interest would be regularly evaluated on the basis of a specific evaluation methodology. The difference of this approach, however, is that the task would not necessarily be shared with other organisations such as the regulators.

[27] Members of the CEPS Task Force expressed concern about the accuracy of the data used by the European Commission in its benchmarking reports.

5. Security of supply and the environment in a liberal energy market

Liberalisation necessitates a separation of commercial decisions made by companies and judgements about policy and regulation made by government and regulatory bodies. This translates into a redefinition of the respective roles of government and company policy/regulatory decisions and by extension, a review of policy instruments. Markets can actually serve as an effective and efficient tool in achieving policy objectives such as security of supply or pollution reduction: governments essentially establish the objectives and set the rules that enable market participants to achieve policy objectives (Egenhofer et al., 2004; Egenhofer & Legge, 2001). It is essential however that policy instruments work with the grain of the market or at least are competition-neutral and transparent. There is a long history of government intervention in the energy sector, given its strategic importance. In some cases there are still attempts to implement policies to protect domestic coal or nuclear power, to promote security of supply above market levels and even to create 'national champions' for industrial policy, employment or other reasons. Such intervention, however, is likely to distort the market, create uncertainty, invite gaming and most importantly distort investment decisions.

The following section highlights key policy and regulatory challenges associated with the changing role of government in pursuing policy objectives in liberalised markets in the areas of security of supply and the environment.

5.1 Security of supply

In general, liberalisation increases security of supply by increasing the number of market participants and improving the flexibility of energy systems. Liberalisation may, however, also pose new risks, such as reserve capacity or inconsistencies with environmental or other policies.

Moreover, governments may need to re-assess the level of security of supply they seek to achieve. Markets make the cost of security of supply more transparent, which in turn can lead to a situation in which consumers are prepared to pay a premium for increased security of supply or to accept a reduced level of security in exchange for lower prices (Egenhofer et al., 2004).

Reserve capacity for power generation

In the monopolised market structure, capacity shortages were never a problem. The system was inherently producing overcapacity in the knowledge that costs could easily be passed on to consumers. In competitive markets, the situation is the reverse. Investment decisions for generation capacity are based on calculations of profitability. Particularly if peak demand is only seldom reached, which by definition is the case for the marginal KWh, incentives to build reserve capacity are low. Especially where generation is oligopolistic – which is the case for most member state markets – there are strong incentives to keep reserve capacity small as it can increase pricing power.

Theoretically, shortages of generation capacity could be offset via trade, especially since peak-load capacity is not a problem at the EU aggregate level. However, interconnection capacity may not allow this. Moreover, there is a risk that responsibility for reserve capacity will simply be shifted from one member state to another ('beggar-thy-neighbour' policy). Therefore a better solution is to identify responsibilities for maintaining reserve capacity associated with *market-based* compensation schemes. Such schemes can include capacity payments, purchases of peaking units by the TSO, competitive bidding, capacity markets, reliability contracts or

capacity subscriptions. These schemes are analysed in greater detail in two other CEPS publications.[28] Another largely neglected area is cutting the peaks by demand-side measures, including for example interruptible contracts or improved energy efficiency, which increases the overall flexibility of the energy system and reduces the need for new plant construction and other infrastructure investments. Similarly, decentralised or distributed generation may have a positive effect on security of supply by increased flexibility, higher efficiency and the fact that decentralised systems are less vulnerable to grid instability, heavy storms (such as those at Christmas 1999, in Europe) or terrorist attacks.

A short description of different capacity mechanisms is contained in Appendix 3 of this report.

Network obligations

Unbundling has changed responsibilities for the security of the transmission grid. Generators and suppliers as market participants are basically responsible for the short-, medium- and long-term balance between supply and demand. TSOs on the other hand are responsible for the safe and efficient operation of the transmission grid, including ancillary services, which enables the market to work.

Effective electricity markets do not develop over night. Especially during the transition period there is greater need for government and regulator activity to monitor reliability, improve price signals and adapt regulation if necessary. But there are structural changes related to liberal power markets. To facilitate cross-border trade, there is a need for market-based congestion management. With a greater number of market participants, there is also a need for appropriate ancillary-services specification, including enforceability rules and the definition of the relationship between power exchanges and TSOs. While overall efficiency of the system will be enhanced by improved price signals, those parts that remain monopolistic, especially the distribution and segments of the transmission networks must be properly regulated. Regulation must be both consistent across the EU/EEA and provide sufficient incentives for short- and long-term development of the network. Crucial elements for achieving a high degree of security of supply are network liability rules. They are best set at synchronously interconnected areas, due to the different operational needs characterising continental Europe, Scandinavia and the British Isles. The regulatory framework at EU level should then take into account this fundamental distinction. In addition, there are 'semi-market-based' solutions. For example the (provisional) Swedish approach with auctions for reserve capacity, conducted by the TSO, is being implemented to cover a transition period until a pure market-based system will be adopted in 2008.

Natural gas: Balancing competition with long-term security aspects

There is a consensus that natural gas growth in Europe will outgrow energy consumption by a factor of almost three with predicted growth of 2.8% p.a. for the next 20 years. Russia would remain by far the main supplier with supplemental imports coming from the Mediterranean, the Caspian and the Middle East, of which a significant share would be via LNG. With growing needs of gas imports into the EU – some of which will have to come from far-away sources – there is an increasing need for new gas infrastructure such as pipelines and LNG terminals. Recent projections of gas demand in an enlarged Europe and the corresponding need for additional imports assume a total investment of €150 to 200 billion for extending and building required infrastructure in pipeline links and LNG-receiving facilities for the next two decades (Cayrade, 2004, pp. 2-5). This raises notably two issues. The first is the regulatory strategy regarding gas merchant lines – infrastructure especially – and LNG terminals (ibid.,

[28] See Egenhofer et al. (2004) and de Vries & Hakvoort (2004). See also IEA (2002).

pp. 4-6, 8-9). The second is how to foster the relationship between the EU and its main suppliers.

As for the regulatory strategy for gas infrastructure, Article 22 of the new gas directive provides the opportunity to exempt privately-financed interconnectors between member states from TPA rules. Such privately-financed infrastructure of merchant lines is seen as crucial for meeting the EU's expected import requirements. Merchant lines can however be problematic from a competition point of view in that they can create or reinforce a dominant position (e.g. CEER, 2003). This potential problem will need further attention.

As to the second issue – EU relations with supplier countries – a specific problem has been the destination clauses for long-term gas contracts, which 'earmark' supplies to exclusive sale in a designated area, mostly a member state market. The European Commission has judged them as anti-competitive as they are seen as contrary to Arts. 81 and 82 of the EC Treaty. Justification from a producer country or company point of view is that in the absence of a true internal gas markets, there continue to exist national markets with different price levels, thereby allowing for windfall profits.[29] This would be the case for example if an importer contracts for a certain volume of gas at a price that is appropriate for the market in question but instead of selling the gas in the designated market, would sell it in a market where higher prices can be achieved.[30] Destination clauses on the one hand avoid windfall profits, but it seems difficult to justify this argument and they might slow down the creation of an internal gas market by helping to 'freeze' market shares.

A restrictive position by the European Commission, however, may have a detrimental effect on relations with the EU's external suppliers. Such relations are crucial to cope with the expected increased dependency on imports in natural gas. On the other hand, it will be difficult for the European Commission to accept a situation where destination clauses undermine competition in EU natural gas markets. The issue would most likely be solved if transportation companies have a less dominant position as intermediaries between producers, traders and final customers and if producers (e.g. Gazprom or Sonartrach) are able to sell directly in consumer markets. Hence, further progress towards the completion of the internal gas market will facilitate a solution.

Gas import dependence on politically unstable countries

Liberalisation of electricity markets has been increasing the share of natural gas in the generation mix. This in turn has raised the import dependence of natural gas, most of which will come from politically unstable or possibly unreliable countries.

Currently, security of supply is dealt with by specifying minimum levels of storage obligations and/or maximum levels of import dependence from a single source, in effect a command-and-control measure, which does not distinguish between different customer groups. However, assigning equal obligations on all companies, independent of the structure of their customers,

[29] Windfall profit can be defined as "profit that occurs unexpectedly as a consequence of some event not controlled by those who profit from it".

[30] This reflects the traditionally-applied pricing mechanism. One of the pricing methods used, mainly for long-term contracts, has been based on competing fuels. Prices differ depending on the customer group (e.g. residential, commercial and for power and industry), even depending on the situation of the individual customer. The price of gas in each segment is set so that it remains competitive with competing fuels (i.e. fuel oil), taking into account the fuel cost (commodity) and operating and capital costs. The price of gas is then adjusted to the border by deducting distribution and transmission costs. The prices, which are weighted by the volumes going into the different market segments, become the basis of negotiation between a buyer and a seller.

seems excessive. Not all customers need to be protected against supply disruptions to the same degree. It is sufficient to oblige gas suppliers to protect priority customers (i.e. households) in case of crisis. It can be left to non-priority customers (e.g. industry or power generators) to decide on whether to have the supplier insure against potential risks and pay for it or whether they prefer to manage supply risks themselves in return for a lower price. If a distinction between priority and non-priority customers is made, this could mean that as long as a gas supply company keeps its exposure to a possible 'risky' resource (to be defined by governments) lower as the share of priority over total customers, there is no need for government measures. In case of a crisis of the risky resource, the gas supply company would still have sufficient supply to serve priority customers (i.e. households). Those gas suppliers that have a surplus of non-priority customers, could even trade their margin of safe supplies to those suppliers that are over-exposed (Luciani, 2004 and Stern, 2002).

5.2 The environment

There are many environmental impacts from the production and consumption of natural gas and electricity. These include CO_2, NOx or SO_2 from power generation or methane emissions from gas production and transport and the risk of nuclear radiation, to name but a few. Historically, environmental policy has been addressed by command-and-control measures, i.e. direct regulation. Since the 1980s, there has been a gradual trend where direct regulation is increasingly being replaced by market-based instruments, such as taxes, tradable permits, support schemes or tax breaks. Market-based instruments are perceived as more cost-effective and creating better incentives to develop new and innovative technologies ('dynamic efficiency'). However, market-based instruments are not always a panacea. The basic preconditions are careful design and efficient implementation in order to ensure that market-based instruments maintain a 'competition-neutral' character in as much as possible.

The EU emissions trading scheme

The concept of emissions trading has traditionally been supported by its proponents as a means to achieve climate change policy in the most cost-effective and market-friendly way. It has also been considered as an effective way of internalising the external costs.

The EU emissions trading scheme, however, leaves a high degree of discretion to member states. During implementation, notably in the allocation of allowances, it became increasingly apparent that member states will treat a number of discretionary items in different ways. These include banking, the treatment of new entrants and closure, the classification of installations, the 'legal definition' of allowances as well as monitoring, reporting and verification.

There is initial evidence that this could lead to distortions between member states, which could feed back into power markets. For example, different rules for new entrants and closures across member states provide incentives for gaming while different definitions of installations or the legal treatment of allowances will lead to a situation in which companies from the same sector within the EU are differently affected by the EU ETS.

The most important area of concern are the rules governing how member states allocate allowances for free to companies (i.e. 'grandfathering'). Grandfathering affects the different market participants in the energy market in very different ways. The incumbent generator will increase its revenue (windfall effect) to the detriment of energy-intensive companies, which face cost increases based on the carbon value of marginal plant. Energy traders (or retailers) also face cost increases due to higher wholesale prices and smaller margins. 'Independent'[31]

[31] Independent means unrelated to generators and/or very low generation capacity.

energy-traders, in particular, face the worst-case scenario with respect to their competitive position compared to a more vertically-integrated trading company (i.e. a company directly linked to generators). The effect may be less competition in retail markets, whereas competition at retail (and wholesale) level is crucial for competition in power markets. A worrying factor is that the 'windfall effect' strengthens the market position of the incumbents to such a degree that it could undermine competition and thereby inhibit new entrants.[32]

Support for renewables

Support for renewables in power generation in most member states is directly linked to prices, mainly through feed-in laws. Feed-in tariffs have been successful in instigating greater utilisation of renewables for power generation. This is not to say, however, that such a measure is seen by all as a panacea, or as something that should be a permanent feature. On the one hand, feed-in tariffs fulfil their purpose of promoting renewables in the context of EU energy and environmental policy. On the other hand, however, viewed through the lens of internal market provisions, national feed-in or other domestic support schemes may potentially distort the internal market and may even hamper cross-border trade.

The European Court of Justice's decision in March 2001 (see ECJ case C-379/98), in favour of the German federal feed-in law, seems to permit this form of support for the immediate future, although some market participants feel that such laws may not be compatible with a fully liberalised internal energy market.[33] Meanwhile, some member states are switching from price support systems for wind energy to tradable green certificate schemes, which eventually could lead into a pan-European trading scheme. While in theory such schemes should achieve the environmental objectives, they also need to prove that they will aid towards the establishment of sustainable generation technologies and are complementary with longer-term policies focusing on efficiency and innovation. It should be mentioned that the overall level of subsidies going to the renewables sector in Europe needs to be compared to the direct and indirect subsidies given to other fuels. For example, the fossil fuel sector is receiving very large direct and indirect subsidies, which may have a distorting effect on fuel choices for electricity generation and therefore provide further concerns with regard to market distortions.

6. Adapting the institutional framework of EU electricity and gas market regulation

Since EU network industry liberalisation started in the mid-1980s, there has been a question about the legal and institutional framework within which EU policy is to take place. Different 'regulatory' philosophies and approaches have prevailed across member states and have in some cases led to asymmetric development of the framework as well as implementation.

6.1 The institutional framework: A plethora of competencies

EU liberalisation has to be agreed in complex negotiations between the European Commission, the Council of Ministers and the European Parliament, which *de facto* – as the EU decision-making process in general – is consensus-oriented. This makes the decision-making process not only slow but it also tends to lead to minimalist outcomes for those policy areas where a broad consensus is missing.

[32] Available remedies include giving free allowances to new entrants or assigning a disproportionately low number of allowances to power generators to compensate energy-intensive companies.

[33] Reuters, 15 March 2001.

Once the decisions have been taken, implementation is largely left to member states, but coordinated for example via comitology procedures[34] or informal processes and supervised by the European Commission through the direct application of Community law, such as competition rules (see Figure 5). In essence, this approach leaves considerable discretion to member states to develop their regulatory philosophy and practice. This is consistent with the subsidiarity principle,[35] governing the assignment of competencies between the EU and member states.

The instruments considered as proportional in electricity and gas market regulation were EU framework legislation and coordination between the European Commission and national regulatory authorities. As a complement, a number of semi-formal or informal processes have been launched – often on the initiative of the European Commission. These include attempts at cooperation between national regulators in the Council of European Energy Regulators (CEER) and the Florence and Madrid Fora, where stakeholders attempted to find a consensus on largely technical issues. Associations have also been formed among transmissions systems operators for electricity and gas, ETSO and GTE respectively, and energy traders, e.g. EFET to forge common European solutions.[36]

The effectiveness of such a process depends on the degree of consensus between member states and determines, as a result, whether a 'common and agreed' regulatory philosophy and practice can be achieved across member states. Electricity and gas market liberalisation, however, has been particularly controversial. It took the Florence European Council (June 1996) to agree on the first electricity directive and the Barcelona European Council (March 2002) to set the target date for full market opening. Moreover, while European Council agreements set objectives, they say little or nothing about the tools to apply. Different member states continued to follow distinct rules with differing capacities and willingness to intervene. And these dissimilar rules and uncertainty in one member state inevitably spill over into the whole sector.

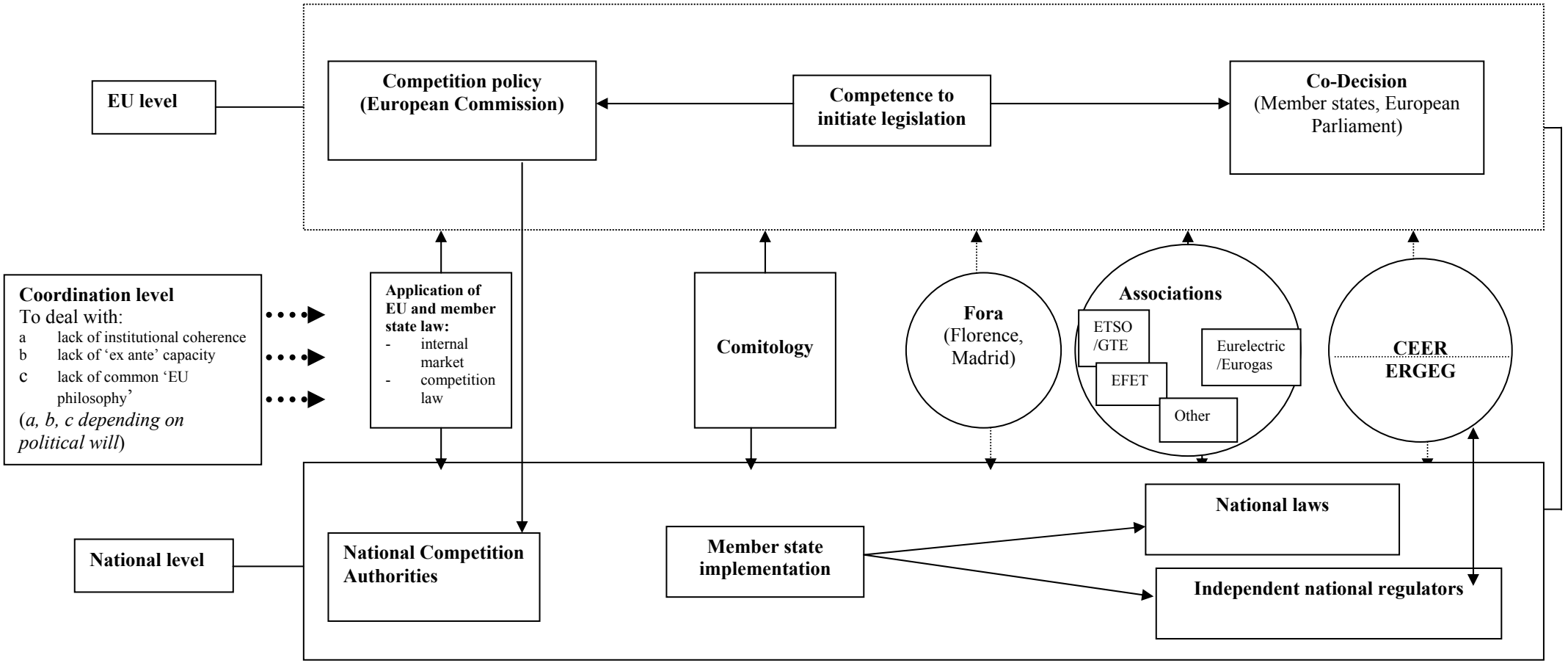
Table 1 summarises a number of shortcomings. In the first instance, there were insufficient rules in some member states from the outset. This included for example TPA and unbundling provisions. Second, implementation or transposition of EU laws has sometimes been late or insufficient. Both shortcomings increase uncertainty over the future and undermine market confidence. A third set of drawbacks are the risk of inconsistencies between the EU and member states and among member states. Areas worth mentioning include the application of TPA, the powers and independence of regulatory authorities or definitions of dominance and relevant markets. Different interpretations, especially if they prevail, are likely to lead to trade distortions and uncertainty and by extension to inefficient markets. Finally, there appears to be insufficient coordination in some areas such as infrastructure planning.

[34] Ad hoc committees consisting of officials from the European Commission and member states who assist the shaping and implementation of legislation. These bodies are an inseparable part of the EU decision-making machinery. For a general introduction, see Pedler & Schaefer (1996).

[35] Enshrined in Art. 5 of the EC Treaty, which states that for shared competencies "only if and in so far as the objective of the proposed actions cannot be sufficiently achieved by member states" the EU shall take action. And if the EU takes action, it should apply the instrument that has the least 'centralising' effect (proportionality principle).

[36] More information on these various organisations can be found in the glossary in Appendix 4.

Figure 5. Patchwork of institutions in the implementation of the internal energy market



Note: This is not a top-down or bottom-up process; it is initiated by EU competence, but legislation is influenced by contributions of the stakeholders (coordination level) and the implementation process at national level.

Table 1. Actual and perceived shortcomings in the internal energy market as a result of the institutional context

Shortcomings	Effects	Causes	Remedies
Insufficient rules	Sub-optimal market rules; Uncertainty over the future	Consensus-centred co-decision	Long-term strategy including credible implementation plan
Late or insufficient implementation	Uncertainty over the future	Insufficient institutional capacity	Clear signal that shortcoming is addressed (precondition: institutional capacity)
Inconsistencies (between EU & MS and between MS), e.g. application of TPA	Inefficient market (e.g. distortions)	No agreed regulatory philosophy and practice; Lack of coordination	Improved coordination procedures
Insufficient coordination between MS, e.g. infrastructure plan	Inefficient market	Lack of political will; Insufficient centralisation	Improved coordination procedures and/or higher degree of centralisation

While many of the initial drawbacks have been addressed by the new directives, there are still a number of areas – as discussed in sections 4 and 5 – that need to be settled within the EU either through improved coordination or a higher degree of centralisation. This raises the issue of the institutional framework. In the following section, we provide a first indicative proposal for institutional adaptation.

6.2 Different models for a 'European regulatory authority'

Challenges for the institutional framework exist not only for electricity and gas but are common – to some extent – for other network industries. Consequently, there have been attempts in other markets to design appropriate 'regulatory institutional settings' at European level. These include notable examples from telecoms, i.e. the European Regulators Group (ERG) and financial services, i.e. the Committee of European Securities Regulators (CESR). The two examples are described in Appendices 1 and 2, respectively. The ERG is built on voluntary coordination of best-practice regulation by national regulators in close cooperation with the European Commission. CESR has chosen a different route. It has been established as an independent advisory group with the mandate to draft policy recommendations on technical issues (for the European Commission) and is invited to give its members' opinion on proposed legislation.

While both ERG and CESR have their merits, theoretically other concepts for a 'European model of a regulatory authority' are possible, as discussed below.

The *first* option is to create an outright UK-style independent regulator (Eurenergy) as an EU agency supervised by the European Parliament and/or member states. This option is highly unlikely for both political and constitutional/legal reasons. It is hard to see how member states could accept an EU 'super regulator', having already invested in national regulators and when member states are loathe to delegate powers to the EU. In addition, the European Commission would most likely be opposed to such a move as it would be seen as curtailing Commission powers. In any case, such a decision would need a revision of the EU Treaty as result of the Meroni doctrine, which is interpreted in a way that prohibits the delegation of executive powers to independent agencies.[37]

[37] According to the Meroni doctrine, delegation of powers to independent agencies must be limited to implementing powers clearly defined and entirely supervised by the delegating institution on the basis of specific and objective criteria. Put differently, this means that delegation cannot concern discretionary

The *second* option is to integrate a regulatory office into the European Commission as part of competition policy authority (European Commission Directorate General for Network Industry Regulation – DG NETREG). While this could overcome potential European Commission reluctance, this option seems equally highly unlikely as it would imply that member states would equally delegate far-reaching powers to the European Commission.

A *third* option could be the creation of a European System of Energy Regulators (ESER), i.e. the gradual integration of national regulators into an EU system, which might eventually 'harden' to a European Regulator. Such a body could grow out of the Council or the Commission or the Council of European Energy Regulators (CEER). While it appears as a pragmatic, step by step approach, over time it would raise issues of legitimacy and political accountability. Ultimately, also the ESER approach would collide with the Meroni doctrine.

The *fourth* option is to refine existing structures, therefore remaining fully within the existing Treaty framework (incremental institutional adaptation). This could entail institutional adaptation of the existing structures, notably at implementation level. This seems to be in line with current political preferences.[38] Such institutional adaptation would most likely be based on comitology procedures – as in the case of the Regulation on cross-border electricity trade – and cooperation between the European Commission and national regulators. This latter cooperation has already been formalised by the creation of the European Regulators Group for Electricity and Gas (ERGEG). ERGEG was set up by the European Commission in November 2003 as an independent advisory group for internal energy market matters. While the creation of ERGEG appears to apply the ERG model from telecoms (see Appendix 1), it is imaginable that CEER as institution could play a more independent role vis-à-vis the European Commission than ERG currently does (Kent, 2003). That would bring CEER closer to the CESR model applied in financial markets (see Appendix 2).

The *fifth* option is to progressively integrate national regulatory authorities in parallel to the development of regional markets. This would mean the establishment of collaborative frameworks of regulators at regional level (i.e. regional CEERs). This would raise issues related to ensuring consistency of the regulatory strategies for regional CEERs as well as provisions to ensure institutional integrity within the European CEERs. Most likely, this would mean that overall boundary conditions would need to be set by some sort of EU framework law.

A final and *sixth* option (bundling of competencies) is to identify the subject matter where a bundling through agencies or other institutional set-up is principally justified. According to the 'Rapport Stoffaës' (2003), the Europeanisation of institutions could add particular value by: 1) reinforcing the Commission's role as the responsible body for undertaking negotiations with third countries, 2) affirming the independence of regulatory authorities from both the European Commission and member states, 3) reducing complexity of the current system, and 4) bundling

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powers involving a margin of political judgement. The Meroni doctrine goes back to a 1958 European Court of Justice judgement and has been applied ever since also by the European Commission. This is supported by all the memoranda from the Commission's Legal Service and also by the main literature on Community law. See for example Lenaerts (1993), who accepts that agencies are useful but regards them as 'internal bodies' in the institutional architecture (p. 40) or also the recent memorandum of the Legal Service of 29 September 2000, in reaction to the announcement of the White Paper on Governance. For full details, see Yataganas (2001).

[38] The European Commission White Paper on "EU policy on services of general interest" concludes on page 24 that "there is a large consensus that there is no need for the creation of a European regulatory authority at this stage. Networks of national regulators coordinated at European level seem to be the preferred option".

technical expertise within EU bodies. Such an approach could most likely be implemented within the current Treaty as well as within the new Constitutional Treaty without even discarding the Meroni doctrine. Furthermore, it would be in line with current EU policies such as the clarification of competencies, increased efficiency of regulation as well as subsidiarity.

6.3 Is there a case for institutional adaptation?

At this stage there is little reason to believe that options 1-3 (e.g. Eurenergy, DG NETREG or ESER) will be politically feasible. Option 5 (EU competency on services of general economic interest) remains uncertain as it is closely related to the adoption and ratification of the European Constitution. And even if the Constitution is adopted and ratified, this will not occur for a significant length of time. And even then, it is highly uncertain that member states will agree on a common policy, let alone the creation of a European Regulator.

Option 4 (incremental institutional adaptation) is already being implemented, as illustrated by the creation of ERGEG. To date, however, it is not certain whether ERGEG will develop more along the lines of the CESR model or that of ERG. Both have their shortcomings. In ERG, decision-making is by consensus, which means that coordination remains voluntarily, raising doubts about the commitment of member state regulatory authorities to the ERG. Thus, the European Commission remains dependent on the political will of regulatory authorities (for details, see Appendix 1). While the new regulatory structure for financial markets (i.e. the CESR model) has been perceived as a breakthrough for Community legislation, close monitoring of its *modus operandi* have revealed a number of drawbacks. At first, the approach can at times be too detailed, thereby adding complexity rather than speeding up a regulatory response. The fact that decisions are taken on a case-by-case basis can make it difficult to identify the appropriate level for decision-making (e.g. framework, implementation, etc.). Finally, the disparity of integration between wholesale and retail financial markets is impeding the promotion of *one* type of legislation and quite often a differentiated approach has to be followed.

Option 5 (regional CEERs) needs to be seen in the broader context of the creation of regional markets, which was analysed in section 4. In any case, it would raise questions related to the consistency of regulatory strategies for 'regional CEERs' as well as the provisions to ensure institutional integrity within the 'European' CEER.

Option 6 (bundling of competencies) could most likely be implemented within the current Treaty as well as within the new Constitutional Treaty (as demonstrated above). There is however a need for political will.

In conclusion, many of the theoretical options available to adapt the institutional framework are politically hard to realise. Others might improve the coordination somewhat but risk increasing complexity and transaction costs, not to mention the associated issues of democratic legitimacy. In the end, institutional developments will depend on political will. As long as there is insufficient political will to move towards a more coherent and efficient institutional framework and especially as long as the EU adheres to the Meroni doctrine, which prohibits EU executive agencies, the only way forward appears to be the bundling of competencies.

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Appendix 1. European Regulators Group

The creation of the European Regulators Group (ERG) in the telecoms sector originated from the perceived need for greater EU-wide alignment of sector-specific regulation with standard competition principles. Thus, the ERG should be seen as part of the institutional adaptation within the context of achieving greater co-ordination of national regulatory practices through the consistent application of the new European regulatory framework (Groebel, 2002). The ERG basically remains an Advisory Group, whose authority rests on consensus rather than a real regulatory body making enforceable decisions. The ERG works through the formulation of common positions, in the form of self-binding declarations of intent, which are expected to exert 'moral pressure' on the members. It does not take legally binding decisions. Nevertheless, the ERG could become critical in ensuring consistency of the application of EU law by national regulatory authorities.

The ERG was set up by the European Commission[39] and came into operation in October 2002. According to the Decision, the Group is to provide an interface between the national regulatory authorities and the *Commission*. Members comprise the heads of the relevant national regulatory authorities. The *Commission* is represented but does not have a vote. The Chairperson is elected from the national regulatory authorities. The ERG can be seen as a complement to comitology committees, which are staffed with member states' representatives.[40] The ERG is financially fully dependent on the European Commission and receives its funds from the EU budget. It currently has a one-person secretariat in Brussels.

It is too early to judge its impact. Given that the secretariat is small, however, it appears that it would indeed only operate as a light coordination body between regulatory authorities and the European Commission. The fact that the budget is paid for by the EU raises two questions. The first is about the commitment of all member state regulatory authority to the ERG. The second concerns the body's independence from the European Commission.

[39] On the basis of a Commission Decision, published in the Official Journal of the European Communities (L 200/38) on 30 July 2002.

[40] The ERG is required to work closely together with the relevant comitology committees, such as the Communications Committee (CO-COM), which was established under Article 22 of the Framework Directive and combines the former Open Network Provision and the Licensing Committee.

Appendix 2. The Committee of European Securities Regulators

The Committee of European Securities Regulators (CESR) was set up as a consequence of the realisation among financial market participants that developments in the sector can be far too quick for legislation to 'catch up'. Securities markets are sophisticated markets with mainly private market participants, including 'network owners' such as stock exchanges or clearing procedures. There are only a few public service obligations attached. Market participants rely to a large extent on reputation – worldwide – and therefore *self-regulation* is both an efficient and effective tool. The creation of the CESR was greatly helped by the fact that the financial markets have been mature and that there was a political will and agreement on some sort of EU level of governance.

Integration of EU financial markets was proposed first by the European Commission 1999 Financial Services Action Plan (FSAP) (European Commission, 1999) and agreed during several European Council meetings. Full implementation of FSAP is foreseen for 2005. The regulatory framework for securities markets was undertaken in a so-called Committee of Wise Men (Lamfalussy Group), which dealt with both substantive (i.e. proposals for appropriate implementation of regulation) and institutional (i.e. convergence and cooperation in day-to-day implementation) issues.

The new regulatory structure

The new regulatory structure designed by the Lamfalussy Group identified four different levels of legislation and regulation (see Box A.1 on the new regulatory structure). Level 1 is framework legislation, level 2 contain implementation measures, level 3 ensures consistency between levels 1 and 2 and level 4 relates to measures to promote enforcement of Community law, all backed up by the newly created CESR.

Level 1 is standard co-decision where the Council of Ministers and the European Parliament agree on *framework principles*. The 'Lamfalussy approach' has been to delegate technical implementation measures to level 2, getting closer to regulatory powers. This also included the goal to make as much use as possible of level 2, ensuring that technical provisions are kept up to date with market and supervisory developments (e.g. competition law).

Given that technical regulation can have and in fact often has a major impact on market structure and competition, the European Parliament has been concerned that level 2 measures remain in line with level 1 framework laws. The Commission and the Council of Ministers have therefore accepted the principles of full European Parliament information and public consultation throughout the process under level 2.[41]

In fact, CESR adds on to the comitology committee (i.e. European Securities Committee), a more independent, more member-state driven advisory committee. While on the face of it, legislation and implementation rests with the standard procedures (co-decision and comitology), CESR has brought two important adaptations. Not only does CESR play a major role in ensuring coordination between levels 1 and 2. The European Commission also can entrust CESR – under certain conditions – to prepare level 2 measures. In fact, this constitutes a short-cut of the EU decision-making process, in that the member states are more likely to accept what CESR has proposed than going through the comitology procedures. Given that there is close cooperation between the European Commission, the European Securities Committee and CESR, agreement among these three is almost synonymous with a decision.

[41] For example, the chair of CESR periodically reports to the European Parliament and upon request. CESR is obliged to circulate its annual report to the European Commission, Council and Parliament.

Box A.1 European securities market regulation

The four levels of the 'Lamfalussy approach':

- **Level 1** consists of *framework legislation* (regulations and directives) adopted under the co-decision procedure by the Council and the European Parliament.
- **Level 2** deals with *implementing measures* decided by the European Securities Committee.
- **Level 3** is concerned with *ensuring that levels 1 and 2 are consistently and timely implemented* by the respective national authorities. This is done by the interaction of the European Securities Committee and CESR.
- **Level 4** is where the *EC and member states endeavour to promote the enforcement of Community law*.

The working of CESR

The CESR was established by Commission decision in June 2001,[42] as an independent body for reflection, debate and advice for the European Commission in the field of securities markets. The overall objective is to ensure more effective cooperation between national supervisors and thus improve day-to-day implementation of Community legislation in member states. Inter alia, CESR is to carry out peer reviews and promote best practice. CESR issues guidelines, recommendations and standards that its members will introduce in their regulatory practices on a voluntary basis. In addition, CESR acts as an independent advisory group to assist the Commission in particular in its preparation of draft implementing measures, the so-called 'level 2' measures. There is an obligation for consultation with market participants, consumers and end-users, putting it a level with the European Commission in this respect. There is close cooperation between CESR and the European Commission with the latter participating in all meetings, although without voting rights.

CESR is fully financed by the national regulatory authorities. CESR operates independently of the European Commission, with a secretariat in Paris of currently 15 permanent employees, in addition to seconded staff. Although principally CESR works on the basis of consensus, this is not always the case. However, there is an obligation to elaborate any dissenting opinions of individual members.

Drawbacks of the 'Lamfalussy' approach

The new regulatory structure for financial markets has been perceived as a breakthrough for Community legislation. Nevertheless, close monitoring of its modus operandi reveals a number of drawbacks. The four-level approach can at times be too detailed, thereby adding complexity rather than speeding up a regulatory response. Due to the fact that decisions are taken on a case-by-case basis, it can be difficult to decide which legislation should be perceived as 'framework legislation' (level 1), and which as 'implementing measures' (level 2 subject to comitology, European Securities Committee). Moreover, as in energy markets, the disparity between wholesale and retail financial markets is impeding the promotion of one type of legislation for the whole market. It must be underlined, however, that due to its recent establishment, the Lamfalussy approach cannot yet be assessed on whether it is producing a real change vis-à-vis the previous arrangements.

[42] Com(2001) 1501.

Appendix 3. Options for Capacity Mechanisms[43]

Mothball reserve

One option that often is proposed is a so-called 'mothball reserve', a collection of mothballed, old plants that can be returned to service if necessary. The question is under what conditions this reserve is deployed. If the market is to perform its regular task and invest in generation capacity, it should be able to rely upon periodical price spikes to finance its investment in peaking units. This means that the reserve should only be deployed at a high price, namely a price equal to the value of lost load. This raises two issues. First, it may be politically unsustainable to allow prices to rise this high for any length of time if they can be lowered by deploying the mothball reserve. After all, the reserve will be something of a public facility. The second issue is that the incentive to withhold capacity by market parties will not be eliminated until the deployment price of the mothball reserve is reached. Nevertheless, if the reserve is to be deployed at any lower price, it will reduce the incentive to invest. This scenario would create a need for a larger reserve.

Capacity payments

A better prospect is offered by methods that convert the irregular revenues from price spikes to a constant revenue stream for generation companies. A primitive form consists of capacity payments, as tried in Spain and several South-American countries and, in a different form, in the former England and Wales Pool. A disadvantage of these payments is that their effect is uncertain: the payments do not necessarily lead to more investment. Instead of fixing the payment level and leaving the investment level to be decided by the generation market, it is more effective to do the reverse. The most promising capacity mechanisms provide a clear signal to the generation market regarding the demand for capacity, but leave it to the market to finance it.

Capacity requirements

The only system that has been tried in practice and that appears to work is the system of capacity requirements, such as the installed capacity (ICAP) system used by PJM on the US East Coast. (For an introduction, see for instance Besser et al., 2002.) In this system, the retail companies are required to purchase a certain percentage of reserve capacity. The percentage is determined by the regulator. This reveals the demand for reserve capacity. The cost of providing the reserve capacity is passed along to the consumers by the retail companies who contract the capacity. The reserve capacity is tradable and may consist of an interruptible load.

Reliability contracts

A disadvantage of capacity requirements is that they do not provide an incentive to maximize the availability of reserve capacity. An improvement in this respect is provided by *reliability contracts*, a system of call options that the system operator purchases from the generation companies (Vázquez et al., 2002). When the options are called, the producers are required to pay the system operator the difference between the market price and the strike price. Operating power plants are a perfect hedge for the generators: their net income is equal to the strike price. Generation companies that have sold options that are not covered by available generation capacity when the options are called, lose on those options. This provides generation companies with an incentive to sell an option volume that is equal to the available volume of the generation capacity that they control. A second advantage is that the generation companies

[43] Drawn from de Vries & Hakvoort (2004, pp. 13-14).

receive an incentive to maximise the availability of their generation units during periods of scarcity. Overall generation adequacy is determined by the system operator, by the volume of options that the operator purchases.

Capacity subscriptions

Where the previous two systems still contain an element of central coordination, a system of *capacity subscriptions* leaves all variables to the market (Doorman, 2000). In fact, this system may be considered more market-oriented than a traditional, unregulated electricity market, because it allows consumers to choose their level of generation adequacy. In this system, each customer needs to purchase an electronic fuse, which can limit his/her electricity use. The fuses are activated by the system operator during periods of scarcity. Customers can choose the size of their fuses. The fuses are sold by generation companies and need to be covered by available generation capacity. Thus, the market for fuses indicates the total demand for generation capacity and provides generation companies with fixed revenues to cover their investments. This system turns the security of supply into a private good: consumers can choose their own level of generation capacity that they want to have reliably available. The drawback of this system, compared with the previous options, is that it is more elaborate, as it requires the installation of an electronic fuse at each customer site. A final option is not to end the consumer franchise (Newbery, 2002). With captive consumers, the free-rider problem is solved. Then the retail companies can cover their full projected demand with long-term contracts. But this option will not prove popular with those in favour of a fully liberalised market.

The discussed capacity mechanisms all have the limitation that they have limited effect when they are implemented in the presence of significant import volumes. To be both effective and economically efficient, an interconnected system would need to implement a capacity mechanism for its whole area.

Appendix 4. Glossary of Technical Terms and Abbreviations[44]

Acceleration package: A set of legislative initiatives by the European Commission aiming at the structural reform of the Internal Electricity and Gas market. For further information, see section 2.3 of this report.

Access Charge: Term related to network access, it is a charge paid by all market participants withdrawing energy from the TSO-controlled grid. The access charge will recover the portion of a utility's transmission revenue requirement not recovered through the variable usage charge.

Ancillary services: Services that ensure reliability and support the transmission of electricity from generation sites to customer loads. Such services may include load regulation, spinning reserve, non-spinning reserve, replacement reserve and voltage support.

Base load: The minimum amount of electric power delivered or required over a given period of time at a steady rate.

Base load capacity: The generating equipment normally operated to serve loads on an around-the-clock basis.

Base load plant: A plant, usually housing high-efficiency steam-electric units, which is normally operated to take all or part of the minimum load of a system, and which consequently produces electricity at an essentially constant rate and runs continuously. These units are operated to maximise system mechanical and thermal efficiency and minimise system operating costs.

Base load unit: A power generating facility that is intended to run constantly at near capacity levels, as much of the time as possible.

Biofuels: Liquid fuels and blending components produced from biomass (plant) feedstocks, used primarily for transportation.

Biomass: Organic non-fossil material of biological origin constituting a renewable energy source.

Blackout: A power loss affecting many electricity consumers over a large geographical area for a significant period of time.

Broker: A retail agent who buys and sells power. The agent may also aggregate customers and arrange for transmission, firming and other ancillary services as needed but does not take title to any of the power sold.

Bundled utility service (electric): A means of operation whereby energy, transmission, and distribution services, as well as ancillary and retail services are provided by one entity.

Call-back: A provision included in some power sale contracts that let the supplier stop delivery when the power is needed to meet certain other obligations.

Capacity: The amount of electric power for which a generating unit, generating station, or other electrical apparatus is rated either by the user or manufacturer. The term is also used for the total volume of natural gas that can flow through a pipeline over a given amount of time, considering such factors as compression and pipeline size.

There are various types of electricity capacity:

> **Installed (or nameplate) capacity:** The total manufacturer-rated capacities of equipment such as turbines, generators, condensers, transformers and other system components.

[44] Definitions are provided on the basis of elaboration – or direct referencing – from several sources; the European Commission and relevant associations, the US Department of Energy (Energy Information Administration's Energy Glossary), California Energy Commission (Glossary of Energy Terms), CEER, CESR and ERG.

Peaking capacity: The capacity of generating equipment intended for operation during the hours of highest daily, weekly or seasonal loads.

Purchased capacity: The amount of energy and capacity available for purchase from outside the system.

Reserve capacity: Extra generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages. Units available for service, but not maintained at operating temperature, are termed 'cold'. Those units that are ready and available for service, though not in actual operation, are termed 'hot'.

Capacity charge: An element in a two-part pricing method used in capacity transactions (energy charge is the other element). The capacity charge, sometimes called 'demand charge', is assessed on the amount of capacity being purchased.

Capacity factor: The ratio of the electrical energy produced by a generating unit for the period of time considered to the electrical energy that could have been produced at continuous full power operation during the same period.

Capacity transaction: The acquisition of a specified quantity of generating capacity from another utility for a specified period of time. The utility selling the power is obligated to make available to the buyer a specified quantity of power.

Dependable capacity: The system's ability to carry the electric power for the time and period specific, when related to the characteristics of the load to be supplied. Dependable capacity is determined by such factors as capability, operating power factor, weather and the portion of the load the station is to supply.

Captive customer: A customer who does not have realistic alternatives to buying power from the local utility, even if that customer had the legal right to buy from competitors.

Carbon intensity: The amount of carbon by weight emitted per unit of energy consumed. A common measure of carbon intensity is weight of carbon per British thermal unit (Btu) of energy.[45]

Carbon sequestration: The fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes.

Committee of European Securities Regulators (CESR): CESR has the tasks of improving coordination (effective supervision and enforcement of the EU single market) among national regulators and advising the European Commission on drafting implementing measures of EU framework directives in the field of securities. For more information: http://www.cesr-eu.org/.

Cogeneration: The production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy.

Congestion: A condition that occurs when insufficient transfer capacity is available to implement all of the preferred schedules for electricity transmission simultaneously.

Congestion management: Alleviation of congestion by the TSO.

Council of European Energy Regulators (CEER): The Council deals with internal energy market matters and in particular with the implementation and development of the EU electricity and natural gas directives (see also ERGEG).

Regional CEER(s): A regulatory approach whereupon regulators of national markets (or regions) that comprise a regional market (as defined by the European Commission) sit together to decide on

[45] When there is only one fossil fuel under consideration, the carbon intensity and the emissions coefficient are identical. When there are several fuels, carbon intensity is based on their combined emissions coefficients weighted by their energy consumption levels.

tariffication methodologies and fees, congestion management and other issues that concern the operation of the regional market in question. The tangible outcome of this approach would be the creation of **regional platforms**, i.e. tailor-made regional solutions to accommodate regional specificities in order to further integrate markets, and eventually lead to a single market.

Customer choice: The right of customers to purchase energy from a supplier other than their traditional supplier or from more than one seller in the retail market.

DG NETREG: DG NETREG is among the regulatory options (determining the shape, character and competences of future European energy regulation) presented in this report. According to it, the regulator is integrated into the European Commission as part of competition policy authority ('European Commission Directorate General for Network Industry Regulation - DG NETREG').

Day-ahead and hour-ahead markets: Forward markets where electricity quantities and market clearing prices are calculated individually for each hour of the day on the basis of participant bids for energy sales and purchases.

Demand-side management (DSM): The planning, implementation and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage, including the timing and level of electricity demand.[46]

Direct access: The ability of a retail customer to purchase electricity or other energy sources directly from a supplier other than their traditional supplier.

Distributed generation: A distributed generation system involves small amounts of generation located on a utility's distribution system for the purpose of meeting local (substation level) peak loads and/or displacing the need to build additional (or upgrade) local distribution lines.

Distribution: The delivery of energy to retail customers.

Distribution system: The portion of the transmission and facilities (substations, transformers and lines) that convey electricity from high-power transmission lines to end-users.

Distribution system operator (DSO): The body responsible for the distribution of electricity to retail customers.

Divestiture: The stripping off of one utility function from the others by selling (spinning-off) or in some other way changing the ownership of the assets related to that function. Stripping off is most commonly associated with spinning-off generation assets so they are no longer owned by the shareholders that own the transmission and distribution assets.

ECJ: European Court of Justice

Electric generator: A facility that produces only electricity, commonly expressed in kilowatt hours (kWh) or megawatt hours (MWh). Electric generators include electric utilities and independent power producers.

Electric power grid: A system of synchronised power providers and consumers connected by transmission and distribution lines and operated by one or more control centres.

Electric power plant: A station containing prime movers, electric generators and auxiliary equipment for converting mechanical, chemical and/or fission energy into electric energy.

[46] It refers to only energy and load-shape modifying activities that are undertaken in response to utility-administered programmes. It does not refer to energy and load-shaped changes arising from the normal operation of the marketplace or from government-mandated energy-efficiency standards. Demand-side management covers the complete range of load-shape objectives, including strategic conservation and load management, as well as strategic load growth.

Electric system reliability: The degree to which the performance of the elements of the electrical system results in power being delivered to consumers within accepted standards and in the amount desired. Reliability encompasses two concepts, adequacy and security. Adequacy implies that there are sufficient generation and transmission resources installed and available to meet projected electrical demand plus reserves for contingencies. Security implies that the system will remain intact operationally (i.e. will have sufficient available operating capacity) even after outages or other equipment failure. The degree of reliability may be measured by the frequency, duration and magnitude of adverse effects on consumer service.

Electric utility: A corporation, person, agency, authority or other legal entity or instrumentality aligned with distribution facilities for delivery of electric energy for use primarily by the public. These include investor-owned electric utilities, municipal and state utilities and rural electric cooperatives.

Electric utility divestiture: The separation of one electric utility function from others through the selling of the management and ownership of the assets related to that function. It is most commonly associated with selling generation assets so they are no longer owned or controlled by the shareholders that own the company's transmission and distribution assets.

Electrical system energy losses: The amount of energy lost during generation, transmission and distribution of electricity, including plant and unaccounted for use.

Electricity generation: The process of producing electric energy or the amount of electric energy produced by transforming other forms of energy, commonly expressed in kilowatt hours (kWh) or megawatt hours (MWh).

Emissions: Anthropogenic releases of gases into the atmosphere. In the context of global climate change, they consist of radiatively important greenhouse gases (e.g. the release of carbon dioxide during fuel combustion).

End user: A firm or individual that purchases products for its own consumption and not for resale (i.e. an ultimate consumer).

Energy efficiency: Refers to programmes that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided.[47]

Energy security/fuel security: A policy that considers the risk of dependence on fuel sources located in remote and unstable regions of the world and the benefits of domestic and diverse fuel sources.

Eurenergy: Eurenergy is among the regulatory options (determining the shape, character and competences of future European energy regulation) presented in this report. This option for a European energy regulation body envisages an outright UK-style independent energy regulator. Eurenergy would be an EU agency supervised by the European Parliament and member states.

European Union of Natural Gas Industry (Eurogas): This association represents the European natural gas industry vis-à-vis the European Union and all other relevant bodies at international level. For more information, see http://www.eurogas.org/.

European Regulators Group (ERG): The European Regulators Group for electronic communications networks and services has been set up by the European Commission to provide a

[47] These programmes reduce overall electricity consumption (reported in megawatt hours), often without explicit consideration for the timing of programme-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the same level of end-use services (e.g. lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programmes, high-efficiency heating, ventilating and air conditioning (HVAC) systems or control modifications, efficient building design, advanced electric motor drives and heat recovery systems.

suitable mechanism for encouraging cooperation and coordination between national regulatory authorities and the Commission, in order to promote the development of the internal market for electronic communications networks and services, and to seek to achieve consistent application, in all member states, of the provisions set out in the directives of the new regulatory framework. For more information, see http://erg.eu.int/.

European System of Energy Regulators (ESER): The European System of Energy Regulators could constitute another regulatory option for the future shape of European energy regulation. ESER would be the gradual integration of national regulators into an EU system which might eventually 'harden' to become a European regulator.

European Energy Regulators Group for Electricity and Gas (ERGEG): ERGEG acts as advisory group of the European Commission to help ensure a consistent application in all member states of the recently adopted new electricity and gas directives as well as the new regulation on cross-border exchanges of electricity. The group provides a transparent platform for cooperation between national regulatory authorities and between these authorities and the Commission. The group was set up by European Commission's Decision of 11 November 2003 (see also CEER).

European Transmission System Operators (ETSO): This body is concerned with the EU-wide harmonisation of network access and conditions for usage, especially for cross-border electricity trade. For more information, see http://www.etso-net.org/.

Financial Services Action Plan (FSAP): The Action Plan details the work that has to be accomplished to reap the full benefits of the euro and to ensure the continued stability and competitiveness of EU financial markets. The action plan identifies a number (42) of legislative actions that need to be undertaken for the completion of the single market in financial services. For further information, see http://europa.eu.int/comm/internal_market/en/finances/actionplan/index.htm.

Florence Forum: The Electricity Regulatory Forum of Florence, which now meets in Rome, was set up to discuss issues regarding the creation of a true internal electricity market that are not addressed in the electricity directive (2003/54/EC). The Forum consists of national regulatory authorities, member states, the European Commission, transmission system operators (TSOs), electricity traders, consumers, network users and power exchanges.

Fuel cell: A device capable of generating an electrical current by converting the chemical energy of a fuel (e.g. hydrogen) directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside. It does not contain an intermediate heat cycle, as do most other electrical generation techniques.

Fuel cycle: The entire set of sequential processes or stages involved in the utilisation of fuel, including extraction, transformation, transportation and combustion. Emissions generally occur at each stage of the fuel cycle.

Futures market: A trade centre for quoting prices on contracts for the delivery of a specified quantity of a commodity at a specified time and place in the future.

Gas Transmission Europe (GTE): Gas Transmission Europe is the European organisation representing natural gas transmission companies and transmission arms of integrated gas companies. For more information, see http://www.gte2.be/.

Generation: The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in KWHs.

Generation company: An entity that owns or operates generating plants. The generation company may own the generation plants or interact with the short-term market on behalf of plant owners.

Generator capacity: The maximum output, commonly expressed in megawatts (MW), that generating equipment can supply to system load, adjusted for ambient conditions.

Generator nameplate capacity (installed): The maximum rated output of a generator, prime mover or other electric power production equipment under specific conditions designated by the manufacturer. Installed generator nameplate capacity is commonly expressed in megawatts (MW) and is usually indicated on a nameplate physically attached to the generator.

Gigawatt (GW): One billion watts or one thousand megawatts.

Gigawatt-electric (GWe): One billion watts of electric capacity.

Gigawatt hour (GWh): One billion watt hours

Greenhouse effect: The result of water vapour, carbon dioxide and other atmospheric gases trapping radiant (infrared) energy, thereby keeping the earth's surface warmer than it would otherwise be. Greenhouse gases within the lower levels of the atmosphere trap this radiation, which would otherwise escape into space, and subsequent re-radiation of some of this energy back to the Earth maintains higher surface temperatures than would occur if the gases were absent.

Greenhouse gases (GHGs): Those gases, such as water vapour, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Green pricing: In the case of renewable electricity, green pricing represents a market solution to the various problems associated with regulatory valuation of the non-market benefits of renewables. Green pricing programmes allow electricity customers to express their willingness to pay for renewable energy development through direct payments on their monthly utility bills.

Grid: The layout of an electrical transmission and distribution system. A system of interconnected power lines and generators that is managed so that the generators are dispatched as needed to meet the requirements of the customers connected to the grid at various points.

Hedging contracts: Contracts which establish future prices and quantities of electricity independent of the short-term market. Derivatives may be used for this purpose.

Hydroelectric power: The use of flowing water to produce electrical energy.

Hydrogen: A colourless, odourless, highly flammable gaseous element. It is the lightest of all gases and the most abundant element in the universe, occurring chiefly in combination with oxygen in water and also in acids, bases, alcohols, petroleum and other hydrocarbons.

IEA: International Energy Agency.

Incremental energy costs: The additional cost of producing and/or transmitting electric energy above some previously determined base cost.

Independent power producer: A corporation, person, agency, authority or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility.

Insider trading: Trading by insiders; or illegal trading by insiders who trade based on insider information.

Interconnected system: A system consisting of two or more individual power systems normally operating with connecting tie lines.

Interconnection: Two or more electric systems having a common transmission line that permits a flow of energy between them. The physical connection of the electric power transmission facilities allows for the sale or exchange of energy.

Intermittent electric generator or intermittent resource: An electric generating plant with output controlled by the natural variability of the energy resource rather than dispatched based on system requirements. Intermittent output usually results from the direct, non-stored conversion of naturally occurring energy fluxes such as solar energy, wind energy or the energy of free-flowing rivers (that is, run-of-river hydroelectricity).

Interruptible gas: Gas sold to customers with a provision that permits curtailment or cessation of service at the discretion of the distributing company under certain circumstances, as specified in the service contract.

Interruptible load: This demand-side management category represents the consumer load that, in accordance with contractual arrangements, can be interrupted at the time of annual peak load by the action of the consumer at the direct request of the system operator. This type of control usually involves large-volume commercial and industrial consumers. Interruptible load does not include direct load control.

Interruptible or curtailable rate: A special electricity or natural gas arrangement under which, in return for lower rates, the customer must either reduce energy demand on short notice or allow the electric or natural gas utility to temporarily cut off the energy supply for the utility to maintain service for higher priority users. This interruption or reduction in demand typically occurs during periods of high demand for the energy (summer for electricity and winter for natural gas).

Interruptible power: Power and usually the associated energy made available by one utility to another. This transaction is subject to curtailment or cessation of delivery by the supplier in accordance with a prior agreement with the other party or under specified conditions.

Kilowatt (kW): One thousand watts.

Kilowatt-electric (kWe): One thousand watts of electric capacity.

Kilowatt hour (kWh): A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 Btu.

Lamfalussy Group - Committee of Wise Men on the Regulation of European Securities Markets: The Group is charged with the task of devising scenarios for improving the process of EU legislation in the field of securities markets so as to ensure its optimal implementation and continued relevance to market developments. The **Lamfalussy group** is responsible for improving the process of rule-making, supervision and enforcement of common securities provisions – the 'how' question.

Load (electric): The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy-consuming equipment of the consumers.

Liquefied natural gas (LNG): LNG is natural gas that has been condensed to a liquid, typically by cryogenically cooling the gas to minus 161 degrees Celsius. This allows it to be transported by tankers.

Load management: Steps taken to reduce power demand at peak load times or to shift some of it to off-peak times. This may be with reference to peak hours, peak days or peak seasons. The main factor affecting electric peaks is air-conditioning usage, which is therefore a prime target for load management efforts. Load management may be pursued by persuading consumers to modify behaviour or by using equipment that regulates some electric consumption.

Losses (Electric utility): Electric energy or capacity that is wasted in the normal operation of a power system. Some kilowatt hours are lost in the form of waste heat in electrical apparatus such as

substation conductors. Line losses are kilowatts or kilowatt hours lost in transmission and distribution lines under certain conditions.

Madrid Forum: The European Gas Regulatory Forum of Madrid was set up to discuss issues regarding the creation of a true internal gas market, which are not addressed in the gas directive (2003/55/EC). The Forum consists of national regulatory authorities, member states, the European Commission, transmission system operators (TSOs), gas suppliers and traders, consumers, network users and gas exchanges.

Market-based pricing: Prices of electric power or other forms of energy determined in an open market system of supply and demand under which prices are set solely by agreement as to what buyers will pay and sellers will accept. Such prices could recover less or more than full costs, depending upon what the buyers and sellers see as their relevant opportunities and risks.

Megawatt (MW): One million watts of electricity.

Megawatt electric (MWe): One million watts of electric capacity.

Megawatt hour (MWh): One thousand kilowatt-hours or 1 million watt-hours.

Merchant line: Merchant lines are privately financed interconnectors between EU member states, they can also be long-haul gas infrastructure importing gas into the EU.

Natural monopoly: A situation where one firm can produce a given level of output at a lower total cost than can any combination of multiple firms. Natural monopolies occur in industries that exhibit decreasing average long-run costs due to size (economies of scale). According to economic theory, a public monopoly governed by regulation is justified when an industry exhibits natural monopoly characteristics.

Network access: The possibility for all electricity suppliers to have unimpeded access to the supply network. See also third-party access (TPA).

Network industries: Network industries include, among others, energy, telephony and transport services providers. Firms active in network industries are firms affected by network activity.

Network regulation (incentive-based): It is network regulation that provides the regulated firm with the types of earnings incentives found in a competitive market and allows the firm, to some degree, to respond to those incentives. It represents an evolution in regulatory approach from more traditional forms of regulation such as rate-of-return or cost-based regulation**.** Incentive-based regulatory mechanisms are: pricing flexibility for competitive services, earnings sharing, price freezes for non-competitive services and price caps.

Nitrogen dioxide: A compound of nitrogen and oxygen formed by the oxidation of nitric oxide (NO) which is produced by the combustion of solid fuels.

Nitrogen oxides (NO_x): Compounds of nitrogen and oxygen produced by the burning of fossil fuels.

Nuclear energy: Power obtained by splitting heavy atoms (fission) or joining light atoms (fusion). A nuclear energy plant uses a controlled atomic chain reaction to produce heat. The heat is used to make steam run conventional turbine generators.

OPEC (Organisation of Petroleum Exporting Countries): The acronym for the Organisation of Petroleum Exporting Countries that have organised for the purpose of negotiating with oil companies on matters of oil production, prices and future concession rights. Current members (as of the date of this writing) are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates and Venezuela. See OPEC's site at http://www.opec.org for more information.

Option: An option is a contractual agreement that gives the holder the right to buy (call option) or sell (put option) a fixed quantity of a security or commodity (for example, a commodity or commodity futures contract), at a fixed price, within a specified period of time. May either be standardised, exchange-traded and government regulated, or over-the-counter customised and non-regulated.

Outage (electric utility): An interruption of electric service that is temporary (minutes or hours) and affects a relatively small area (buildings or city blocks).

OTC (over-the-counter): A security that is not traded on an exchange, usually due to an inability to meet listing requirements.

Peak demand: The electric load that corresponds to a maximum level of electric demand in a specified time period.

Peak load: The highest electrical demand within a particular period of time. Daily electric peaks on weekdays occur in late afternoon and early evening. Annual peaks occur on hot summer days.

Peak load plant: A plant usually housing old, low-efficiency steam units, gas turbines, diesels or pumped-storage hydroelectric equipment normally used during the peak-load periods.

Peaking capacity: Capacity of generating equipment normally reserved for operation during the hours of highest daily, weekly or seasonal loads. Some generating equipment may be operated at certain times as peaking capacity and at other times to serve loads on an around-the-clock basis.

Power marketers: Business entities engaged in buying and selling electricity. Power marketers do not usually own generating or transmission facilities. Power marketers, as opposed to brokers, take ownership of the electricity and are involved in interstate trade. These entities file with the Federal Energy Regulatory Commission (FERC) for status as a power marketer.

Power exchange: An entity providing a competitive spot market for electric power through day- and/or hour-ahead auction of generation and demand bids.

Power pool: An association of two or more interconnected electric systems having an agreement to coordinate operations and planning for improved reliability and efficiencies.

Primary energy: All energy consumed by end users, excluding electricity but including the energy consumed at electric utilities to generate electricity.

Public utility: Enterprise providing essential public services, such as electric, gas, telephone, water and sewer under legally established monopoly conditions.

Raw fuel: Coal, natural gas, wood or other fuel that is used in the form in which it is found in nature, without chemical processing.

Real-time market: The competitive generation market controlled and coordinated by the TSO for arranging real-time imbalance energy.

Real-time pricing: The instantaneous pricing of electricity based on the cost of the electricity available for use at the time the electricity is demanded by the customer.

Regulation: The governmental function of controlling or directing economic entities through the process of rule-making and adjudication.

Reliability: Electric system reliability has two components: adequacy and security. Adequacy is the ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and unscheduled outages of system facilities. Security is the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system facilities.

Renewable Energy Sources (RES): Energy sources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy sources include: biomass, hydro, geothermal, solar, wind, ocean thermal, wave action and tidal action.

Research and development (R&D): Research is the discovery of fundamental new knowledge. Development is the application of new knowledge to develop a potential new service or product

Reserve generating capacity: Amount of generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages.

Restructuring: The process of replacing a monopoly system of electric utilities with competing sellers, allowing individual retail customers to choose their electricity supplier but still receive delivery over the power lines of the local utility. It includes the reconfiguration of the vertically-integrated electric utility.

Retail market: A market in which electricity and other energy services are sold directly to the end-use customer.

Self-generation: A generation facility dedicated to serving a particular retail customer, usually located on the customer's premises. The facility may either be owned directly by the retail customer or owned by a third party with a contractual arrangement to provide electricity to meet some or the customers' entire load.

Services of General Economic Interest (SGEI): The term Services of General Economic Interest is used in Art. 86 of the Treaty and refers to market services that the member states subject to specific public service obligations by virtue of a general interest criterion.

Settlement: The process of financial settlement for products and services purchased and sold. Each settlement involves a price and quantity.

Spot market: A market in which a commodity is bought and sold for immediate or very near-term delivery, usually for a period of 30 days or less. The transaction does not imply a continuing arrangement between the buyer and the seller. A spot market is more likely to develop at a location with numerous interconnections, thus allowing for a large number of buyers and sellers.

Spot price: The price for a one-time open market transaction for immediate delivery of a specific quantity of product at a specific location where the commodity is purchased 'on the spot' at current market rates.

Stocks: Inventories of fuel stored for future use.

Stranded costs: Costs incurred by a utility that may not be recoverable under market-based retail competition. Examples include undepreciated generating facilities, deferred costs and long-term contract costs.

Sunk costs: Part of the capital costs actually incurred up to the date of reserves estimation minus depreciation and amortisation expenses. Items such as exploration costs, land acquisition costs and costs of financing can be included.

Supply-side: Activities conducted on the utility's side of the customer meter. Activities designed to supply electric power to customers, rather than meeting load though energy efficiency measures or on-site generation on the customer side of the meter.

System (electric): Physically-connected generation, transmission and distribution facilities operated as an integrated unit under one central management or operating supervision.

Tariff: A published volume of rate schedules and general terms and conditions under which a product or service will be supplied.

Third-party access (TPA): TPA is related to the unhindered and uncomplicated access to electricity and gas markets by suppliers and new market entrants at the national, regional and local level.

Transmission (electric): The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer. In brief, transmission stands for transporting bulk power over long distances.

Transmission circuit: A conductor used to transport electricity from generating stations to load.

Transmission line: A set of conductors, insulators, supporting structures and associated equipment used to move large quantities of power at high voltage, usually over long distances between a generating or receiving point and major substations or delivery points.

Transmission network: A system of transmission or distribution lines cross-connected and operated in such a manner as to permit multiple power supply to any principal point.

Transmission system (electric): An interconnected group of electric transmission lines and associated equipment for moving or transferring electric energy in bulk between points of supply and points at which it is transformed for delivery over the distribution system lines to consumers or is delivered to other electric systems.

Transmission System Operator (TSO): The body responsible for the transmission of bulk electricity from the points of generation to where the electricity is transformed in order to be delivered to consumers.

Transport: Movement of natural, synthetic and/or supplemental gas between points beyond the immediate vicinity of the field or plant from which produced except 1) for movements through well or field lines to a central point for delivery to a pipeline or processing plant within the same state, or 2) movements from a city gate point of receipt to consumers through distribution mains.

Trunk line: A main pipeline.

Turbine: A machine for generating rotary mechanical power from the energy of a stream of fluid (such as water, steam or hot gas). Turbines convert the kinetic energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

Unbundling: Disaggregating electric utility service into its basic components and offering each component separately for sale with separate rates for each component. For example, generation, transmission and distribution could be unbundled and offered as discrete services. U**nbundling** has recently acquired a political connotation of separating vertically integrated monopoly functions of public or privately-owned utilities into their component parts for the purpose of separate service offerings.

Union of the Electricity Industry (EURELECTRIC): It is the sector association representing the common interests of the European electricity industry and its worldwide affiliates and associates. For more information, see http://public.eurelectric.org/.

Universal service – Universal Service Obligations (USOs): Electric service sufficient for basic needs (an evolving bundle of basic services) available to virtually all members of the population regardless of income.

Vertical integration: The combination within a firm or business enterprise of one or more stages of production or distribution. In the electric industry, it refers to the historical arrangement whereby a utility owns its own generating plants, transmission system and distribution lines to provide all aspects of electric service.

Volt: A unit of electromotive force. It is the amount of force required to drive a steady current of one ampere through a resistance of one ohm.

Voltage: The difference in electrical potential between any two conductors or between a conductor and ground. It is a measure of the electric energy per electron that electrons can acquire and/or give up as they move between the two conductors.

Watt (W): The unit of electrical power equal to one ampere under a pressure of one volt. A watt is equal to 1/746 horsepower.

Watt-hour (Wh): The electrical energy unit of measure equal to one watt of power supplied to, or taken from, an electric circuit steadily for one hour.

Wholesale competition: A system whereby a distributor of power would have the option to buy its power from a variety of producers, and the producers would be able to compete to sell their power to a variety of distribution companies.

Wholesale power market: The purchase and sale of electricity from generators to resellers (who sell to retail customers) along with the ancillary services needed to maintain reliability and power quality at the transmission level.

Appendix 5. List of Task Force Members and Invited Guests and Speakers

Chairman: Dag Klackenberg
Chairman (non-executive), Vattenfall AB

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Germana Canzi
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Nathalie Chadeyron
Head of EDF Liaison Office
Electricité de France (EDF)

Dag Christensen
Director
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Peter Claes
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Georg Danell
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Jacques de Jong
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Geoffrey Frewer
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European Investment Bank

Vicky Giannakis
Advisor
Tractebel

Tim Gould
Officer
European Free Trade Association (EFTA)

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