2nd Technical Workshop: Gas Market Design and Natural Gas Transmission Grid Codes

Transmission Grid Codes - Transitioning to EC Network Code Implementation

Fotis Thomaidis
Partner, VIS Economic & Energy Consultants

07/12/2017
Agenda

- Outline the process and roles for preparation of the grid code
- Present the key prerequisites for efficient application of the grid code
- Identify the key transitioning steps to apply the EC Network Codes
- Focus on the role of the regulator and actions that need to be taken by the regulator to apply the key provisions
## Overview of grid code preparation

<table>
<thead>
<tr>
<th>Key prerequisites for effective application of grid code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transitioning to grid codes in line with 3rd Energy Package</td>
</tr>
<tr>
<td>Role of the Regulator</td>
</tr>
</tbody>
</table>


Process for preparation of grid code

1. Drafting of code by TSO
2. Drafting of code by TSO, with informal consultations with stakeholders
3. Establishment of official grid code committee, chaired by TSO
4. Review by Regulator & revision by TSO
5. Public Consultation Process
6. Finalization by TSO
7. Approval by Regulator
Main contents of grid code

System operation / third-party access
- Capacity booking
- Congestion management procedures
- Quantity nomination / renomination
- Delivery of gas to entry points / withdrawal at exit points
- Allocation of quantities at entry / exit points
- System balancing & operational gas
- Metering

System development & maintenance
- New connections
- System development & investment planning
- System maintenance

Coordination with stakeholders
- Interconnection agreements & agreements with DSOs
- Electronic platform
- Management of emergencies

General provisions
- Definitions
- Force Majeure
- Dispute settlement
Overview of grid code preparation

Key prerequisites for effective application of grid code

Transitioning to grid codes in line with 3rd Energy Package

Role of the Regulator
Legislative framework prerequisites for grid code

The key prerequisites that should be present in the National Legislation in order for the grid code to be applied efficiently and in line with the 3rd Energy Package:

- **Gas Law** in force applying the 3rd Energy Package
- **Mandate** of Regulator to regulate the gas sector
- **Unbundling** and certification of TSO in line with 3rd Energy Package (Ownership Unbundling, Independent Transmission Operator, Independent System Operator)
- **Clear responsibilities** of TSO and Regulator for the grid code development
Requirements for efficient implementation of the grid code

To efficiently implement the provisions of the grid code, in line with the 3rd Energy Package, the TSO is required to proceed with:

- Establishment of an **electronic information system** that facilitates data exchange with system users and simplifies transactions, such as capacity contracting, nominations / renominations, and secondary capacity market (*Requirement of Regulation 715/2009*)

- Signing of **Interconnection Agreements** with neighboring TSOs, including definition of rules for flow control, measurement principles, rules for matching of nominations and quantity allocation, procedures for exceptional events (*Requirement of EC Interoperability Code*)

- Signing of **agreements with other connected systems** (e.g. distribution) to ensure cooperation and coordination of operators on issues such as measurement, matching of nominations, exchange of information for quantity allocation

- Installation and use of **daily / intra-daily meters at exit points**, to the extent possible, to increase the accuracy of information used for allocation of quantities, and facilitate intra-day system balancing
Overview of grid code preparation

Key prerequisites for effective application of grid code

**Transitioning to grid codes in line with 3rd Energy Package**

Role of the Regulator
Transitioning to EC network codes

Starting point

• Long-term transmission contracts
• Monthly nomination of capacity
• Monthly allocation of volumes
• Monthly balancing

Transitional steps

• Shift towards daily processes

EC Network Codes

• Intra-day transmission contracts
• Daily nomination / intra-day renomination of capacity
• Daily / intra-day allocation of volumes
• Intra-day balancing

- Enhancement of systems, processes and capabilities of TSO
- Cooperation with neighboring operators
- Awareness of shippers for transmission operation
- Strengthening of market competition and liquidity
The role of interconnection agreements

• The EC Network Codes seek to harmonize operation of all interconnection points across the EU
• Such a framework would allow shippers to move gas without technical, operational or communication barriers within, at least, the European borders
• The EC Network Codes require that all EU TSOs enter into Interconnection Agreements with adjacent EU TSOs
• These Interconnection Agreements set the basis for cooperation of TSOs to ensure harmonized operation of the systems
• The signing of Interconnection Agreements is mandatory between Member States, but optional with third countries
Grid code areas examined

Focus on:

• Delivery of gas at entry / withdrawal at exit points
• Interoperability
• Capacity booking
• Congestion management
• Nominations / renominations
• Quantity allocation
• Balancing
Delivery of gas at entry / withdrawal at exit points

**Technical specifications**

TSO must publish technical specifications for gas at entry / exit points, including at least:
- Gas quality specifications
- Max / min pressure
- Max flow technically allowed

**Rejection of delivery at entry points**

Cases in which TSO is allowed to reject delivery at entry points:
- Gas outside technical specifications (quality, pressure)
- Volumes exceeding booked capacity (daily or hourly)

**Rejection of withdrawal at exit points**

Cases in which TSO or system users are allowed to reject withdrawal of gas at exit points:
- TSO may reject withdrawal if volumes exceed daily or hourly contracted capacity
- System users may reject withdrawal if gas is outside the quality specifications

**Role of the Regulator**

Approval of unit charge for delivery of gas outside technical specifications by system user (if any)

Approval of unit charge paid by TSO in case of withdrawal of gas outside technical specifications (if any)
Interoperability

Interconnection Agreement (IA) & agreements with other connected systems

TSO IA(s) with neighboring TSO(s), covering all contents defined in the Interoperability Network Code. Use of common units between the TSOs is required.

Gas quality and odorization differences

Applicable only when adjacent systems have differences in gas quality or odorization practices, restricting cross-border trade

Application of energy units for capacity

Capacity units applied by TSO must be in energy (kWh) and not volume (cubic meters). Transition plan is required.

Alignment with Gas Day, Gas Year

EC Network Codes specify an EU-wide Gas Day and Gas Year

Role of the Regulator

- Participate in decision on signing Interconnection Agreements with third countries
- Must be informed by TSO on main provisions of IAs
- Jointly decides with neighboring Regulator on approval of TSOs’ proposals for lifting restrictions for trade due to gas quality and/or odorization

Participate in decision on signing Interconnection Agreements with third countries
- Must be informed by TSO on main provisions of IAs
- Jointly decides with neighboring Regulator on approval of TSOs’ proposals for lifting restrictions for trade due to gas quality and/or odorization
Capacity booking – Firm capacity products

Entry – Exit Regime with Model Transportation Contracts

Transitional step
- Yearly Capacity (up to 15 years)*
- Quarterly Capacity
- Monthly Capacity

Transitional step
- Yearly Capacity (up to 15 years)
- Quarterly Capacity
- Monthly Capacity
- Daily Capacity

Electronc Platform
Sufficient market liquidity

EC Network Codes
- Yearly Capacity (up to 15 years)
- Quarterly Capacity
- Monthly Capacity
- Daily Capacity
- Intra-day Capacity

Role of the Regulator
- Approval of model firm capacity transportation contracts
- Approval of proportion of capacity offered by TSO on long-term / short-term basis (stakeholder consultation required)

Reserved Capacity:
- Existing interconnections: At least 10% of capacity on annual and 10% on quarterly basis
- New interconnections: At least 10% of capacity on quarterly basis

* Aiming to cover booking needs arising from long-term contracts and intergovernmental agreements
Capacity booking – Interruptible capacity products

• The TSO offers at least daily interruptible capacity at interconnection points
• Interruptible capacity at other entry and exit points of the system is also offered
• Interruptible capacity is only offered in case all firm capacity at the point has already been booked
• The TSO may also offer products for interruptible capacity of a duration longer than one day, but only if the corresponding monthly, quarterly or yearly firm capacity has been sold
• Interruptible capacity is allocated via the same mechanism as firm capacity
• Exception is the within-day interruptible capacity, allocated by means of over-nomination procedure (system users may nominate more than contracted)

Role of the Regulator

• Approval of model interruptible capacity transportation contracts
Capacity Allocation Mechanism

**IPs with neighboring TSOs**
- Transitional step: A non-discriminatory capacity allocation mechanism is applied (First-Come-First-Served (FCFS), pro rata, single-sided auctions)

**IPs with third countries**
- EC Network Codes:
  - **Auction** jointly with neighboring TSO (Following EC Network Code rules)
  - Depends on **Regulator decision** on application of joint auctions
  - Same as before

**Other entry / exit points**
- Interconnection agreement
- Selection of capacity booking platform

**Role of the Regulator**

- Decision on application of joint auctions (in line with EC Network Codes) at **interconnections with third countries**
- Joint decision with neighboring Regulator on **capacity booking platform**, if no agreement is reached by the TSOs
Congestion Management

Operation of secondary capacity market

System users must be allowed to trade their booked capacity in a secondary market. Such exchanges are handled via the TSO electronic platform.

Congestion Management Procedures (CMP) at entry points

- Capacity increase through oversubscription and buy-back scheme (COBB)
- Firm day-ahead use-it-or-lose-it mechanism (FD-UIOLI). Included in grid code, only if preconditions defined in EC Network Codes are met
- Surrender of capacity, not applicable for daily or within-day products, or for capacity already offered in the secondary market
- Long-term use-it-or-lose-it mechanism (LT-UIOLI)

Role of the Regulator

- Decides whether CMP will be applied at interconnections with third countries
- Approves COBB scheme proposed by TSO
- Decides if FD-UIOLI will be included in grid code as CMP
- Monitors utilization of contracted capacities and decides whether LT-UIOLI procedure should be triggered
Nomination / renomination of quantities

Transitional step
- A process for **periodic** (daily, weekly or monthly) **binding nomination**, with renomination possibility is required
- The process should take into consideration the **current conditions**, including TSO capabilities, number of system users, agreements and coordination with neighboring systems

EC Network Codes
- A process for **daily binding nomination/renomination** process in line with EC Network Codes’ requirements has to be set up
- The process should be **aligned at all entry/exit points**
- For connections with neighboring transmission or distribution systems a **matching process** for nominated volumes has to be applied

Role of the Regulator
- **Decision on the entry / exit points on which nominations are required** (following consultation with TSO)
- **Ensure consistency of nomination process** with distribution network code and codes of other operators

**Alignment of Gas Day with EC Regulations**
- Interconnection agreement
- Agreements with DSOs
Quantity Allocation – Information Models

• The EC Balancing Code foresees application of an Information Model that defines the exchange of information between TSO – DSOs – Forecasting Party, used for allocation of quantities at exit points (mainly to distribution systems), and the notification of system users

• Three variants are foreseen:
  – **Base case**: The model for information provision, where the information on NDM off-takes consists of day ahead and within day forecasts
  – **Variant 1**: The model for information provision where the information on NDM and DM off-takes is based on apportionment of measured flows during the gas day
  – **Variant 2**: The model for information provision where the information on NDM off-takes is a day ahead forecast

• The Regulator is responsible for designating the information model. Selection of the model is crucial for daily and intra-day balancing by the system user as it affects the frequency of informing the user on its allocated quantities

• Selection of the information model depends on the situation of the market (e.g. daily, intra-daily and non-daily meters installed, customer base and consumption profiles, number of system users at transmission and distribution)
Quantity Allocation Rules & Process

**Transitional step**
- IPs with neighboring TSOs
  - A mechanism for allocating quantities to system users daily or monthly is required, **based on current market conditions** (e.g., timing of meter reading, availability of intra-day meters, cooperation between TSO and DSOs)
- IPs with third countries
- Exit points

**EC Network Codes**
- Quantity allocation according to Interconnection Agreement rules
- Depends on Regulator decision on Interconnection Agreement
- Daily / intra-day quantity allocation based on Information Model applied

**Role of the Regulator**
- Selection of Information Model
- Designation of forecasting party (following consultation with TSO, DSOs) – incentives for accurate forecasting may be applied
- Regulator decision on Interconnection Agreement with third countries affects quantity allocation

*Interconnection agreement
Selection of Information Model & forecasting party
Distribution code with aligned information obligations of DSO*
Development of balancing mechanisms

Role of the Regulator

- Decision the application of interim measures, by reviewing and approving the annual report on interim measures prepared by the TSO
- Targets to the TSO for reducing long-term balancing contracts may be defined

Transitional step
Balancing by the TSO through procuring balancing services from suppliers

Transitional step (in line with Balancing Code)
Interim measures for balancing (foreseen in EC Balancing Code)

EC Network Codes
Intra-day balancing by system users at trading platforms

Liquidity of short-term wholesale market
Interim measures for balancing

- Interim measures for daily balancing can be applied if the market does not have sufficient liquidity to allow full application of EC Balancing Code
- Measures constitute a transitional step and should be applied in a horizon of up to 5 years
- The main interim measure to be applied is the establishment of a balancing platform, where the TSO is a party to all capacity trades, as a means for increasing liquidity
- If the balancing platform is not sufficient, other measures, can be applied. In particular, the TSO may procure balancing services (maximum 1 year contracts) with defined daily tolerance levels and imbalance charges

Role of the Regulator

- Approval of daily imbalance charge methodology
- Approval of tolerance level of daily imbalances
- Approval of balancing contract duration longer than one year if required
Intra-day balancing at trading platforms

- System users must be able to **minimize their imbalance position** during the day, in a virtual trading platform.
- TSO retains a **residual role in maintaining the system balanced**, through balancing actions, that include:
  - Purchasing or selling short-term capacity products **at the platform**
  - Procuring **balancing services**
- TSO may trade short-term capacity products at **neighboring trading platforms**, if trading at the local platform is limited.
- TSO may require system users to have **within-day balancing obligations**, further to their daily balancing obligations (only if absolutely necessary to ensure system integrity and minimize need for balancing actions).

**Role of the Regulator**

- Approval of TSO trade at **neighboring platform** (annually)
- Potential provision of **incentives to TSO** for efficient balancing actions
- Setting (or approval) of methodology for **neutrality charges**
- Approval of terms for **linepack flexibility**
- Approval of application of **within-day balancing obligations**
Overview of grid code preparation

Key prerequisites for effective application of grid code

Transitioning to grid codes in line with 3rd Energy Package

Role of the Regulator
Usual role of Regulator for grid code development (1/4)

**Interoperability**
- Alignment of units / timing
  - Alignment of Units
  - Alignment of Gas Day, Gas Year
- Signing of Agreements with adjacent operators
  - Interconnection Agreements
  - Agreements with other connected systems
- Management of trade barriers
  - Gas quality differences
  - Odorization differences

**Capacity booking**
- Application of Entry – Exit Regime
- Approval of model transportation contracts
- Definition of Reserve Capacity

**Capacity products offered by TSO**
- Annual, quarterly, monthly firm capacity offered
- Daily firm capacity offered
- Intra-daily firm capacity offered
- Daily Interruptible capacity offered
- Other Interruptible capacity offered

Small Regulator Involvement  Moderate Regulator Involvement  Large Regulator Involvement
Usual role of Regulator for grid code development (2/4)

**Capacity booking**
- Establishment of Capacity allocation mechanisms
  - Transitional allocation mechanisms for IPs
  - Auctions at IPs in line with EC CAM Code
  - Capacity allocation mechanisms for other entry/exit points

**Congestion management**
- Operation of secondary capacity market
- Application at IPs with 3rd countries

**Establishment of Congestion Management Procedures**
- COBB
- FDA-UIOLI
- LT-UIOLI
- Surrender of capacity

Small Regulator Involvement  
Moderate Regulator Involvement  
Large Regulator Involvement
Usual role of Regulator for grid code development (3/4)

**Nomination / Renomination**
- Definition of entry/exit points where nominations are applied
- Establishment of transitional nomination process at entry/exit points

**Establishment of daily nomination process**
- Daily nomination process at entry/exit points in line with EC Balancing Code
- Matching process at connections with neighboring systems

**Quantity allocation**
- Establishment of transitional quantity allocation process

**Daily / intra-daily quantity allocation**
- Quantity allocation at IPs based on Interconnection Agreement
- Quantity allocation at exit points based on Information Model

Small Regulator Involvement

Moderate Regulator Involvement

Large Regulator Involvement
Usual role of Regulator for grid code development (4/4)

- **Balancing**
  - Transitional balancing through procurement of balancing services from suppliers
  - Interim measures for balancing (foreseen in EC Balancing Code)
  - Intra-day balancing by system users at trading platforms
  - Balancing actions performed by the TSO

<table>
<thead>
<tr>
<th>Regulator Involvement</th>
<th>Small</th>
<th>Moderate</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Regulator Involvement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate Regulator Involvement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Regulator Involvement</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>