



Regional Gas Grids – Towards the single European market

Gas Committee - System Harmonisation Project Group
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1 The definition and main characteristics of an integrated Regional/European Gas Market

1.1 Introduction

If the benefits of energy liberalisation are to be attained then Europe must establish a robust and transparent, traded gas market. As with electricity, gas is a 'network' energy, and access to the gas grid has a crucial influence on the development of gas trading. The creation of the Regional/European Gas Grid Model with its harmonised technical and operational standards and clear roles among market participants is an important step in developing an integrated European Gas Market.

The whole EU gas grid should be operated in a consistent way to provide the optimum capacities and services needed by the grid users. Whilst a single European System Operator would seem the ideal and most efficient way to do this, a more practical solution given the current diversity and fragmentation in the EU gas industry would be the formation of Regional Independent System Operators (R_ISOs). This paper sets out the main features of this ambitious but practical step. In the longer term the numbers of TSOs (Transmission System Operators) may well decrease though the natural tendency to achieve economies of scale, and the Regional Operators may well combine to become a single European System Operator. The way forward set out in this paper therefore could be both a viable improvement in the European Gas Market that could be implemented during the next few years and a potential transitional phase towards complete integration.

1.2 Characteristics

To be truly competitive and integrated the European Gas Market must encompass all of Europe. The market is facilitated at the wholesale level through trading, unimpeded by national borders or barriers to entry. The main characteristics of such a market are:

- accessibility on a non discriminatory basis
- efficiency
- transparency
- liquidity and
- resilience of the system

These features of accessibility, efficiency, transparency, liquidity and reliability should characterise all maturities of contracts for buying and selling wholesale gas, which involve

- **The Forward market**
- **The Day-Ahead market**
- **The Intra-day market and**
- **The Balancing market**

The **Forward market** should be able to cover not just the next calendar year and one year beyond that but also longer-term periods - at least up to 10 years -, a feature which (albeit with reduced liquidity) is possible in mature and well-functioning financial and commodity markets. Confidence, that the short-term market will exist for many years, may well be sufficient for significant medium-term or even long-term investments to be made. But the extension of forward maturities would further facilitate long-term investments in assets. Such a market is important to be based on a reliable underlying price for the physical commodity.

The **Day-Ahead market** is a market:

- where participants optimise their portfolios and square up physical or financial positions and
- which generates a solid physical underlying price, based on energy demand and supply, as well as on the existing congestions and the applied congestion management methods

An **Intra-day market** is where market participants can fine-tune their physical positions on a very short term basis before realisation, by getting access to prices throughout Europe, as long as the existing congestions allow this.

It enables market participants with physical positions to avoid imbalances during delivery and thus to reduce TSO balancing actions and avoid additional costs for balancing purposes, which in general are reflected in the end consumer prices.

The **Balancing market** is where the R_ISO and other shippers/traders can cover almost real-time their balancing needs offered on a market basis by market participants. Ultimately this market is part of the intra-day market. The balancing market facilitates the residual balancing role of the R_ISO (the TSOs jointly) for technical grid reliability.

These types of market are fundamental to our vision of a truly competitive market, but unfortunately some or all of these markets are not the current reality in most of the EU member states.

1.3 The products of an integrated Regional/European Gas Market

Europe currently consists of a number of connected physical markets, with discrete pricing zones separated by physical or contractual congestion, or even by non-harmonised transportation access terms which prevent the free flow of gas between neighbouring networks. An integrated Regional Market (which in effect will lead to the harmonisation of products across the wider market into a European Market) should possess its own Regional wide features:

- A Regional Gas Price Index based on the Day-Ahead market
- A Regional Gas Price for Futures for all long term maturities

The creations of these features are important because:

- a) They could facilitate a liquid, deep, reliable and robust market, which virtually summarises the characteristics of the several physical markets in one price signal
- b) They could be used for sending price signals about the integrated European Gas Market, contrary to the physical products of each individual physical (national or local) market which can give information only about this specific market
- c) They could animate the interest of international financial, trading and energy companies and facilitate long term and stable presence and investment activities in the European Market, as it is the case in other international commodity markets like the oil markets.

In order to achieve such a competitive commodity market with the specified characteristics it is necessary to develop access to transport capacity and the transport market. In the following chapter a model of the Regional Independent System Operator (hereinafter “R_ISO”) is described. It would serve as an interim step on the way to the Internal European Gas Market. The R_ISO might be an “accepted” part of the internal EU gas market and an appropriate solution to cope with physical and technical conditions that are different in each region.

2 Recommendations for Regional Gas Grids

2.1 Introduction

Gas pipes in Europe provide a regulated service for pipeline users to supply gas to customers. Yet at almost every interface between the high-pressure pipes in Europe there are inconsistencies ranging from differences in operation, planning, processes, pricing principles, capacity allocation terms etc. These differences lead not only to serious inefficiencies in the operation of the EU gas grid, but also present barriers to trade for companies wishing to buy gas in one part of Europe and sell it in another. The continuing difficulties of trying to achieve real harmonisation between gas TSOs is now obvious to all involved in the market and a new approach is required.

The responsibility for the optimal design and operation of gas grids needs to start with the analysis of multiple networks at the same time. This is not the same as attempting to join up the individual analyses carried out by TSOs (done for the purpose of each individual TSO), which is an approach that would tend to reinforce the barriers and inefficiencies inherent in the current situation. Users of the grid should be able to access the capacity that a single operator of the combined grid(s) would be able to make available, and should not have to pay more than the costs efficiently incurred by a single grid operator for the combined grids.

The model is based on the idea that Transmission System Owners (TOs) operate their network technically (mainly at maintenance level), and a common R_ISO handles and manages the capacities in the transmission pipelines. Commercially sensitive activities such as matching the balancing status of each shipper in the area and providing the clearing and settlement services should be managed by the Market operator e.g. based on a Hub (for that region). Only where such a Market or Hub operator has not been set up, R_ISO should be responsible for commercially sensitive activities.

The R_ISO model would more easily lead to the regional market integration than models based on national/local approach. Ownership unbundling or national Independent System Operators alone do not solve the cross border challenges.

Besides the need for analysing the grids on a regional basis, there are several further reasons why establishing the R_ISO is an appropriate next step. Such reasons are e.g. the possibility to have:

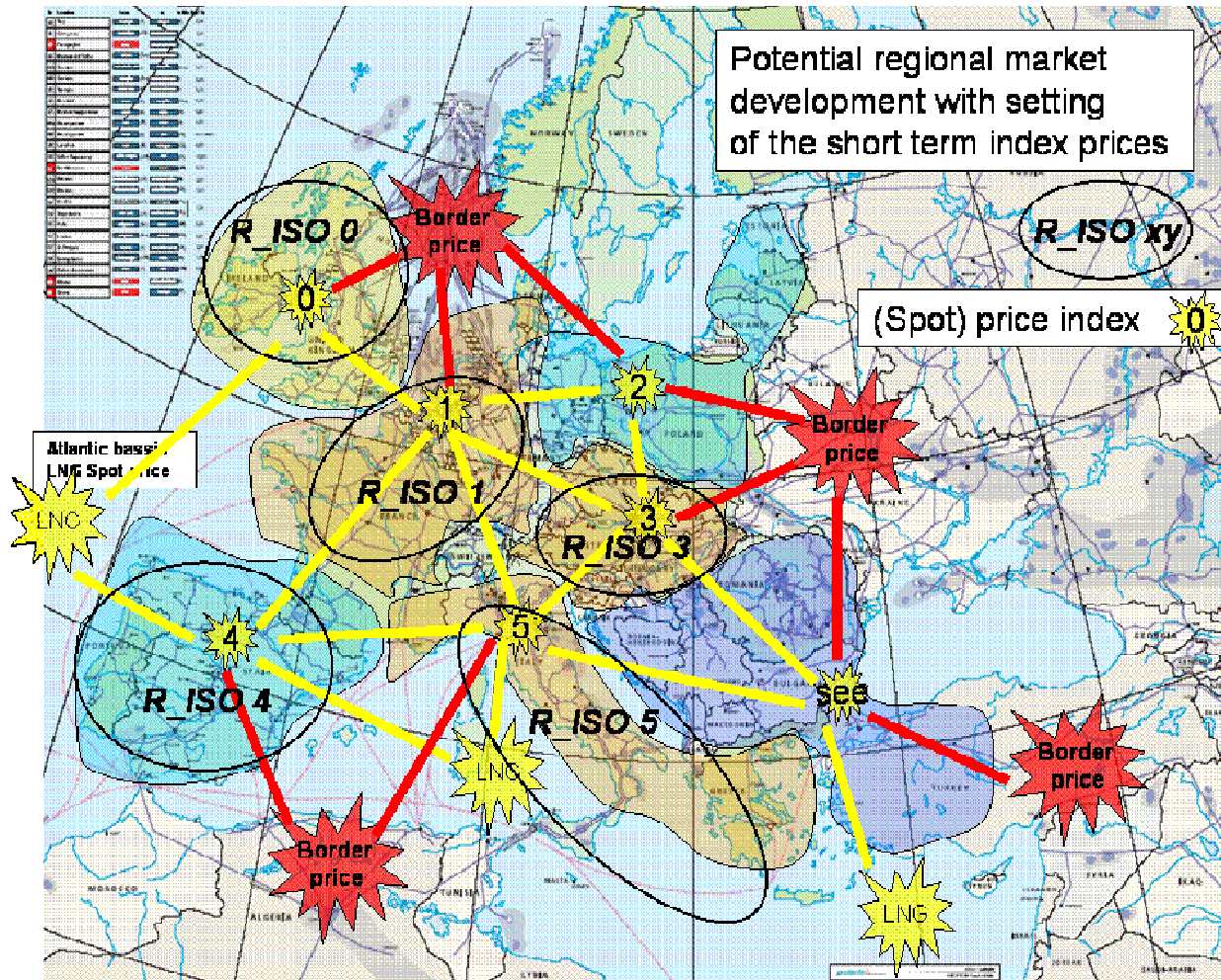
- coordinated investment planning

- cross-border open season processes
- provisions of co-ordinated cross-border capacity products,
- harmonisation of access
- coherent information provisions

R_ISOs can be set up without waiting for the creation of regional gas markets; indeed confidence in a regional gas market seems only likely to develop once there are practical steps being taken to establish a R_ISO.

Supra-national market areas should then start to arise naturally, As side effects the national influences on grid tariff setting reduce and the market concentration also falls due to the enlargement of the relevant market area.

The following map is an illustration of the formation of regional gas grids, based on the major, existing pipeline connections:



The R_ISO in Europe should be the smallest number that is technically and commercially viable. As many existing zones as practical should be included to encompass at least, say, 50 bcm (billion cubic metre) of final demand and possibly well over 100 bcm. The technical constraints will be primarily the physical limitations of a working balancing market (i.e. the need to link between market offers (more on larger area) and flow of gas (more time constraints)). The larger physical market is a key criterion to provide the basis for a liquid short-term trading market.

From the pipeline owner's perspective an inter-TO compensation scheme is likely to be required. Based on the principles agreed by the TOs' representatives (e.g. GTE+) the R_ISO system would develop an appropriate model for Inter - TO compensation, which will compensate the cost incurred by the usage of TO grids.

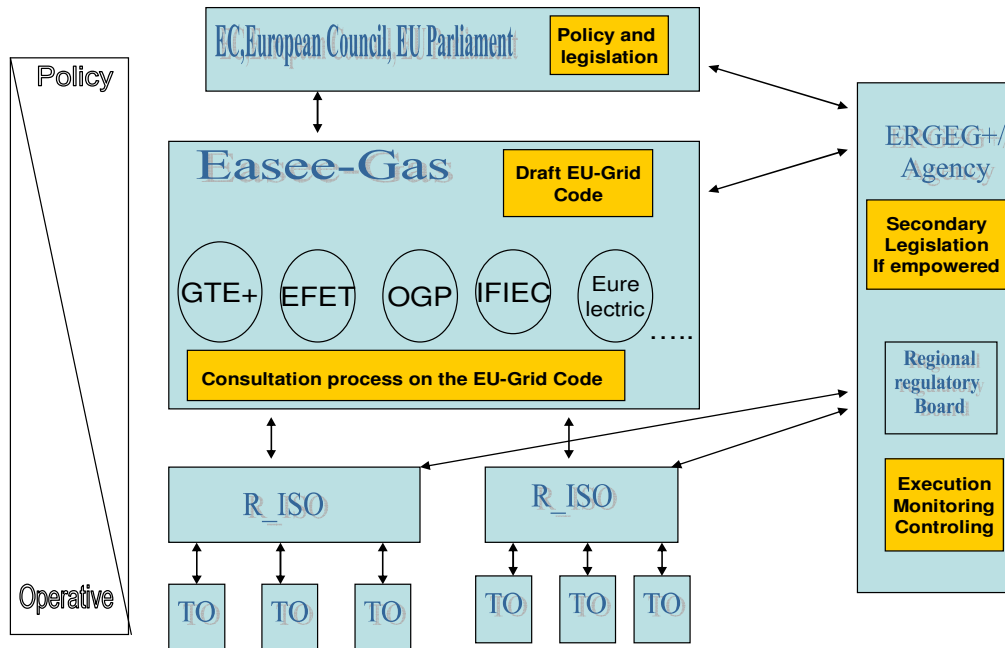
The transmission system owners (TOs) will continue to be responsible for the technical management and maintenance of their individual networks (at TO level), each of which will be a component part of the Regional Gas Grid. The TOs' primary responsibility for the development of their networks will therefore coincide with a collective responsibility to build and operate the Regional Gas Grid in a way which meets public needs established in EU legislation. Each TO will therefore have the obligation to participate in the Regional Gas Grid.

There is a need for a supervisory institution, a European Independent System Operator Agency (or GTE+), which sets out the principles for Inter-TO compensation, Ten Year Statements on system enhancement and represents the TO views in market rules setting. The market rules could be drafted in a consultation process guided by EASEE-gas (see for more details the chapter Regional Grid Code).

The European law, including directives, regulations and Guidelines, must contain obligations to ensure that the European and/or Regional Grid will be developed, maintained and operated. These obligations have to ensure that the relevant TOs maintain their networks and that the regional grid is developed and operated by the relevant R_ISO in order to meet conditions set out in European law.

The numerous institutions/parties should interact and cooperate as follows:

Decision making process concerning EU Grid Code



(EC = European Commission, EU = European Union, EASEE = European Association for the Streamlining of Energy Exchange, GTE+ = Gas Transmission Europe, EFET = European Federation of Energy Traders, OGP = International Association of Oil & Gas Producers, IFIEC = International Federation of Industrial Energy Consumers, Eurelectric = Union of The Electricity Industry, ERGEG = The European Regulators' Group for Electricity and Gas.)

2.2 Scope of the Regional Gas Grid

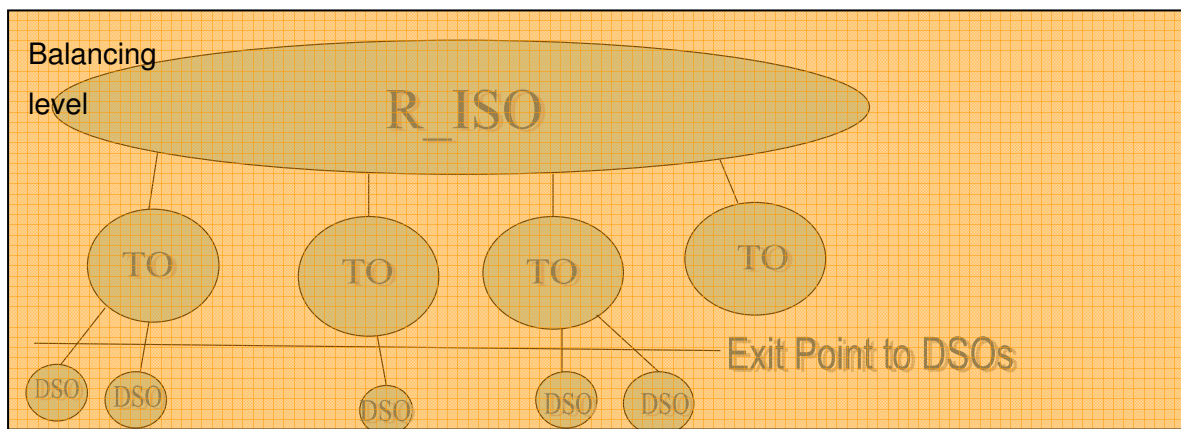
The Regional Gas Grid shall be defined as follows: the scope of the Regional Gas Grid as part of a European Gas Grid shall cover all the high pressure gas transmission pipelines (or networks) in the region with a direct connection to any other high pressure gas pipeline (or network).

It is clear that in order to be able to fulfil this task the R_ISO must control flows also on sub-lying pipelines. Some of its tasks are:

- Operation of a Regional Grid Control Centre
- Optimisation of capacity provisions

- Allocation of capacities on regional basis
- Collection of entry/exit tariffs
- Enabling a regional balancing market and buy/sell balancing energy out of that market
- Credibility check for market participants (licences)
- Future grid investment decisions of regional/European importance

Definition of the scope of the network under control of the R_ISO



The short-term price index for the relevant region would be set at a virtual point in the network operated by each R_ISO.

2.3 Regional Independent System Operator (R_ISO)¹

Definition

Regional Independent System Operator (R_ISO) means the entity responsible for optimising usage and allocation of cross-border capacity. It covers cross border transport in transmission pipelines in Europe or the relevant region. R_ISO should be responsible for

¹ A similar model of a R_ISO is well functioning in the USA in electricity market. See for more details www.pjm.com

coordinated development and operation of the transmission pipelines within the regional grid. This function is carried out by an undertaking domiciled (at least having headquarter) in one member state of the R_ISO area.

Independence

The Regional Independent System Operator shall be independent at least with regard to its legal form, organisation and decision-making power, from all other activities not connected with responsibilities of R_ISO. The R_ISO shall be established in the legal form of a company or a joint venture where the other market players or other shareholders such as the EBRD, banks, equity funds, hold jointly the majority, e.g. 60 % of the company and 40 % by the relevant TOs (TOs must not have the majority in such a company).

Functions

1. The R_ISO shall undertake the following responsibilities:
 - (a) Drafting of the grid standard transportation contracts following the framework agreed within EASEE-gas
 - (b) Management of Capacities in the Regional Gas Grid: the pipeline capacities provided by the TOs for the cross border transport of natural gas in the Regional Grid shall be managed by the R_ISO. Ownership and maintenance of the transmission lines remains in the hands of TOs. The R_ISO has to ensure optimum utilisation of the line capacities in the Regional Gas Grid by coordinating the transport services. The TOs shall provide the data required for system access as instructed by the R_ISO (Regional Grid Control Centre).
 - (c) Implementation of market places for balancing services used for calling off natural gas by the R_ISO for balancing services; in the event that no offer for balancing energy is made available, the R_ISO shall take precautionary measures and shall notify them to a new “Regulatory Body” (see 2.6) responsible for the Regional Gas Grid.
 - (d) Long-term planning: The R_ISO should manage a sophisticated regional planning process for transmission expansion to ensure the continued reliability of the gas system. In the event of capacity bottlenecks in the Regional Grid the R_ISO as a leader shall investigate in cooperation with TOs, Storage Operators, Gas Producers and Suppliers measures for an optional extension of the capacities necessary to

meet the demand in accordance with the ERGEG GGP on Open Season. The long-term plans shall be submitted to the Regulatory Board for its approval. Such approval shall be given together with any stipulations and conditions required.

- (e) Undertaking of a tender process for the investment of the additional capacity demand identified in the long-term planning in case TOs do not meet their responsibility to expand their systems accordingly (a new additional TOs would be created in this case, but the owner of the assets might be different).
 - (f) Operate and maintain a website for online capacity booking alternatively conduct auctions. Use of such website by network users may be made conditional on registration, provided that this is free of charge;
 - (g) Calculation and publication of available capacities and actual aggregate flows for each entry and exit point in the Regional Gas Grid
 - (h) Facilitation of a secondary market platform for trading and secondary markets for capacity;
 - (i) Collection of Entry/Exit Fees and then redistribute them to the relevant TOs depending on the Inter-TO compensation model.
2. R_ISO should get proper incentives to comply with its regulatory obligation to maximise the cross border capacity it allocates to the market.
 3. R_ISO would have the obligation to comply with the EU legislation and therefore is a subject to penalties if it fails to fulfil these obligations.

2.4 Third Party Access in the Regional Grid

All access demand has to be placed to R_ISO. Shippers seeking network access shall apply to the R_ISO into which entry, exit or virtual point such parties wish to inject the natural gas to be transported.

2.5 Responsibilities of Transmission System Owners (TOs)

1. TOs shall be obliged to:

- (a) Maintain the transmission lines safely, reliably and efficiently in accordance with the state of the art, and pursuant to the R_ISO's standards (based on the technical and operational standards set up by the guidelines under the new or amended

Regulation, most suitable agreed by EASEE-Gas), and ensure the provision of all indispensable ancillary services;

- (b) Compute and announce the available pipeline capacity to the R_ISO;
- (c) Control the transmission lines operated by them in line with the business standards of the R_ISO;
- (d) Follow the R_ISO's instructions in controlling systems to meet the claims of parties entitled to system access, especially with regard to handling the schedules;
- (e) Enter into contracts on the exchange of data (on measurements at the system borders) with other system operators, the R_ISO;
- (f) Contribute to long-term adequacy and planning of the transmission systems under the leadership of the R_ISO; expand their systems according to the capacity demand identified in the long term planning by R_ISO and approved by the Regulatory Board;

2. Should a dispute arise between a transmission line undertaking and the R_ISO with regard to the measures and information required complying with the tasks as provided, a Regulatory Authority shall arbitrate upon the request of the transmission line undertaking or the R_ISO.

3. TOs have the obligation to comply with the EU legislation and therefore they are a subject to penalties if they fail to fulfil these obligations.

2.6 Regulatory responsibilities relating to the Regional Gas Grid and R_ISO

To safeguard the advent of truly competitive markets and unimpeded access to the transmission system on a non-discriminatory basis, a strong, stable and clear regulatory framework is necessary in each Member State and at the EU/relevant regional level, whereby the EU should define the over-arching principles.

In order to undertake functions which extend beyond their current, mainly national, responsibility, and the national regulators will need to be empowered through new EU legislation in form of a new European Regulatory Body (ERGEG+/Agency) and if necessary an adequate Regional Regulatory Body to oversee the functioning of the Regional Gas Grid and the R_ISO. Nevertheless it is necessary that the European Regulatory Body ensure the consistency across the different regions (same methodologies in each region). It could be only reached by setting the principles at the EU level by having a single EU Grid Code, which will comprise consistent local TOs codes, consistent R_ISO codes etc (see chapter 2.7.).

Within its regulatory function concerning the Regional Grid the new European Regulatory Body (EREGG+/Agency) shall have following tasks:

- 1) of ensuring that regulatory principles and practices are harmonised and uniformly applied all over the relevant region and later on all over Europe, especially in each price zone, which may transcend Member State boundaries;
- 2) of governing the functioning of the gas system, of access to transport and distribution networks and the charging arrangement for use of the system;
- 3) of ensuring convergence between the regulatory principles and charging arrangements they apply in each price zone and;
- 4) of approving or amending the proposed grid standard transportation contracts
- 5) of arbitration upon the request of the transmission line undertaking or the R_ISO
- 6) of providing transparency and access to historical data

The responsibility of the European Regulatory Board (EREGG+/Agency) encompasses in particular the approval:

- 1) of the long-term plans. Such approval shall be given together with any stipulations and conditions required;
- 2) of a methodology for the calculation of tariffs;
- 3) of a calculation scheme for available line capacities;
- 4) of a detailed Regional Grid Code based on the European Grid Code chapters;
- 5) of a fee to cover the costs of the R_ISO.

2.7 Regional Grid Code as an appendix of the EU Grid Code

The regional Grid Code should form a part or be an appendix of the EU Grid Code. The EU Grid Code should be prepared by an independent industry-wide body, such as the EASEE-gas organisation, which represents the entire gas chain (all market participants). The organisation should serve as a standardisation body (consultation platform) for the EU gas market with the aim to develop standards and operational rules for streamlining of the business processes between the stakeholders.

The new European Independent System Operator Agency (GTE+), which will take care of issues dealing purely with TOs, shall be responsible for:

- a) Setting up of the Inter-TO compensation model;
- b) Preparing of the ten Year Statements on system enhancement;
- c) Ensuring closer communication and coordination among TOs;
- d) Agreeing of the minimum safety and maintenance requirements;
- e) Agreeing standardized methodology for capacity calculation and congestion management;
- f) Setting up a transparency platform.
- g) Maintenance planning;
- h) Deciding on emergency procedures

The scope of the harmonization body (EASEE-Gas) work should include:

- a) Procedures for a coherent and common grid access to the EU;
- b) A well-defined framework and a formal change procedure for Regional Grid codes and the standard transportation contracts
- c) Harmonisation of Invoicing and payments;
- d) Harmonisation of Balancing rules / charges;
- e) Defining of data format of communication
- f) Defining codification method;
- g) Defining and agreeing on quality specification:
- h) Harmonisation of trading arrangements;

All documents prepared by EASEE-gas (or other mandated industry-wide body) shall be binding and take immediate effect. Documents prepared by regulated sectors, in particular by the GTE will be subject to approval by the EC (and ERGEG+/Agency) after presentation to the Madrid Forum and the new European Regulatory Body (ERGEG+/Agency). The regional regulatory bodies (boards) will work independently but in the coordinated way controlled by the new European Regulatory Body (ERGEG+/Agency).

The Regional Grid Code will be based on the common EU Grid Code and modified only if essential to meet the conditions relevant in a particular region. The Regional Grid Code should be prepared by the R_ISO. The final Regional Grid Code should be subject to approval by the regional regulatory body/board.

The minimum content of a Grid Code shall cover at least:

- a) Procedures for a coherent and common grid access to the Regional Grid,
- b) Standardised minimum requirements for the application for access to the Regional Grid;
- c) Balancing rules (technical requirements, integration of markets);
- d) Interoperability rules including the obligatory implementation of technical standards adopted by accredited institutions (e.g. CEN, EASEE- gas);
- e) Operational security/requirements (IT communication and coordination between R_ISOs and TOs and shippers, maintenance and restoration of supply);
- f) Operational Interconnection (nomination, renomination times and matching processes, OBAs, harmonisation of data exchange protocols etc.);
- g) Tarification (definition of cost base, entry/exit tariffs for cross boarder flows etc.);
- h) Information management and Transparency based on the new EU legislation/Guidelines.