

EUROPEAN COMMISSION

DG TREN

**ELECTRICITY LIBERALISATION
INDICATORS IN EUROPE**

OCTOBER 2001

OXERA

Netherlands Energy Research Foundation

Energy System Analysis and Planning

Centre ATOM, Université Panthéon-Sorbonne

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Questionnaire: Industry associations **Error! Bookmark not defined.**

Questionnaire: National ministerial bodies **Error! Bookmark not defined.**

Questionnaire: National regulatory institutions **Error! Bookmark not defined.**

Questionnaire: TSOs **Error! Bookmark not defined.**

Appendix 3: EUROSTAT Questionnaire **Error! Bookmark not defined.**

Abbreviations

AAPEX	Alpen Adria Power Exchange (Austria)
APX	Amsterdam Power Exchange
ATC	available transfer capacity
CCGT	combined-cycle gas turbine
CEER	Council of European Energy Regulators
CfD	contract for differences
CHP	combined heat and power
CO ₂	carbon dioxide
CUSC	Connection and Use of System Code (UK)
DC	direct current
DG TREN	Directorate General for Transport and Energy
DETI	Department for Enterprise, Trade and Investment
DTI	Department of Trade and Industry (UK)
ECN	Netherlands Energy Research Foundation
EDF	Electricité de France
EDP	Electricidade de Portugal
EEC	European Economic Community
EFA	electricity forward agreement
EFET	European Federation of Energy Traders
EnBW	Energie Baden-Württemberg
EEX	European Energy Exchange
ERSE	Entidade Reguladora do Sector Eléctrico (Portugal)
ESAP	Energy System Analysis and Planning
ESB	Electricity Supply Board (Ireland)
ETSO	European Association of Transmission System Operators
EU	European Union
EURELECTRIC	Also known as the Union of the Electricity Industry
GB	Great Britain
GDF	Gaz de France
HHI	Hirschmann–Herfindahl index
HV	high voltage
I&C	industrial and commercial
IEA	International Energy Agency
IFIEC	International Federation of Industrial Energy Consumers
IIPLEX	Independent Irish Power Exchange
IPP	independent power producer
IPX	Italian Power Exchange
ILR	Institut Luxembourgeois de Régulation
LPX	Leipzig Power Exchange
LV	low voltage
MV	medium voltage
NETA	new electricity trading arrangements (in the UK)
NGC	National Grid Company (UK)
NI	Northern Ireland
NIE	Northern Ireland Electricity
NSI	North Sea Interconnector (planned between UK and Norway)
NTC	net transfer capacity
NTPA	negotiated third-party access
OFGEM	Office of Gas and Electricity Markets (OFGEM)
OTC	over the counter
PES	public electricity supply
PSO	public-service obligation
REE	Red Eléctrica de España
RTPA	regulated third-party access
SB	single buyer
SPE	Société de Production d'Electricité (Belgium)
SSO	security-of-supply obligation
TAR	Tribunale Amministrativo Regionale (Italy)
TPA	third-party access
TSO	transmission system operator
UCTE	Union for the Coordination of Transmission of Electricity
UNIPED	International Union of Producers and Distributors of Electrical Energy

Executive Summary

This report describes work on the development of a set of indicators intended to measure the impact of liberalisation on European electricity markets. It also presents empirical results for such indicators and provides an audit of official data sources available for their evaluation. The project was commissioned by the European Commission's Directorate General for Transport and Energy (DG TREN), and undertaken by a consortium of consultants and academics, led by OXERA, and supported by ECN, ESAP and ATOM.

For this indicator project, the consultants were able to draw on data collected in the context of two earlier indicator initiatives undertaken at European level, coordinated respectively by EUROSTAT, the statistical body of the European Commission, and EURELECTRIC, the European Federation of Electricity Companies. Compared to the EUROSTAT and EURELECTRIC initiatives, the present project provides a methodological framework based on the supply-chain structure of the electricity industry.¹ The methodology underpins and guides the selection of the indicators, and, while the framework developed is general enough to encompass earlier approaches, it extends the scope of earlier initiatives. The indicators developed in this project aim to identify the principal drivers for effective competition, in terms of changes brought about in existing market structures and of framework conditions necessary for the emergence of competitors. Moreover, particular attention is paid to indicators measuring the integration of the European electricity industry—for instance, in terms of the emergence of pan-European companies and the development of wholesale markets spanning several regions across national borders.

Because of the wider scope of the present project, the consultants sent out a series of project-specific questionnaires to collect additional data required for the empirical evaluation of the indicators. The mail-out covered all European Union (EU) member states, as well as Norway and Switzerland, and consisted of 59 questionnaires customised to target five different industry stakeholder groups: industry associations, customer associations, national regulatory authorities, national ministerial bodies, and transmission system operators (TSOs). Additional information used for the evaluation of the indicators includes data provided by Europe-wide industry associations (in particular, UCTE and ETSO), private data banks (in particular, the generation market database, EPIC, which is managed by ESAP), and data collected directly from companies and market places.

It should be noted that the empirical aspect of the project has generally suffered from the double problem of lack of data collected by official sources, and lack of harmonisation between existing data in different countries. Nevertheless, a significant amount of information could be collected, and is presented in the empirical part of this report.

¹ The methodological framework presented in this work is largely based on an indicators exercise undertaken in 2000 by OXERA for the governments of the UK and the Netherlands. See DTI and Ministry of Economic Affairs (MEA) (2000), 'Energy Liberalisation Indicators in Europe: A Consultation Paper based on a study carried out by OXERA for the Governments of the UK and the Netherlands', October.

The indicators framework

The present indicator project provides a methodological framework based on the supply-chain structure of the electricity market. At the simplest level, activities along the electricity supply chain can be divided into two categories:

- (potentially) competitive activities, mostly in the upstream generation market and the downstream supply market; and
- (naturally) monopolistic network activities primarily present at the transmission and distribution network level.

Such a distinction also underlies the motivation behind the electricity liberalisation directive (96/92/EC).

Within each of the two basic categories, three key areas of focus were identified. A number of individual indicators were then developed in each area to cover aspects of the market influenced by liberalisation and to characterise framework conditions necessary for competitive entry to occur. For (potentially) competitive areas of the supply chain, the areas identified were generation markets, wholesale markets, and customer supply. For each of these, further sub-groups of indicators were identified, which can be summarised as follows.

1. Competition in power generation

Individual indicators in this market area refer to:

- market concentration;
- generation market characteristics;
- entry and decommissioning; and

pan-European integration, such as cross-border flows.

2. Development of wholesale markets

Individual indicators in this market area refer to:

- the emergence, growth and international character of standardised wholesale markets;
- wholesale price movements;

the existence of balancing and penalty regimes.

3. Competition in the supply of customers

Individual indicators in this market area refer to:

- market opening and concentration;
- entry conditions and the existence of customer load profiling;
- internationalisation of supply markets;
- customer switching and contract renegotiations; and

price and quality indicators.

The indicators measuring the impact of liberalisation in (naturally) monopolistic, or non-competitive, areas of the electricity market also focus on three key areas, each encompassing a number of sub-groups summarising individual indicators. These areas refer to network activities, interconnection of national networks, and indicators of regulatory influence. Each set of indicators and their principal sub-groups are summarised below.

1. Network activities

Individual indicators in this market area refer to:

- the degree of separation between network and other activities;
- the scope of monopoly rights;
- the type of access regimes and the publication of access tariffs;
- the cost of access; and

the type of security-of-supply obligations (SSOs).

2. Interconnection of national networks

Individual indicators in this market area refer to:

- technical openness (in terms of available interconnector capacity);
- foreign market participation (in terms of interconnector capacity accessible to non-incumbents);
- congestion management; and

cross-border tariffication.

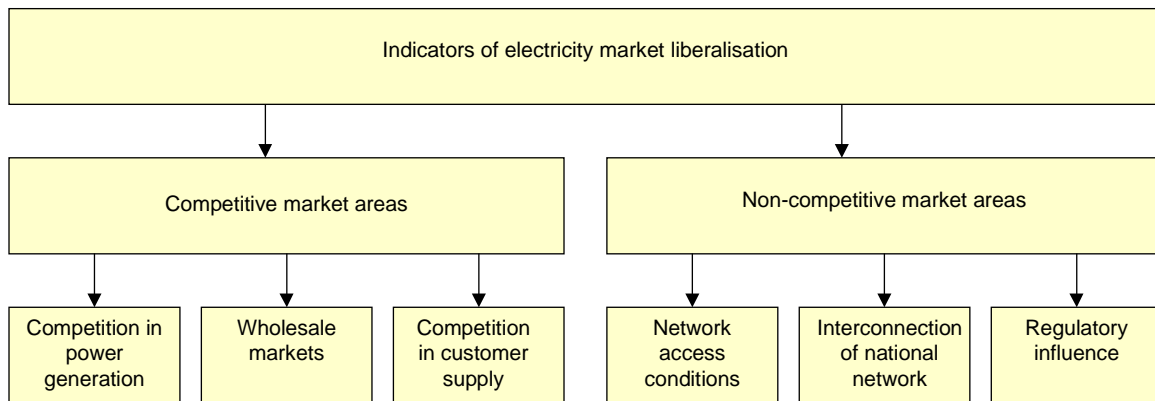
3. Regulatory influence

Individual indicators in this market area refer to:

- the level of energy taxes;
- the extent of public-service obligations (PSOs);

the scope of regulatory activities, and the division of power between different regulatory authorities.

The figure below provides a schematic view of the structure of the indicator framework underlying the present report.

Figure 1: Summary of indicator framework

As a general rule, the individual indicators in all market areas refer to two aspects linked to liberalisation and competition.

- **Changes in market structures, from which conclusions about the success or failure of liberalisation can be drawn**—an example of this group of indicators is given by the market concentration indicators: in countries where a monopolistic market structure prevailed before liberalisation, the number of independent generators or suppliers is expected to increase with successful liberalisation. Their number therefore provides an indicator of the successful development of competition. Another example is provided by price indicators: competition is expected to provide an incentive to lower prices, and the monitoring of price movements is therefore included in the indicators.
- **Framework market conditions enhancing the development of competition**—an example of this second group of indicators is provided by the establishment of regulated third-party access (RTPA) regimes, or the introduction of standardised load profiling in the residential market, without which switching of small customers cannot be managed. Another example is the emergence of standardised wholesale markets, which can be the result of regulatory intervention, or be due to private market initiatives.

A special feature of the indicator framework developed is that, in each of the key market areas, certain indicators have the explicit objective of monitoring the integration of national markets into a single European market. Such indicators include the emergence of pan-European generators or suppliers operating in a number of national markets, the development of cross-border trade, or the importance of international participants in national wholesale markets.

The indicators selected for the European Commission project are presented in a set of tables below. The following paragraphs provide explanatory notes for the summary view offered by the tables.

Data sources

The tables follow the classification of the indicators into three competitive and three non-competitive market areas. They also contain information on the principal data sources used to evaluate the indicators in the empirical part of the report.² The main data sources used in the context of this report are as follows.

- **EUROSTAT**—this source refers both to data received in response to the indicator questionnaire sent by EUROSTAT to national statistics offices at the end of 2000, and to those collected regularly by EUROSTAT in its function as the official statistics body of the EU. This latter category contains mainly price data.
- **EURELECTRIC**—this source refers to data received in response to the indicator questionnaire sent by EURELECTRIC to its members in the second half of 2000.
- **Questionnaire**—this source refers to data received in response to the project-specific questionnaires sent by the consultants in April 2001 to the five following industry stakeholder groups: customer associations; industry associations; regulatory authorities; relevant ministerial bodies; and TSOs. In total, 59 questionnaires were sent out, and 30 responses had been received as of September 25th 2001.
- **UCTE and ETSO**—these two Europe-wide industry associations have proved particularly helpful in providing statistics and data on national power balances, as well as cross-border transfer capacities.
- **EPIC**—this source refers to the generation market database operated by ESAP. This database is used in a number of other public European Commission documents, such as the European Commission Annual Energy Review.
- **Other sources**—which include power exchange web sites, data from reporting agencies (such as Platts), and company data from reports and web sites.

Prioritisation of indicators

A further feature of the summary tables is that indicators considered of particular importance and usefulness are highlighted and colour-coded (in green and yellow). These highlighted indicators are thereafter called ‘key indicators’. The consultants recommend that key indicators be included in future European Commission indicator publications, and that they be updated regularly. The colour coding has been introduced because of issues raised by the empirical evaluation of the indicators.

² A detailed discussion of the data sources is provided in the report and its appendices.

- **Green**³ denotes key indicators which provide essential information on European electricity markets and for the evaluation of which official data sources exist and have been used in this report. Indicators in the ‘green’ category include, for example, simple market concentration measures,⁴ country power balances, retail price indices, or indicators characterising access regimes.
- **Yellow** denotes key indicators which are so far not very developed, either because of restrictions on official and/or harmonised data available for their evaluation, or because of lack of a standardised definition referring to the industry aspect in question. In order to benefit from the valuable information represented by these indicators, the data harmonisation and collection process needs to be improved from its current level. It is recommended that efforts be undertaken at European level to include the indicators in future EU publications. Examples of indicators highlighted in yellow include measures of vertical integration in the industry, and concepts of service quality, security of supply and ancillary services, for which definitions at a European level are not yet standardised.

Indicators without highlights (thereafter referred to as ‘secondary indicators’) sum up two sets of circumstances.

- The most important reason for classifying indicators as secondary is the belief that, for a number of indicators, it will be very difficult to obtain public information, even if the European Commission undertakes future efforts in the area. This is because certain indicators refer to information that companies consider highly commercially sensitive, and the willingness to make such data available to the public is esteemed to be very low. A case in point is information referring to volumes traded by individual members on wholesale markets, or to contracts renegotiated between suppliers and customers in lieu of supplier switching.
- Other indicators have been classified as secondary because it is considered that the interpretation difficulties associated with them are too substantial to warrant setting up a centralised data-collection system for them. Examples of such indicators include the average waiting time for obtaining generation plant authorisation, or the number of wholesale market participants that can set the system marginal price.

It should be noted that it seems unavoidable that the prioritisation of the indicators is to a certain extent subjective, and subject to changes as new information becomes available. While the consultants’ assessment is based on the theoretical and empirical work undertaken in the context of this project, changes to the classification are possible at any point.

³ If this report is printed in black and white, the green shows as a dark grey, and the yellow as light grey.

⁴ It should be noted that market concentration measures based on consolidated data taking into account indirect as well as direct stakes held by generators and suppliers present considerable data problems and cannot be included in the ‘green’ category.

Indicators of market competition

Generation markets

Table 1: Summary of indicators of power generation

Indicator	Data sources ¹
1.1 Market concentration	
Market share of the largest generator (share in total capacity)	EUROSTAT, EURELECTRIC
Market share of the three largest generators (share in total capacity)	EUROSTAT, EURELECTRIC
List of generators with market share of 5% or above (share in total capacity)	EUROSTAT, EURELECTRIC
Market share of the largest generator (share in total generation)	EUROSTAT, EURELECTRIC
Market share of the three largest generators (share in total generation)	EUROSTAT, EURELECTRIC
List of generators with market share of 5% or above (share in total generation)	EUROSTAT, EURELECTRIC
1.2 Available generation capacity, production and type of plant	
Generation market make-up—types of plant	EUROSTAT
Versatility of generation	EURELECTRIC, EPIC
Balance of meeting peak demand	EURELECTRIC, UCTE
1.3 Vertical integration upstream and downstream	
Share of generation vertically integrated with supply/distribution (ownership links)	EPIC, company reports
1.4 Entry in generation	
Share of new/repowered capacity coming on stream in total national capacity (%)	EPIC
Share of decommissioning plants in total national production capacity (%)	EPIC
Average wait (months) between applying for and obtaining generation plant authorisation	Questionnaire
Number of generation plant applications received per year	Questionnaire
Number of generation plant applications granted per year	Questionnaire
1.5 Internationalisation	
Share of foreign ownership in total capacity	Company information, *
Share of foreign ownership in new generation capacity	Company information, *
1.6 Pan-European market concentration	
Market shares of the ten largest companies in European market	Company information
1.7 Cross-border exchanges	
Share of imports in total consumption	UCTE

Notes:¹ An asterisk in Tables 1 to 3 denotes data being commercially confidential.

Wholesale markets

Table 2: Summary of indicators of wholesale markets

Primary indicator	Data sources
2.1 Standardised wholesale markets	
Existence of standardised wholesale market	Individual exchanges
Existence of standardised contracts	Individual exchanges
Existence of derivatives market	EFET, individual exchanges
Standardised wholesale market planned	Press reports
Number of participants	Individual exchanges
Share of total market volume traded on standardised wholesale markets	Individual exchanges
Number of participants that can set the system marginal price	* (requires in-depth analysis)
Average, minimum and maximum monthly prices	Individual exchanges
2.2 Internationalisation	
Number of non-domestic members	Individual exchanges
Volumes traded by non-domestic members	*
2.3 Balancing mechanism	
Existence and type of balancing mechanism	Questionnaire
Existence and type of penalty regimes	Questionnaire
2.4 Bilateral wholesale markets	
Volumes of long-term contracts	*
Volumes of short-term contracts	*
Wholesale prices	Platts

Supply markets

Table 3: Summary of indicators of supply market liberalisation

Primary indicator	Data sources
3.1 Degree of market opening	
Share of eligible customers	European Commission
Liberalisation planned	European Commission
3.2 Market concentration measures	
Number of suppliers (retailers, wholesalers and traders selling to final customers)	EURELECTRIC, EUROSTAT
Market shares of the largest supplier	EURELECTRIC, EUROSTAT
Market shares of the three largest suppliers	EURELECTRIC, EUROSTAT
List of all suppliers with 5% or above	EURELECTRIC, EUROSTAT

Table 3: Summary of indicators of supply market liberalisation (cont'd)

Primary indicator	Data sources
3.3 Entry conditions	
Existence of load profiles for residential customers	Questionnaire
3.4 Internationalisation	
Share of eligible customers supplied by non-domestic suppliers (number of customers)	Questionnaire
Market share of non-domestic suppliers in eligible market (volume of sales)	Questionnaire
3.5 Pan-European market concentration	
Pan-European participation of supply companies	* (information not in company reports)
3.6 Customer switching	
3.6.1 Switching of industrial customers	
Percentage of eligible customers switching supplier (numbers)	EUROSTAT, EURELECTRIC
Percentage of eligible customers switching supplier (volume)	EUROSTAT, EURELECTRIC
3.6.2 Switching of residential customers (where relevant)	
Percentage of eligible customers switching supplier (numbers)	EUROSTAT, EURELECTRIC
Percentage of eligible customers switching supplier (volume)	EUROSTAT, EURELECTRIC
3.6.3 Contract renegotiations in the industrial market	
Share of contracts renegotiated with incumbent suppliers (number of contracts, %) since start of liberalisation	Questionnaire, *
Share of contracts renegotiated with incumbent suppliers (TWh, %) since start of liberalisation	Questionnaire, *
3.7 Retail prices	
3.7.1 Eligible customers	EUROSTAT
3.7.2 Non-eligible customers	EUROSTAT
3.7.3 Households to industrials rebalancing ratio	EUROSTAT
3.8 Service quality	
Continuity of supply—interruptions (minutes/year)	Questionnaire
Continuity of supply—interruptions (number/year)	Questionnaire
Restoring the electricity supply	Questionnaire

Indicators of non-competitive impacts of liberalisation

Network activities

Table 4: Summary of indicators of network unbundling and access

Primary indicator	Data sources
4.1 Separation of network activities	
<i>4.1.1 Transmission network</i>	
Identity of the owner of the transmission grid	Questionnaire
Identity and ownership of the TSO	Questionnaire
Legal/management separation enforced	Questionnaire
Account unbundling enforced	Questionnaire
<i>4.1.2 Distribution network</i>	
Ownership separation between supply and distribution business	Questionnaire
Legal/management separation enforced	Questionnaire
Account unbundling enforced	Questionnaire
4.2 Scope of monopoly rights	
Is there a legal monopoly on ancillary services?	Questionnaire
In the case of monopoly ancillary services, what share of these is contracted out?	Questionnaire
If there is no legal monopoly on ancillary services, what market share is held by the incumbent?	Questionnaire
Is entry into ancillary network services observed?	Questionnaire
4.3 Access regime	
<i>4.3.1 Transmission</i>	
Type of access regime	Questionnaire
Published standard tariffs available	Questionnaire
<i>4.3.2 Distribution</i>	
Type of access regime	Questionnaire
Published standard tariffs available	Questionnaire
<i>4.3.3 Ease of access</i>	
Number of access disputes outstanding	Questionnaire
Number of companies that have to be negotiated with in order to provide a nationwide service	Questionnaire
4.4 Cost of access	
Ratio (energy costs:network costs)	European Commission— separate report
Diversity of tariffs	European Commission— separate report
4.5 Security-of-supply obligations (SSOs)	
Are SSOs imposed on network operators?	Questionnaire
What form do SSOs take?	Questionnaire

Table 4: Summary of indicators of network unbundling and access (cont'd)

Primary indicator	Data sources
4.6 Technical background data	
Total length of network—distribution	Questionnaire, ETSO-separate report
Total no. of customers—residential	Questionnaire, ETSO-separate report
Total no. of customers—industrial	Questionnaire, ETSO-separate report

Interconnection

Table 5: Summary of interconnection indicators

Primary indicator	Data sources
5.1 Technical openness	
Share of interconnector capacity in total national capacity (available transfer capacity, ATC)	ETSO, TSOs
Planned increase in share of interconnector capacity	ETSO, UCTE
Historical development of share of interconnector capacity	ETSO, TSOs
5.2 Foreign market participation	
Share of imported production in national consumption	EUROSTAT, IEA
Share of available interconnector capacity reserved for incumbents	not available
Utilisation rate of cross-border transmission lines	not available
5.3 Congestion management	
Type of congestion management in force	TSOs (requires in-depth analysis)
5.4 Cross-border tariffs	
Level of cross-border tariffs	European Commission—separate report

Regulatory influence

Table 6: Energy policy indicators

Primary indicator	Data sources
6.1 Energy policies	
<i>6.1.1 Taxes</i>	
Share of energy taxes in retail prices	EUROSTAT
Share of environmental taxes in retail prices	EUROSTAT
<i>6.1.2 Public-service obligations (PSOs)</i>	European Commission— separate report
6.2 Scope of regulatory activities	
<i>6.2.1 Access issues</i>	
Who has the power to determine access terms and conditions—the regulator, the ministry or another institution?	Questionnaire
Who has the power to rule on access disputes—the regulator, the ministry or another institution?	Questionnaire
Who has the power to impose unbundling measures and/or structural separation—the regulator, the ministry or another institution?	Questionnaire
Who acts as instance of appeal against decisions in the access area?	Questionnaire
<i>4.2.2 Tariff issues</i>	
Who has the power to determine network access and transmission tariffs—the regulator, the ministry or another institution?	Questionnaire
Who acts as instance of appeal against decisions in the tariff area?	Questionnaire
<i>4.2.3 Interconnection issues</i>	
Who has the power to determine rules for interconnection access and usage tariffs—the regulator, the ministry or another institution?	Questionnaire
Who acts as instance of appeal against decisions in the interconnection area?	Questionnaire
<i>4.2.4 Wholesale and retail markets</i>	
Who has the power to determine the rules of the wholesale market—the regulator, the ministry or another institution?	Questionnaire
Who acts as instance of appeal against decisions in the wholesale market area?	Questionnaire
Who has the power to determine rules on the retail market (eg, fixing of retail tariffs)—the regulator, the ministry or another institution?	Questionnaire
Who issues the licences—the regulator, the ministry or another institution?	Questionnaire
Who acts as instance of appeal against decisions in the retail market area?	Questionnaire
Who has the power to investigate anti-competitive behaviour—the regulator, the ministry or another institution?	Questionnaire

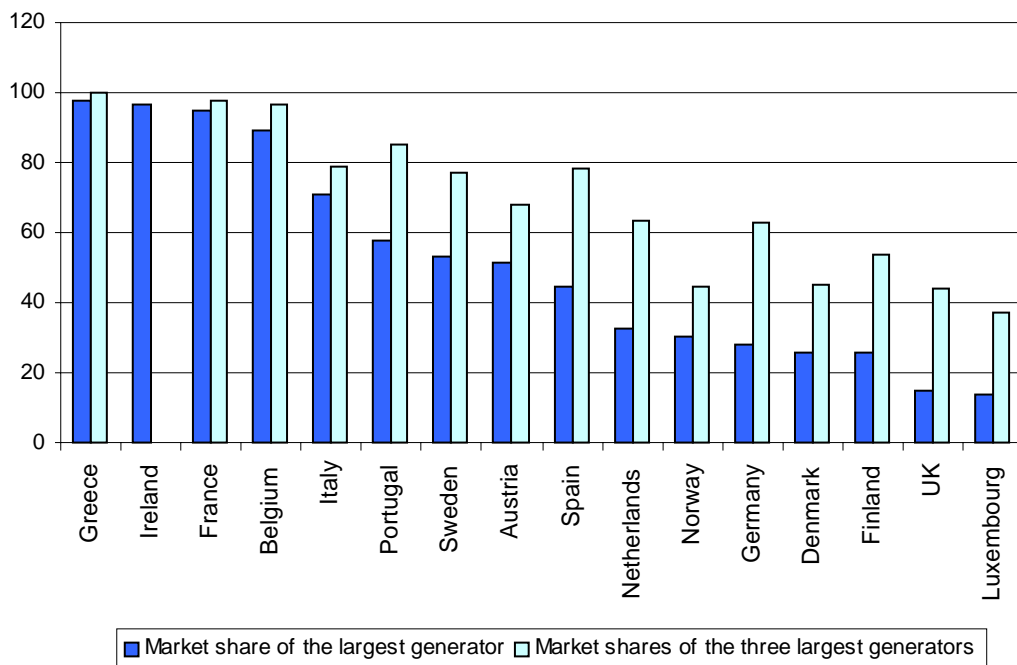
Presentation of selected key indicators

To illustrate how the indicators can be presented, a few selected key indicators are shown below.

The illustrative figures and tables refer to indicators of:

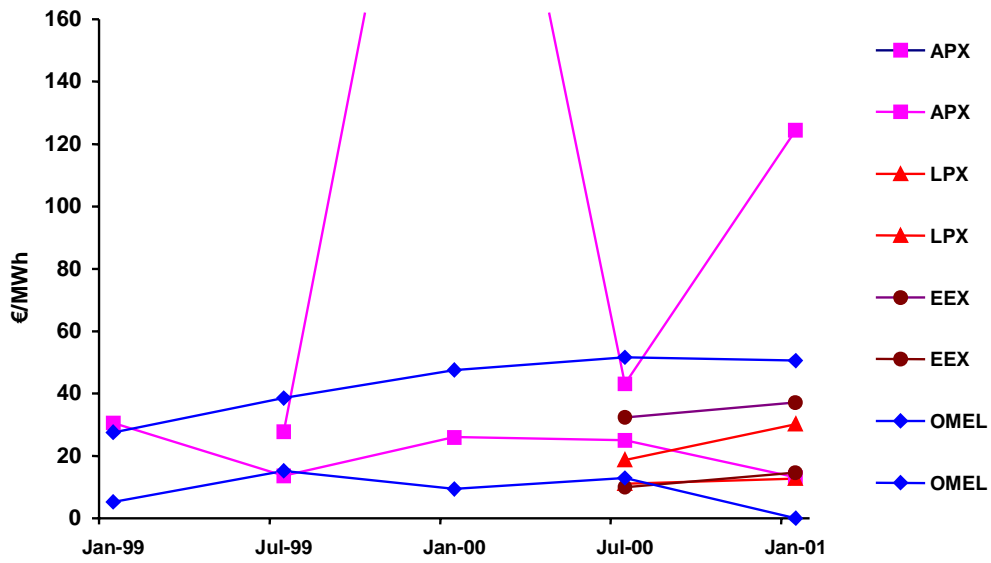
- market shares in total national generation capacity—these can be used to evaluate market concentration in a given generation market;
- average monthly prices of European power exchanges and power pools—this indicator can be used to evaluate a possible convergence of regional wholesale prices;
- the size of eligible and non-eligible markets in Europe—this allows progress in providing access to customer markets to be compared;
- the extent of unbundling in European transmission and distribution networks—this indicator is helpful, for example, to evaluate the necessity of imposing further structural remedies regarding the separation of network activities;
- technical openness and foreign market participation—this is one of the indicators providing information about the potential for integration between markets;
- taxation of domestic customers—energy taxes play an important role in overall demand and can, for example, influence the attractiveness of a market to foreign investors.

Figure 2: Market shares (%) in total national generation capacity, 1999/2000



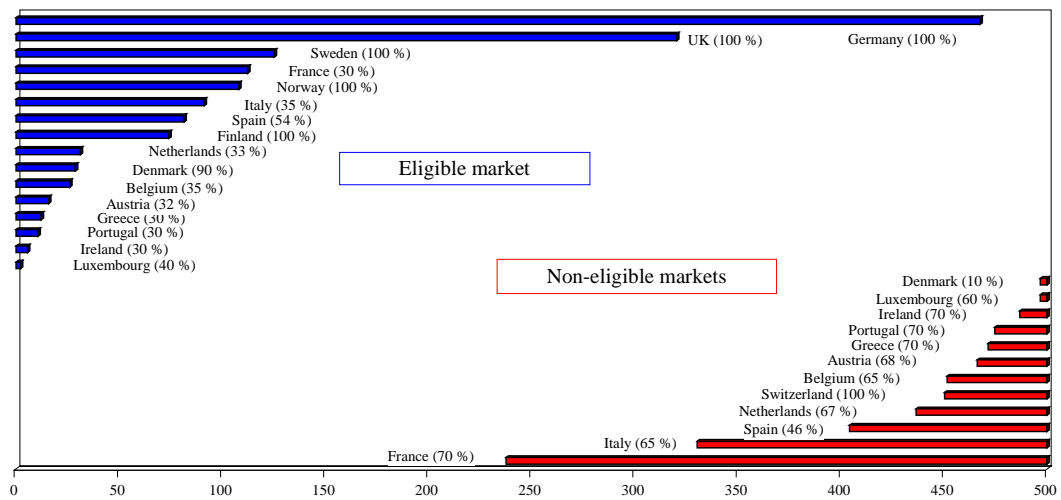
Source: EURELECTRIC and EUROSTAT.

Figure 3: Maximum and minimum monthly prices on European power exchanges and power pools



Sources: APX, EEX, LPX, OMEL.

Figure 4: Size of eligible and non-eligible markets in Europe (market size in TWh)



Source: ATOM.

Table 7: Extent of network unbundling

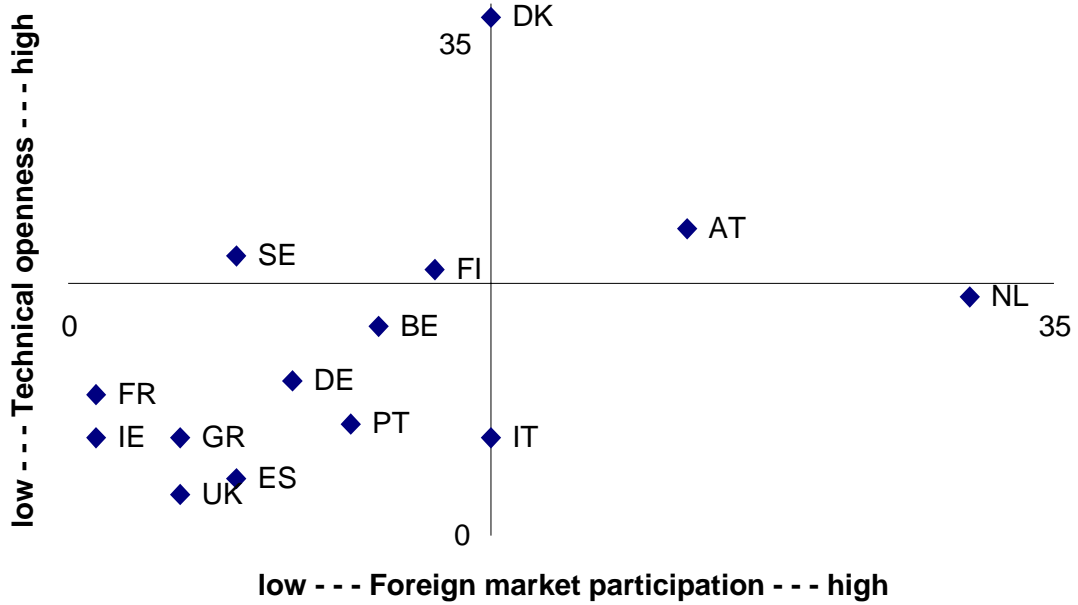
Country	Transmission network			Distribution network		
	Ownership separation of the TSO	Legal/ management separation	Account unbundling	Ownership separation	Legal/ management separation	Account unbundling
Austria	x	x	✓	x	x	✓
Belgium	x	✓	✓	x	x	✓
Denmark	x	✓	✓	x	x	✓
Finland	x	✓	✓	x	✓	✓
France	x	✓	✓	x	✓	✓
Germany	x	✓	✓	x	✓ ¹	✓
Greece ²	x	✓	✓	x	x	✓
Ireland	✓	✓	✓	x	x	✓
Italy	✓	✓	✓	x	✓	✓
Luxembourg ³	—	—	✓	—	—	✓
Netherlands	✓	✓	✓	x	✓	✓
Norway	✓	✓	✓	x	x	✓
Portugal	x	✓	✓	x	x	✓
Spain	x	✓ ⁴	✓	x	✓ ⁴	✓
Sweden	✓	✓	✓	x	✓	✓
UK (GB)	✓	✓	✓	x	✓ ⁵	✓
UK (NI)	x	✓	✓	x	✓	✓

Key: Information shaded in grey has been verified through responses received to the project-specific questionnaire; all other information has been collated through desk research. ✓ signifies that the feature of network unbundling referred to has been implemented, x that it has not.

Notes: ¹ For some of the largest distribution system operators. ² Greece has adopted a law for the transposition of the electricity directive but has an additional two years in which to implement the legislation. ³ The small Luxembourg transmission network (eg, only 91 km for Cegedel) is considered part of the distribution network since it simply links RWE and Electrabel to the distribution network in Luxembourg. ⁴ Legal separation from generation and retailing activities, but only accounting separation from transmission/distribution activities. ⁵ Business separation is due to be introduced in August 2001. There will be a requirement for public electricity suppliers (PESs) to separate legal entities, for example in terms of management, operations and local.

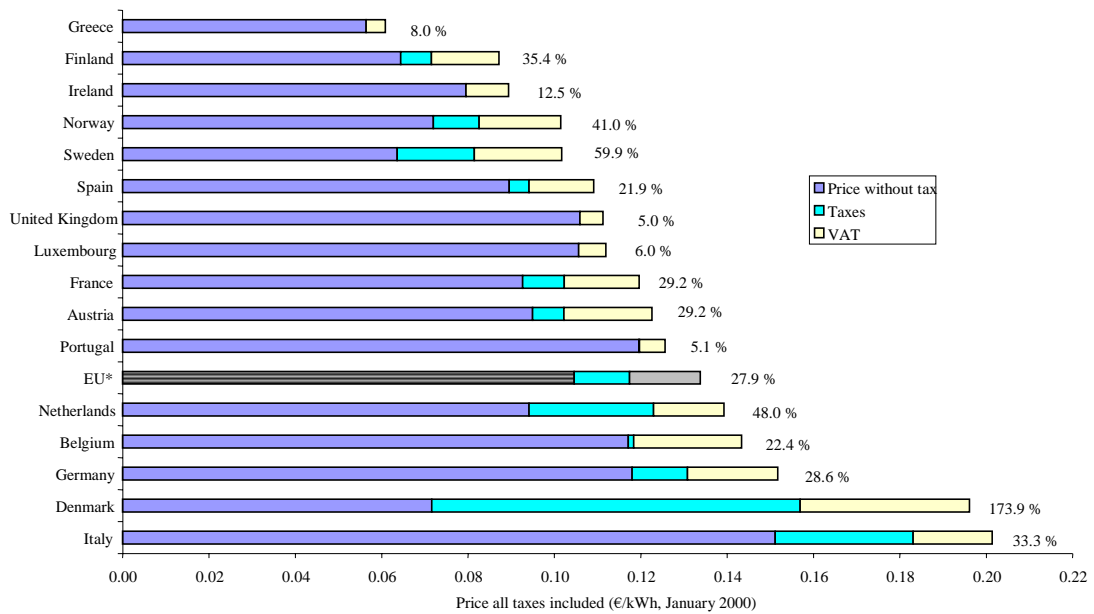
Sources: OXERA, Elkraft System AMBA (Denmark), Fingrid System Oy (Finland), DVG (Germany), GRTN (Italy), Statnett SF (Norway), Red Eléctrica de España (REE) (Spain), Svenska Kraftnät (Sweden), National Grid Company (NGC) (UK), Northern Ireland Electricity (NIE) (Northern Ireland).

Figure 5: Technical openness and foreign market participation



Source: ECN, based on data in Tables 9.1 and 9.4.

Figure 6: Taxation of domestic customers with consumption of 3.5 MWh/year



Notes: Data not available for Switzerland. * EU: Norway not included. The percentages show the importance of total taxes, in per cent of the price without tax.
Source: EUROSTAT.

Recommendations and next steps

One of the main conclusions emerging from this project is that the indicators work needs to be placed in a wider context. This report presents a methodologically sound framework and contains an initial evaluation of the indicators. This evaluation is based on a number of public and private data sources discussed earlier in this Executive Summary and in detail in the full report.

However, some issues still need to be tackled at a theoretical and, above all, empirical level, and these require a concerted pan-European consultation process. Such a consultation process could be coordinated by the European Commission or EUROSTAT, or any other supra-national body deemed appropriate. The aim of the consultation would be to institutionalise the collection of harmonised data. Remaining issues to be addressed include the following.

- *Definition issues*—the precise definition of some indicators needs to be agreed upon. The adoption of standardised indicators by all member states and/or relevant industry bodies is necessary to ensure that data are prepared in a harmonised and comparable format across Europe.
- *Data-collection issues*—there is a need to set up permanent data-collection mechanisms in all member states to ensure the continuity and consistency of the monitoring aspect. National regulatory authorities would be well placed to take responsibility for such mechanisms; however, the involvement of other institutions might also be envisaged.

The most constructive way forward now seems to be to use the present framework as a discussion base for pan-European industry and regulatory forums and expert working groups. Such concerted work should lead to a single data-collection exercise for a standardised set of indicators that could be updated regularly at a national and European level.
