



CEER  
Security of Electricity Supply  
Report 2004

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## EXECUTIVE SUMMARY

This report presents the security of electricity supply situation in the CEER member countries that participated in the work of the CEER Working Group / Task Force Security of Supply, in terms of:

- Organisational issues and institutional arrangements
  - Responsibility for security of supply
  - Power system value chain and security of supply
- Emergency regulation, prevention and remedy of crisis situations
- Power system security criteria
- Methodology for validation of non-delivered energy

The purpose of the report is to give a comprehensive overview of the actual situation and practical implementation of the security of supply issues mentioned above. The report contains neither qualitative nor quantitative validation of any of the components covered. Furthermore, no recommendations whatsoever are provided.

## PARTICIPANTS

The report was produced by representatives of the CEER member regulatory authorities, who contributed to the activities and work of the CEER Working Group / Task Force Security of Supply in 2003 and 2004.

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## INTRODUCTION

The term 'security of supply' represents an all encompassing phrase for efficient investment, maintenance, and operation and is closely related to the quality in supplying electric power through the whole value-chain from the electricity power generator to the end user. Different stakeholders emphasise different elements.

Within this structure and problem space, the CEER TF Security of Supply has proposed the following definition for security of supply:

*"Security of supply means that customers have access to electricity  
at the time they need it with the defined quality and  
at a transparent and cost-oriented price "*

It is obvious that this definition implies dependencies between security of supply, technical quality of supply, commercial (service) quality and reliability.

Whereas the definition above indicates the key objectives in achieving security of supply, different regulatory approaches in the EU member states often lead to different implementation and specific actions. These differences are referred to where necessary.

The report is intended to be updated as and when necessary in order to provide information about relevant developments and to support future regulatory tasks, especially those related to monitoring of security of supply. Optionally the scope of the report may also be extended if this is considered necessary by the CEER, adding additional topics of interest.

## 1. ORGANISATIONAL ISSUES AND INSTITUTIONAL ARRANGEMENTS

### 1.1 Responsibility for Security of Supply

The national governments, who are the decision makers and are responsible for strategic goals, energy regulatory authorities, who are responsible for regulating the power markets, Transmission and Distribution System Operators (TSO, DSO), and other stakeholders including the European Commission<sup>1</sup>, all bear responsibility for security of supply, depending on the legal framework and regulatory environment in the state concerned.

The formally assigned legal and material responsibilities of different stakeholders for specific areas of security of electricity supply are presented in this chapter.

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<sup>1</sup> Presently the EC has no formal responsibility for energy policy or security of supply. Nevertheless, it is expected that the EC will have significant role in all the aspects of security of supply in the future.

1.1.1 RESPONSIBILITIES FOR THE SHORT-TERM SECURITY OF TRANSMISSION GRID OPERATION				
COUNTRY	GOVERNMENT	REGULATOR	TSO	OTHERS
Austria	Grants concession to TSO	Grid code, market rules	Planning, operation, control, maintenance	-
Belgium	The federal government appoints the TSO and approves grid code and rules. Walloon region: The regional government appoints the LTSO (Local Transmission System operator) and approves grid code and rules	The federal regulator gives an advice on grid codes and rules. Walloon region: The regional regulator writes grid codes and rules in coordination with the LTSO	Planning, operation	-
Denmark	Grants concession to TSO	-	Grid code, market rules, planning, operation	-
Finland	Sets overall regulatory framework - Electricity Market Act sets system responsibility to TSO	Supervision of Electricity Market Act and its system responsibility functions	Grid code, planning, maintenance, operation	Follow instructions set up by the TSO
Great Britain	Sets overall regulatory framework	Oversight through effective regulation, approval of grid code changes	Planning, operation	-
Greece	Minister of Development approves the grid code	Grants an opinion to the Minister of Development regarding the approval of the grid code	Real time operation, control, procurement of ancillary services	Public Power Corporation (PPC) - vertically integrated company: owner of the transmission grid, responsible for grid maintenance and all aspects of technical support.
Ireland	Legislation grants exclusive responsibility to TSO.	Oversight through effective regulation, approval of grid code changes	Real time operation and planning duties	Transmission Asset Owner - maintenance and construction
Italy	Ministry is responsible for security of supply & setting of directives to other subjects	Establishes dispatching framework rules, approves TSO rules where responsibility is identified	Operational responsibility for security of supply	-
Netherlands	-	Grid code	Operational planning, operation & congestion management	-

1.1.1 RESPONSIBILITIES FOR THE SHORT-TERM SECURITY OF TRANSMISSION GRID OPERATION <i>(cont'd)</i>				
COUNTRY	GOVERNMENT	REGULATOR	TSO	OTHERS
Norway	Directions	Directions	Planning, operation, coordination (subcontractors' reaction times considered vs. incentives/penalties)	Grid owners: inspection, maintenance
Portugal	Grants concession to TSO, Transmission Grid Code	Dispatching Code	Planning, operation, maintenance	-
Spain	Grid code	Check ex-post TSO's decisions	Grid code proposal, forecasts, coordination and operation	Grid owners: maintenance
Sweden	Grants concession to TSO	-	Planning, operation	-

1.1.2 RESPONSIBILITIES FOR THE SHORT-TERM SECURITY OF DISTRIBUTION GRID OPERATION				
COUNTRY	GOVERNMENT	REGULATOR	DSO	OTHERS
Austria	The governments of federal states grant concession to DSOs	Distribution code, market rules	Planning, operation, control, maintenance	-
Belgium	Under the responsibility of the regional governments, depends on the region. Distribution code, rules. Walloon Region: The regional government appoints the DSOs, approves grid code & rules	Under the responsibility of the regional regulators, depends on the region. Distribution code, rules. Walloon Region : The regional regulator writes distribution code and rules, in coordination with the DSOs.	Planning, operation	-
Denmark	Rules	-	Planning, operation	-
Finland	Sets overall regulatory framework - Electricity Market Act sets system responsibility to DSO	Supervision of Electricity Market Act and its quality of supply functions	Grid code, planning, maintenance, operation	Follow instructions set up by DSO
Great Britain	Sets overall regulatory framework for supply of electricity	Oversight through effective regulation, approval of the distribution code changes	Planning and real time operation	-
Greece	Minister of Development approves the distribution code.	Grants an opinion to the Minister of Development regarding the approval of the distribution grid code.	PPC: Owner of the distribution grid, responsible for all technical and operational aspects.	-
Ireland	Legislation grants exclusive responsibility to the DSO	Oversight through effective regulation, approval of the distribution code changes	Real time operation and planning duties	-
Italy	Grants concession to DSO implying security management	Economic resources for DSO to guarantee security of supply through tariffs, quality regulation through standards	Concession includes responsibility for security of supply	-
Netherlands	-	Distribution code	Operational planning, operation, congestion management	-
Norway	Directions	Directions	-	Grid owners: inspection, maintenance
Portugal	Distribution Code, Quality of Service Code	Supervision of fulfilment of Quality of Service Code	Planning, operation and maintenance	-
Spain	-	-	Operation	Grid owners: maintenance
Sweden	Grants concession	Distribution code	Planning, operation	-

1.1.3 RESPONSIBILITIES FOR THE LONG-TERM SECURITY OF TRANSMISSION GRID INFRASTRUCTURE				
COUNTRY	GOVERNMENT	REGULATOR	TSO	OTHERS
Austria	Approves grid extensions	Sets and approves tariffs	Forecast (grid), planning, coordination	-
Belgium	The federal government approves grid development plan. Walloon Region: The regional government approves the local transmission grid development plan	The federal regulator collaborates on the elaboration of the grid development plan and approves tariffs. Supervision & monitoring of the TSO. Walloon Region: The regional regulator collaborates on the elaboration of the local transmission grid development plan and gives an advice to the regional government	Elaboration of the grid development plan and implementation of the approved plan. Grid maintenance Walloon Region : Elaboration of the local transmission grid development plan and implementation of the approved plan. Local transmission grid maintenance	-
Denmark	Approves grid extensions	Approves tariffs	Forecast, planning, coordination	-
Finland	Overall regulatory framework - Electricity Market Act includes responsibility to develop grid infrastructure. Ministry of Trade and Industry approves cross-border expansion of grid	Approves grid expansions over 110 kV. Approves regulated asset base, rate-of-return-on capital & efficient operational costs	Forecast of transmission needs, planning, coordination	Information regarding the transmission needs
Great Britain	Sets overall regulatory framework for supply of electricity	Approves tariffs and sets standards, price controls	Planning, maintenance, coordination	-
Greece	Minister of Development approves the 5-year grid development plan (which imposes investment obligation), approves the budget and the use-of-system tariffs. Private projects are not allowed.	Grants opinion to the Minister of Development regarding approval of the 5-year development plan and assignment of grid extension projects. Approves the regulated asset base, the rate-of-return-on capital and operational costs.	The Independent System Operator recommends the 5-year development plan on rolling annual basis and supervises the implementation of the approved plan.	Public Power Corporation (vertically integrated company, transmission grid owner): Implements the investments of the approved development plan if being assigned to. Third Parties implement the approved development plan if selected after international tender carried out by the ISO.
Ireland	Legislation sets out TSOs responsibility to prepare a forecast statement in a form approved by the Regulator	Approves tariffs and price controls, approves capital investment programme	Planning, coordination and system operation	Transmission System Asset Owner carries out construction and maintenance
Italy	Ministry is responsible for security of supply, sets directives to other subjects, approves long term development plan proposed by TSO	Sets infrastructure capital remuneration granting an incentive + 2% for new investments in transmission	Prepares a long term development plan which has to be approved by Ministry.	-

1.1.3 RESPONSIBILITIES FOR THE LONG-TERM SECURITY OF TRANSMISSION GRID INFRASTRUCTURE <i>(cont'd)</i>				
COUNTRY	GOVERNMENT	REGULATOR	TSO	OTHERS
Netherlands	-	Checks grid capacity plans, approves grid extensions (exceptional projects only), sets tariffs	Forecasting, planning, investment, construction, coordination	-
Norway	Directions	Directions, licensing	Planning, coordination, investment	Grid owner: planning, investment
Portugal	Grants concession to TSO and approval of Transmission Grid Code	Approval of grid investments and grid tariffs, opinion about transmission network security standards	Demand forecast, planning, coordination and investment	-
Spain	Planning	Reports to the Government the potential problems and solutions	Planning proposal	Grid owners: investment
Sweden	Grants concession	-	Planning investments	-



1.1.4 RESPONSIBILITIES FOR THE LONG-TERM SECURITY OF DISTRIBUTION GRID INFRASTRUCTURE				
COUNTRY	GOVERNMENT	REGULATOR	DSO	OTHERS
Austria	Governments of federal states grant concession to DSOs	Sets and approves tariffs	Forecast (grid), planning coordination	-
Belgium	Under the responsibility of the regional governments, depends on the region. Walloon region: The regional government approves the distribution grids development plans	The federal regulator approves the tariffs. Supervision & monitoring under the responsibility of the regional regulators. Walloon region: The regional regulator collaborates on the elaboration of the distribution grids development plans and gives an advice to the regional government	Planning and grid maintenance. Walloon region: Elaboration of the distribution grid development plan. Distribution grid maintenance.	-
Denmark	Grants concession to DSO	Approves tariffs	Planning	-
Finland	Overall regulatory framework - Electricity Market Act includes responsibility to develop network	Network licensing (sets e.g. operation area within Finland). Approves the regulated asset base, the rate-of-return-on capital and efficient operational costs regarding the grid.	Forecasts, planning	-
Great Britain	Sets overall regulatory framework for supply of electricity	Approves tariffs and sets standards, price controls	Planning, maintenance	-
Greece	Not defined, lack of legislation.	Not defined, lack of legislation.	The whole responsibility lies with the Public Power Corporation (vertically integrated company) which is the owner and operator of the distribution grid.	-
Ireland	Establishes functions of DSO in legislation	Issues Licence and monitors performance of licensee	Operate, plan and maintain a distribution system with a view to ensuring that all reasonable demands for electricity are met	-

1.1.4 RESPONSIBILITIES FOR THE LONG-TERM SECURITY OF DISTR. GRID INFRASTRUCTURE <i>(cont'd)</i>				
COUNTRY	GOVERNMENT	REGULATOR	DSO	OTHERS
Italy	As transmission	Sets infrastructure capital remuneration	Licence implies long term maintenance of security standards	-
Netherlands	-	Checks network capacity plans, approves grid extensions (only in case of exceptional projects), sets tariffs (yardstick regulation of both price and quality)	Forecasting, planning, investment, construction	-
Norway	-	-	-	Grid owner: planning, investment
Portugal	Approval of Quality of Service Code and Distribution Grid Code	Approval of grid tariffs	Demand forecast, planning, coordination and investment	-
Spain	-	-	Planning	Grid owner: investment
Sweden	Grants concession	Supervising and monitoring	Planning and investments	-

1.1.5 RESPONSIBILITIES FOR THE GENERATION ADEQUACY AND MEETING OF DEMAND					
COUNTRY	GOVERNMENT	REGULATOR	TSO/DSO	GENERATORS	OTHERS
Austria	-	Security of supply forecast, market rules	-	-	-
Belgium	The federal government approves, after advice of the regional government, the 10 year indicative program for generation.	The federal regulator elaborates a 10 year indicative program for generation.	The TSO gives an advice on the 10 year indicative program for generation.	Investments under market conditions.	
Denmark	-	-	TSO is responsible for overall long term security of supply	-	-
Finland	Regulatory framework and competition. Ministry of Trade and Industry supervises the adequacy and demand issues	Supersivion of electricity energy markets	Balancing markets	Markets	-
Great Britain	Sets overall regulatory framework for supply of electricity	Sets overall regulatory framework for supply of electricity	Power balance and market, procures balancing market reserves	Capacity determined through market mechanism	-

(\*) Note on Greece (following page): Since July 2003 the new electricity law has significantly changed the current system regarding the long-term generation adequacy. However, the law has not been applied yet.

### 1.1.5 RESPONSIBILITIES FOR THE LONG-TERM GEN. ADEQUACY AND MEETING OF DEMAND (cont'd)

COUNTRY	GOVERNMENT	REGULATOR	TSO/DSO	GENERATORS	OTHERS
Greece (*)	-	-	Every two years ISO and DSO prepare a non-binding forecast regarding generation adequacy.	-	Every supplier (i.e. holder of a supply authorization) is obliged to be the owner of generating capacity within the EU that equals: The total power allowed to serve customers (as specified in the supplier's authorisation) plus a reserve margin of 15%. PPC (vertically integrated company) is obliged to serve customers as the last-resort supplier.
Ireland	Legislation requires TSO to monitor; regulator may hold tender for new capacity	Regulator must take account of security of supply as a key criterion. Runs tenders if necessary	TSO prepares annual Generation Adequacy Statement	-	-
Italy	Releases new power plant licences, sets law for capacity payment	Applies capacity payment following frameworks set by ministry, advises government on power plant efficiency standard	Verifies daily plants availability, schedules plant repowering and maintenance in case of power shortages	-	-
Netherlands	Ministry will become responsible for monitoring security of supply	-	-	-	Market signals for Generators to invest in new generation capacity
Norway	Directions	Directions	Power balance and market, forecasting	-	Nord Pool: day-ahead market
Portugal	Approval of Generation Expansion Plan (public system)	Opinion on the Generation Expansion Plan	TSO presents a proposal for the Generation Expansion Plan (public system)	-	-
Spain	Indicative planning, market rules	Monitoring	Forecasting	Investment (under market conditions)	-
Sweden	-	-	Power balance	-	-

1.1.6		RESPONSIBILITIES FOR THE DEMAND & SUPPLY FORECASTING			
COUNTRY	GOVERNMENT	REGULATOR	TSO/DSO	GENERATORS	OTHERS
Austria	-	Security of supply forecast	-	-	-
Belgium	-	The federal regulator makes demand and supply projections in the framework of the 10 year indicative program for generation.	Makes peak demand projections	-	-
Denmark	-	-	TSO demand & supply forecast	-	-
Finland	Studies and forecasts	None	Transmission / distribution forecast and studies	As market participant on its own needs	-
Great Britain	-	None	TSO demand/ supply forecast	-	-
Greece	Studies and forecasts	Studies and forecasts	Studies and forecasts	Studies and forecasts	-
Ireland	-	Studies	Studies & Forecasts	-	-
Italy	Studies and forecasts	Studies and forecasts	Studies and forecasts, sets demand for day ahead and in relation to long term development plant.	-	-
Netherlands	Ministry will become responsible for monitoring SoS	-	-	-	Each market participant is responsible for its own demand forecasting to be able to provide balanced schedules
Norway	-	-	Execute, inform the authorities	-	-
Portugal	Approval of Generation Expansion Plan	Approval TSO and DSO forecasts for tariffs setting purposes	TSO and DSO demand and supply forecast	-	-
Spain	-	Five years forecast	Demand and supply forecast	Inform TSO: maintenance schedule and availability	-
Sweden	-	-	-	-	-

## 1.2 Power System Value Chain and Security of Supply

The responsibilities of the regulatory authorities in the countries covered by the report, with respect to the different components in the power system value chain are described below.

## 1.2.1 Generation

### Austria

No direct responsibilities. Regulator is indirectly responsible through market rules, general terms and conditions for grid users' access to the grid, grid & distribution code.

### Belgium

The federal Regulator makes proposals to the federal Government on license demands for new generation and determines the need for future generation in the framework of the 10 year indicative program for generation.

### Denmark

No direct responsibilities. Regulator is indirectly responsible through market rules, general terms and conditions for grid users' access to the grid, grid & distribution code.

### Finland

No direct responsibilities. Regulator is indirectly responsible through supervision of Electricity Market Act and Monitoring market behavior.

### Great Britain

Regulator licenses generators. Also, indirectly through market rules: general terms and conditions for grid users' access to the grid; and grid & distribution code.

### Greece

-

### Ireland

Regulator incentivises main incumbent generator to improve availability performance.

### Italy

Regulator sets capacity payment following guidelines introduced by the government, sets connection rules and tariffs, advises government on generation efficiency standards

### Netherlands

No direct responsibility. Generation adequacy is left to the market.

### Norway

Regulator handles applications for licences. Supervision and control of conditions established in given licence. Prepares and develops directions connected to this.

### Portugal

Regulator gives opinion on the Public System Generation Expansion Plan.

## Spain

Solve grid access conflicts. Report on authorizations. Monitor market behaviour. Report on Market Rules. Inspect technical issues of the power plants.

## Sweden

As indicated in chapter 1.1.

## 1.2.2 Transmission

### Austria

Tariffs setup and approval by Regulator. Market rules, general terms and conditions for access to the grid, grid and distribution code.

### Belgium

The federal Regulator approves the tariffs, approves the general terms and conditions for access to the grid, advises on the grid code and rules, and collaborates with the TSO on the grid development plan.

Walloon Region: The regional Regulator verifies the general terms and conditions for access to the local transmission grid, collaborates with the LTSO on the grid development plan.

### Denmark

Regulator defines revenue frameworks, general and individual efficiency improvement requirements. General terms and conditions for access to the grid, and grid codes.

### Finland

Regulator licenses electricity transmission companies including responsibilities for the system and grid development. Regulator approves the individual grid infrastructure expansions higher than 110 kV. Regulator supervises the system and grid development responsibilities of TSO, according to the Electricity Market Act.

### Great Britain

Regulator licenses electricity transmission. Approval of tariffs. Network operators identify and progress the individual infrastructure developments necessary to ensure that they meet the requirements of their licence and/or the relevant planning standards. Failure to develop the network appropriately resulting in breach of licence is a matter for Regulator.

### Greece

Regarding the short-term security of the transmission grid operation, Regulator grants an opinion to the Ministry of Development on the approval of the transmission grid code.

The regulator grants an opinion to the Ministry of Development regarding the approval of the TSO's 5-year transmission grid development plan. It also approves the regulated asset base, the rate-of-return on capital and the operating expenses regarding the transmission grid.

## Ireland

Regulator licenses the Transmission System Operator and the Transmission System Owner (asset owner). Also regulates transmission tariffs (Transmission Use of System) and third party access and approves transmission network construction and development. Regulator also approves changes to the transmission Grid Code, the ancillary service contracts and the reserve provision contracts.

## Italy

Regulator sets transmission rights and performs regulation of the transmission services (sets tariffs, grants dispatching priorities, guarantees non discriminatory access to grid)

## Netherlands

Regulator is responsible for tariff setting, approval of Technical Codes (responsibility for rule making will move to Ministry), checking of transmission capacity plans. Regulator will become (by 1 January 2005) responsible for checking quality plans (current transmission capacity plans can be regarded as part of quality plans).

## Norway

Regulator handles applications for licences, supervises and controls conditions established in a given licence. Regulator is responsible for the financial regulation of the grid owners and prepares and develops directions related to that and to the transmission tariffs.

## Portugal

Regulator gives opinion on transmission network security standards. Regulator approves the Dispatching Code, the Network Access Code, the Grid Investments Plan and tariffs.

## Spain

Regulator solves grid access conflicts, reports on grid code, inspects technical issues.

## Sweden

As indicated in chapter 1.1

## 1.2.3 Balancing

### Austria

Regulator is responsible for market rules and approval of the general terms and conditions for the clearing & settlement agents.

### Belgium

The federal Regulator approves the calculation methods and the volumes for the primary, secondary and tertiary reserves, and approves the rules for the balancing system.



## Denmark

Cost-plus regulation.

## Finland

Balancing and balance settlement is included in system responsibility of the Electricity Market Act. TSO is responsible for the system. Balancing is managed with technical reserves and regulation market by TSO. Regulator grants a licence to system responsible company and supervises the system responsibility (and also balancing) as stated in the Electricity Market Act.

## Great Britain

Regulator's responsibilities include market arrangements, approval of the general terms and conditions for the clearing & settlement agents. The power of veto on changes to the 'Balancing and Settlement' code.

## Greece

Indirect participation of Regulator through the market arrangements (grid code). Regulator decides on the details regarding the application of transmission grid code and market arrangements. It also controls the fulfillment of the requirement of the electricity law that offers for balancing must reflect the variable cost of the respective generating unit.

## Ireland

Regulator establishes and oversees trading arrangements, including rules on imbalances.

## Italy

Regulator sets dispatching rules and supply resources, prepares dispatching conditions and approves dispatching rules written by the TSO

## Netherlands

Regulator is responsible for rules for provision of schedules. Basic balancing rules and settlement of imbalances are part of technical codes (system code) as approved by the Regulator.

## Norway

Regulator appoints the system operator (TSO) to operate and develop power balance market, supervises and controls the system operator.

## Portugal

Regulator approves balancing rules.

## Spain

Regulator reports on grid code and market rules and performs monitoring.

Sweden

As indicated in chapter 1.1

## 1.2.4 Distribution

Austria

Tariffs setup and approved by Regulator. Market arrangements, general terms and conditions for access to the grid, grid and distribution code.

Belgium

The federal Regulator approves distribution tariffs. Technical issues are under the responsibility of the regional authorities.

Walloon region: The local Regulator writes distribution codes and rules, in coordination with the DSOs.

Denmark

Regulator's responsibilities include revenue frameworks and general and individual efficiency improvement requirements, General terms and conditions for access to the grid, and grid codes.

Finland

Regulator licenses electricity distribution companies including grid development responsibility (within a licensed area in Finland). Regulator approves the individual network infrastructure expansions higher than 110 kV. Regulator supervises the grid development, distribution and connecting responsibilities of DSO according to the Electricity Market Act.

Great Britain

Regulator licenses electricity distribution, and is concerned with tariffs setup and approval, market arrangements, general terms and conditions for access to the grid, and the grid and distribution codes.

Greece

Regarding the short-term security of the distribution grid operation, Regulator gives an opinion to the Ministry of Development on the approval of the distribution grid code.

Owing to lack of legislation regarding the long-term security of distribution grid infrastructure, the relevant responsibilities are assumed de facto by the Public Power Corporation (a vertically integrated company), which is the owner and operator of the distribution grid.

Ireland

Regulator regulates Distribution System Operator through existing legislation and the distribution licence. As such distribution use-of-system charges, security of supply standards, distribution code conditions and retail market systems and business processes are regulated by the Regulator. DSO issues annual reports on security of

supply and general performance items. Performance is based on targets set by the Regulator.

#### Italy

Regulator approves tariffs and sets connection rules, establishes link between single buyer and DSO.

#### Netherlands

Regulator is responsible for tariff setting (based on yardstick regulation for both price and quality), approval of Technical Codes (responsibility for rule making will move to Ministry), checking of distribution capacity plans. Regulator will become responsible (by 1 January 2005) for checking quality plans (current distribution capacity plans can be regarded as part of quality plans).

#### Norway

Regulator is responsible for the financial regulation of the grid owners, and prepares and develops directions connected to that and to the transmission tariffs. Regulator handles applications from concessionaires for exemptions.

#### Portugal

Regulator is responsible for tariff setting, approval of Network Access Code and the supervision of the fulfillment of the Quality of Service Code.

#### Spain

Tariffs (report).

#### Sweden

As indicated in chapter 1.1

### 1.2.5 Supply

#### Austria

General aspects (non-discrimination, etc.)

#### Belgium

The federal Regulator elaborates a 10-year indicative programme for generation based on demand and supply projections and makes proposals to the federal Government on demands for licences for new generation.

Flemish region: On regional level, a system of supply licences is installed which determines the basic requirements any supplier must meet.

#### Denmark

General aspects (non-discrimination, etc.)

## Finland

General market supervision of competition in supply market (including non-discrimination etc.)

## Great Britain

Regulator licenses electricity supply. The role of Regulator is defined by: "competition where possible, regulation where necessary". Regulator performs general market surveillance of the competitive electricity supply market (including non-discrimination etc).

## Greece

Regulator gives an opinion to the Ministry of Development regarding granting of supply authorizations as well as the terms and conditions of the respective authorizations. Within this framework, Regulator recommends to the Ministry of Development the upper limit of the capacity to be granted to each supplier through the authorization. This limit is related to the generating capacity actually owned by each supplier within the EU.

## Ireland

End-user customers, i.e. customers not served by independent licensed suppliers, are served at tariff levels approved by the Regulator. These tariffs are reviewed on an annual basis. Regulator may also set the format of these tariffs. Other regulatory supply functions include the approval of non-revenue controls such as energy efficiency targets and targets for quality of supply.

## Italy

Regulator is responsible for market monitoring, (concurrence, transparency, access to grid etc.). Regulator registers eligible customers, sets supply rules for DSO with the single buyer.

## Netherlands

Regulator is responsible for tariff setting (for supply to non-eligible consumers) until 1 July 2004 (full market opening). After 1 July 2004, Regulator will be monitoring retail prices and may implement maximum prices.

## Norway

Regulator is responsible for the supervision and control of power pool concession to operate and develop a day-ahead market. Regulator performs financial regulation of the grid owners, prepares and develops directions connected to that and to the transmission tariffs. Regulator handles applications from concessionaires for exemption for supply of electricity.

## Portugal

Regulator is responsible for approving tariffs for customers of the public system.

## Spain

General aspects and monitoring (non-discrimination, etc.)

Sweden

As indicated in chapter 1.1.

## 1.2.6 Co-ordination, Management and Information Exchange

Austria

Regulation and supervision of the control area managers, clearing and settlement agents, distribution grids.

Belgium

Monitoring and supervision of the TSO and other market participants by the federal Regulator. The federal Regulator can request all necessary information from the TSO and other market participants.

Walloon & Flemish regions: monitoring and supervision of the LTSO, the DSOs and other market participants (e.g. the suppliers) by the regional Regulator, that can request all necessary information from all the market participants.

Regional Regulator for the Brussels Region has the right to obtain all relevant information from authorized suppliers and DSO.

Denmark

Transparency of prices and supply conditions in a broad sense.

Finland

TSO and DSOs manage and co-ordinate networks in an operational and planning sense. Regulator has the right to obtain all relevant information from TSO and DSOs. Regulator has the sole responsibility for imposing conditional financial penalties on TSO and DSOs where breach of the terms of the Electricity Market Act occurs.

Great Britain

Transmission and Distribution Companies manage and co-ordinate networks in an operational and planning sense. Necessary information exchange is governed by the relevant grid, distribution and balancing and settlement codes. Regulator has overarching powers to require information in respect of license holders' licence conditions.

Greece

Supervision and control of compliance of all authorization holders in the electricity sector (generation, transmission, distribution, supply) with the terms of the respective authorizations. Regulator has the right to obtain all relevant information from authorization holders. Regulator has the sole responsibility for imposing fines and penalties to the authorization holders in case of breach of the terms of the respective authorizations.

## Ireland

Regulator has the powers to obtain all necessary information from TSO and DSOs. The Transmission and Distribution Companies manage and co-ordinate networks in an operational and planning sense. Necessary information exchange is provided by the relevant grid, distribution and the trading and settlement codes.

## Italy

As per art 2.12 of law 481, the law that establishes the authority, together with service regulation task, Regulator is asked to guarantee the wider information on its activities. An annual list and publication of orders and activities is provided through a consultation document.

## Netherlands

Rules for coordination and information exchange are defined in technical codes (System Code, Grid Code and Metering Code) as approved by Regulator.

## Norway

Supervision and control of different concessionaires and the security of supply situation. Co-ordinate the development of different regulations.

## Portugal

Rules for coordination and information are defined in codes published by Regulator (documents of grid characterization, exchange of information, etc)

## Spain

Regulation (proposal and report) and supervision of market agents, market and system operators, etc.

## Sweden

As indicated in the chapter 1.1

## 2. EMERGENCY REGULATION

Emergency regulation, acts and laws, where they exist, have been designed in the relevant member states to be used in the crisis situations, where electricity market and market mechanisms do not function properly and the security of electricity supply has to be achieved by alternative measures.

When describing the scope and responsibilities of the Regulators in relation to emergency regulation, only *force majeure* in the international law sense (but not e.g. high price spikes, non-convergence of the market, or similar) is referred to.

2.1 WHAT EMERGENCIES ARE COVERED BY EMERGENCY REGULATION AND HOW	
COUNTRY	
Austria	Force majeure (e.g. crisis in primary energy sources)
Belgium	The TSO can take all necessary actions in case of emergency situations or upcoming emergency situations. The transmission grid code provides for the TSO to prepare a priority list for load-curtailement to different customer groups and a reconstruction code to be used in case of a large grid failure. Walloon region: The LTSO and the DSO's may take all necessary actions, but the TSO actions prevail always.
Denmark	The system responsible company can take the necessary steps to redistribute production, trade and consumption
Finland	Force majeure giving the authorities (Ministry of Trade and Industry and NESAs) and TSO authority to impose rules to save the system and transmit the existing power
Great Britain	Force majeure (e.g. crisis in primary energy sources)
Greece	The transmission grid code provides for the Independent System Operator to prepare a priority list for load-curtailement to different customer groups
Ireland	Regulator approves load shedding priorities and plans drawn up by the DSO. The Regulator can also give directions to TSO and to DSO as required by emergency circumstances.
Italy	Force majeure
Netherlands	TSO and DSOs are responsible for load curtailment and system restoration in case of disturbances. Appropriate plans must be in place as required by technical codes. Plans must be public. Ministry might have authority to ration electricity in case of national emergencies.
Norway	-
Portugal	There is a Decree-law (DL 114/2001) that establishes definitions of energy crisis situations and measures to be implemented in those situations. During declared energy crisis situations the Government can adopt exceptional measures in order to mitigate unbalances between supply and demand and to improve energy resources distribution.
Spain	In case of extreme emergency, the Government implements the emergency measures defined by law. In case of soft emergency, the TSO is responsible of implementing measures established in a specific procedure included in grid code.
Sweden	All kind of force majeure, giving the Regulator and the TSO the authority to impose far-reaching regulation in order to save the system and distribute remaining power

2.2 ROLE OF REGULATOR WITHIN THE EMERGENCY REGULATION FRAMEWORK	
COUNTRY	
Austria	Monitoring & advisory
Belgium	The federal Regulator gives an advice on the reconstruction code and on the load-curtailment plan of the TSO.
Denmark	None
Finland	Monitoring and approval of system responsibility of TSO
Great Britain	Monitoring & advisory
Greece	Regulator approves the principles for the preparation of the load-curtailment priority list by the ISO
Ireland	Regulator approves load shedding priorities plan drawn up by DSO. Regulator can also give directions to TSO and DSO as required by emergency circumstances
Italy	Regulator approves the dispatching code and the technical rules of connection that include provisions in regard to security of supply
Netherlands	Role of Regulator in case of emergencies is currently under investigation
Norway	Planning, executing, monitoring
Portugal	None
Spain	Ex-post analysis
Sweden	Planning, executing, monitoring

### 3. POWER SYSTEM SECURITY CRITERIA

Historically, one of the most common and widely accepted power system security criterion is the so called “*n-1*” rule. Essentially it states that the electric power network shall withstand the unplanned outage of “*1 element out of n*” and stay in operation without jeopardising system operational integrity<sup>2</sup>. However, as the implementation of this criterion has also developed over many years, significant differences exist among the different TSOs. Beyond that some other common and widespread criteria are of key importance for the operational security of supply.

An overview of the operational security criteria and some security constraints used internally and on the international interconnections is presented below.

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<sup>2</sup> In a narrow sense this applies to transmission. In distribution networks, it shall be possible to maintain the normal operational state by switching and/or network - re-configuration after the occurrence of a “n-1 contingency”.



COUNTRY	OPERATIONAL SECURITY CRITERIA	
Austria	N-1 in transmission	A single line or a single transformer
	N-1 in distribution	A single line or a single transformer after contingency and after switching actions and/or re-configuration in the distribution network
	Thermal rating 380/220 kV (normal)	100% nominal load in continuous operation in all 3 Austrian control areas throughout the year
	Thermal rating 380/220 kV (overload)	Seasonally dependent in the western control areas
	System split protection relay settings	No internal system split relays. Overcurrent relays at the interconnection circuits in 1 Austrian control area set to 115% of the nominal load of the specific internal transmission lines. After crossing this threshold the affected interconnection circuits are switched off. This special measure will be released after the completion of the 380 kV lines project currently in preparation
Belgium	N-1 in transmission	Single line, transformer, generating unit, busbar in some cases
	N-1 in distribution	Walloon Region: - Flemish Region: No formal obligation to meet this criterion. At MV this is general practice (after manual dispatch). (Remark: quality control on regional level on the basis of international outage criteria (SAIDI, SAIFI, CAIDI)) Brussels Region: Single line, transformer
	Thermal rating 380/220 kV (normal)	Depends on the season
	Thermal rating 380/220 kV (overload)	Depends on the season
	System split protection relay settings	-
Denmark East	N-1 in transmission	Single component with a failure frequency higher than one incident in 3 years
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	-
	Thermal rating 380/220 kV (overload)	-
	System split protection relay settings	Trip-off of the interconnection to Sweden at $f < 47\text{Hz}$ after 0,5 sec or at $f < 47,5\text{Hz}$ after 9 sec
Denmark West	N-1 in transmission	Single line, transformer or CHP in the transmission grid
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	100%
	Thermal rating 380/220 kV (overload)	125%
	System split protection relay settings	-

COUNTRY	OPERATIONAL SECURITY CRITERIA (cont'd)	
France	N-1 in transmission	Single line
	N-1 in distribution	Parallel operation at the 20 kV and 63 kV substations
	Thermal rating 380/220 kV (normal)	Different temperature ranges assumed: Summer 10.05.-20.09: $t \leq 30$ °C Interseason 20.04-10.05, 20.09-10.11: $t \leq 21$ °C Winter 1 10.11-20.04: $t \leq 15$ °C Winter 2 10.11-20.04: $t \leq 5$ °C
	Thermal rating 380/220 kV (overload)	Max 20 minutes depending on the overload
	System split protection relay settings	-
Finland	N-1 in transmission	All credible series and parallel faults, e.g. lines, transformers, busbars, according to Nordic dimensioning criteria
	N-1 in distribution	Switching actions and/or re-configuration in the distribution network
	Thermal rating 380/220 kV (normal)	100% nominal load in continuous operation taking into account the environmental conditions (e.g. temperature)
	Thermal rating 380/220 kV (overload)	120 – 130% during short time interval, time interval depends on the loading
	System split protection relay settings	Frequency (e.g. over-frequency) relays in AC interconnectors between Finland and Sweden. Otherwise normal overloading relays within and between countries.
	System split protection relay settings	-
Great Britain	N-1 in transmission	For areas with load > 60 MW, 1 line or transformer under fault or maintenance
	N-1 in distribution	Distribution networks are passive, designed to provide in a case of a single circuit outage: immediate restoration of supply to group demands in excess of 60 MW; restoration of supply within 15 minutes for group demands in excess of 12 MW; restoration within 3 hours for group demands in excess of 1 MW.  Beyond that some more implementation details are used dependent on specific load category
	Thermal rating 380/220 kV (normal)	Ratings for planning purposes: circuit breakers continuous rating; transformers cyclic rating based on the 24 hour load cycle; underground cables rating based on the 24 hour load cycle; overhead lines continuous seasonal rating
	Thermal rating 380/220 kV (overload)	Short term overload may be applied in the post-fault conditions
	System split protection relay settings	No specific operational values – system splitting is used only as a temporary expedient in particular locations, pending reinforcement
Ireland	N-1 in transmission	Single line, transformer
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	-
	Thermal rating 380/220 kV (overload)	-
	System split protection relay settings	-

COUNTRY	OPERATIONAL SECURITY CRITERIA <i>(cont'd)</i>	
Italy	N-1 in transmission	Single line, transformer, busbar
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	-
	Thermal rating 380/220 kV (overload)	-
	System split protection relay settings	-
	System split protection relay settings	-
Netherlands	N-1 in transmission	Single line, transformer, generating unit
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	No summer/winter values used
	Thermal rating 380/220 kV (overload)	No criteria are included in grid code.
	System split protection relay settings	No criteria are included in grid code.
	System split protection relay settings	No criteria are included in grid code.
Norway	N-1 in transmission	Single line, transformer, busbar in some cases
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	-
	Thermal rating 380/220 kV (overload)	-
	System split protection relay settings	-
	System split protection relay settings	-

COUNTRY		OPERATIONAL SECURITY CRITERIA (cont'd)
Portugal	N-1 in transmission	Single line, transformer
	N-1 in distribution	-
	Thermal rating 380/220 kV (normal)	At the 400 kV lines thermal limits varying from 1086 MVA in summer to 1410 MVA in winter  At the 220 kV lines thermal limits varying from 268 MVA in summer to 344 MVA in winter
	Thermal rating 380/220 kV (overload)	A. Single lines fault: 20% overload (= < 20 minutes) 30% overload (= < 10 minutes)  B. Double lines fault: 30% overload (= < 20 minutes)
	System split protection relay settings	There is an automatic and a manual load shedding plan for the transmission grid:  AUTOMATIC LOAD SHEDDING The frequency relay system measures the frequency and acts according to: The starting limit for every unit is set at 49,0 Hz. Only for pumping units the limit is set at 49,5Hz. The end limit is set at 48Hz, due to the thermal units which are set at 47,5 Hz, with a 3 second delay. The distribution grid is coordinated together with transmission and the frequency load shedding limits are set at 49,0 Hz and 48,0 Hz.  MANUAL LOAD SHEDDING The manual frequency relay system should be activated if: There is any overload in transmission lines greater than 30%; In stationary regime, the voltage reaches 360kV (for 40Kv lines), or 198 kV (for 220kV lines). In stationary regime, the frequency drops to 49,0 Hz. There is any overload in transformers greater than 30% during Winter (December to February), or greater than 10% during Summer (June to September), or 10% on the other months.
Spain	N-1 in transmission	Single line, transformer, generator or reactor in the transmission grid
	N-1 in distribution	Different specific criteria per each distribution network operator, not made publicly available
	Thermal rating 380/220 kV (normal)	At the 380 kV lines thermal limit varying from 900 MW in summer to 1250 MW in winter  At the 220 kV lines thermal limit varying from 300 MW in summer to 380 MW in winter
	Thermal rating 380/220 kV (overload)	15% overload to the above normal thermal limits (Max. 20 minutes)
	System split protection relay settings	-
	System split protection relay settings	-

## 4. NON DELIVERED ENERGY

Similarly as for some other security of supply terms, different definitions, usage and calculation algorithms exist for the Non Delivered Energy (NDE). In this report, the NDE value is referred to as:

*“the calculated cost, incurred per customer, in case of interrupted electricity supply electricity to that specific customer, that the grid operator is due to refund to the customer for covering the damage.”*

It is obvious that the value of the NDE would vary significantly e.g. between the households and high-tech industry customers.

Presently, a concept of the NDE as a measure of the satisfactory level of security of supply provided by the grid operator for the customer is used in only a few CEER countries.

COUNTRY	NON DELIVERED ENERGY – CONCEPT, USAGE, VALUE
Finland	<p>According to the Electricity Market Act:</p> <ul style="list-style-type: none"> <li>Standard compensation for customers in case of non-delivery (10% of annual network charges if non-delivery 12 - 24 hours, 25% of annual network charges if non-delivery is 24 – 72 hours, 50% of annual network charges if non-delivery is 72 – 120 hours, 100% of annual network charges if non-delivery exceeds 120 hours, maximum per customer is 700 € after 1.9.2005 (presently 350 €)</li> <li>Discounts to consumers if quality or non-delivery problems exist. Discount for non-delivery equals at least two weeks of annual network charges.</li> </ul>
Ireland	<p>Planned Supply Interruption Guarantee: The DSO guarantees to provide at least 2 days notice before a planned interruption. If it fails to do so, then compensation to domestic customers is: €35 and to industrial customers is €130</p> <p>Network Repair Guarantee: In the case of Network repair guarantee, in case of a network fault, if a customer is without power for more than 24 hours after the DSO is notified, then domestic customers can claim €65 and €130 for business customers. An extra €35 can be claimed for every additional 12 hours.</p>
Netherlands	<p>In case of unplanned outages lasting longer than 4 hours, network companies have to pay the following compensations to individual users:</p> <ul style="list-style-type: none"> <li>Household Euro 35</li> <li>Small Industry Euro 910</li> <li>Large industry Euro 0.35 per kW contracted transmission capacity (maximum Euro 91000)</li> </ul> <p>Above mentioned figures are currently under revision. Different steps for different durations are considered.</p> <p>Next to these compensations, an integrated price-quality-regulation scheme is in preparation. This scheme is based on a standard quality level for SAIDI. The value of NDE for households is determined as an input to this scheme. This value is expressed as a function of SAIDI. For example, in case of an interruption of 2 hours every 4 years (comparable to the current quality level), the value for such an interruption could be around 3 Euro for households and around 34 Euro for industries. This scheme will be applied to determine distribution network tariffs. This scheme will be implemented in 2005 in addition to the before mentioned compensations.</p>
Norway	<p>In case of no unplanned outages / no disturbances: (1 € = 7,5 NOK)</p> <ul style="list-style-type: none"> <li>Household and agriculture NOK 3,-</li> <li>Industry NOK 35,-</li> </ul> <p>In case of unplanned outages / disturbances:</p> <ul style="list-style-type: none"> <li>Household and agriculture NOK 4,-</li> <li>Industry NOK 50,-</li> </ul>

COUNTRY	NON DELIVERED ENERGY – CONCEPT, USAGE, VALUE <i>(cont'd)</i>
Portugal	There is an incentive to improve continuity of supply in medium voltage distribution networks. A reference level of NDE and a neutral band are defined. Beyond the neutral band each kWh of NDE is valued at 1,5 €/kWh
Spain	In case of non-compliance with the quality limits established, discounts are applied to consumers.