Network code on Interoperability and Data Exchange Rules for European Gas Transmission Networks

Launch Documentation

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1. Introduction

Regulation (EC) No 715/2009 (Gas Regulation) defines several tasks for the European Network of Transmission System Operators for Gas (ENTSOG). Amongst these is the development of European-wide harmonised network codes to be applied by all Transmission System Operators (TSOs) for Gas.

On 11 September 2012, the European Commission (EC) formally invited ENTSOG to submit a Network Code to the Agency for the Cooperation of Energy Regulators (ACER or Agency) by 11 September 2013 (Invitation letter).

The Network Code shall be drafted in line with the framework guidelines on Interoperability and Data Exchange Rules for European Gas Transmission Networks issued by ACER on July 26 2012 (Framework Guidelines).

ENTSOG has launched a Public Consultation (until 11 October 2012) and has organised a kick-off Workshop on 26 September 12 to ask Stakeholders' feedback on the project plan for preparing this Network Code, including extensive dialogue and consultation with industry stakeholders. The conclusions to this project plan consultation will be published in a separate document (Consultation responses Public Consultation Project Plan).

A key step in the project plan is the release of launch documentation which is intended to provide a foundation for discussions and the development activity that will be held during the subsequent interactive Network Code development process. There will be a number of Stakeholder Joint Working Sessions (SJWSs), which are working sessions dedicated to the discussion of specific topics relevant to the draft Network Code.

The Invitation letter by Commission clearly states that the Network Code should cover the following areas: Interconnection Agreement, Units, Gas Quality (aspects not directly dealt with in the context of CEN mandate M/400), Odourisation and Data Exchange. In view of the fact that capacity calculation is addressed already in the network code on capacity allocation mechanisms (CAM[1]) and the close relationship of this topic with both that network code and the recently adopted Guidelines on Congestion Management Procedures[2] point 2.2 Annex 1 Gas Regulation (CMP Guidelines), the Commission would consider it beneficial if the respective section of the CAM Network Code were to be supplemented along the lines of these Framework Guidelines. The Commission is considering making use of its right of

[1] A draft code was re submitted by ENTSOG to ACER on September 17 2012

[2] Commission Decision of 24 August 2012 amending Annex I to Regulation 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission networks (2012/490/EU), OJL 231/16,28.08.2012

proposal to put forward a text for comitology in this regard. Therefore ENTSOG will not pay attention to Capacity Calculation in this launch documentation.

This present launch documentation (Launch Documentation) focuses on following key issues for addressing in the Network Code development process:

- General Provisions
- Interconnection Agreement
- Units
- Gas Quality
- Odourisation
- Data Exchange

For each key issue following information will be described in the Launch Documentation:

- Framework Guidelines
- ENTSOG's views/current situation/examples
- Policy options
- Questions for Stakeholders' input

In the Launch Documentation, ENTSOG lists up some questions for Stakeholders' input. Stakeholders can provide this input at the SJWS. Following SJWS are scheduled:

	Date	ISSUES
SJWS 1	14.11.2012	IA + Gas Quality + Odourisation
SJWS 2	28.11.2012	Data Exchange + Units
SJWS 3	11.12.2012	Feedback + Summary

The results of such debates will feed into the drafting of the Network Code, which ENTSOG will be carrying out in parallel with the SJWS.

For the avoidance of doubt, this Launch Documentation shall not be construed as part of the Network Code and is publicly disclosed to the market as a working document in the context of the drafting process of the Network Code only and without any commitment whatsoever from ENTSOG nor its members as to the proposed content of the Network Code. Any and all interested parties, in their capacity as professional stakeholder, shall be responsible for seeking to obtain the accurate and relevant information needed for their own assessment and decision to participate to the drafting process.

The proposed content of the Network Code and the present Launch Documentation should not be considered to give rise to any specific right or obligation whatsoever to ENTSOG or any of its members as to any stakeholder.

2. General Provisions (Scope and application of the Network Code; objective; implementation, transitional period and monitoring; dispute resolution)

> Framework Guidelines

"The network code developed by the European Network of Transmission System Operators for Gas (ENTSOG) on the basis of these framework guidelines shall apply to TSOs, with the aim to reach full market integration. LNG operators and storage operators shall facilitate interoperability and support the provisions related to TSOs laid down in these framework guidelines, in line with Article 15(1)(b) of the Gas Regulation.
TSOs shall cooperate with stakeholders, including distribution system operators, in developing and implementing the network code. European TSOs are encouraged to co-operate as much as possible with TSOs from Third Countries on interoperability issues.

The overarching objective of the network code is the harmonisation of rules for the operation of transmission systems in order to encourage and facilitate efficient gas trading and transport across gas transmission systems within the EU, and thereby to move towards greater internal market integration. The network code must be compliant with the overall objectives of the internal energy market, including security of supply, the completion of the internal gas market, and delivering benefits to the consumers. The specific objective of the network code is to define consistently harmonised technical, operational, communication rules and rules for business conduct that will allow the achievement of the objectives as set out in the framework guidelines, as well as in the Third Energy Package. Interconnection Agreements, units, gas quality and odourisation, capacity calculation and data exchange are areas where barriers to the efficient functioning of the Internal Gas Market have been identified by the Agency and for which a common approach based on harmonised rules could smooth the interoperation of the systems, including communication.
The technological underpinnings of the interoperability and data exchange rules are subject to constant change. The operational, communication and business practices follow these developments. The framework guidelines set out principles and requirements taking into account these potential developments. Whereas the means and format through which necessary information is communicated between TSOs and between TSOs and counterparties, shall be defined in the network code on interoperability as described in the section on Data Exchange, the precise content of the same information will be determined by other network codes as well.

The network code shall foresee that the TSOs shall comply with its requirements within 12 months after its entry into force, unless otherwise specified in these framework guidelines. Such compliance includes the adaptation or completion of existing contracts and agreements.
The conduct of assessments and public consultations shall not impede the implementation of the network code, pursuant to the provisions of the Gas Directive, the Gas Regulation and the present framework guidelines.

The network code shall require TSOs timely to inform all concerned counterparties on the possible consequences the implementation of the network code may have on their activities, to afford them time to adapt their practices.

The network code shall state that adjacent TSOs shall endeavour to resolve any dispute which may arise among them, while the relevant dispute settlement authorities, pursuant to Article 41(11) of the Gas Directive, shall, within their competence, act upon request of any of the TSOs, making every effort to reach a common decision on such disputes. Should the relevant dispute settlement authorities fail to reach such a common decision, the Agency shall take measures according to the provisions of Article 8 of the Agency Regulation."

> **ENTSOG's view/current situation/examples**

Scope and application + objective:

A network code can only develop rules applicable to transmission system operators (TSOs). The Network Code shall focus on cooperation among TSOs as well as between TSOs and Network Users. National provisions should be established relating to other operators (producers, LNG and storage operators, non-EU entry points,…). These provisions should be compatible with the Network Code and support the TSO provisions.

Capacity calculation is identified by ACER as an issue to be tackled in the Network Code. However, in the Invitation letter, the Commission is considering making use of its right of proposal to put forward a text for comitology in the CAM network code in this regard. Therefore, for the time being, capacity calculation is considered out of scope of this Launch Documentation.

Implementation timing:

Given the different stages of development and interoperability of natural gas transmission networks across Europe, implementation of common Interoperability and Data Exchange rules may only be capable of being achieved gradually. The Network Code should therefore define rules that are consistent with the ultimate goal of a common European market.

An implementation time of 12 months appears very challenging (e.g. changing IT systems, managing interactions with other Network Codes,…) and might be unfeasible in some cases. The Network Code is a supporting network code for the market related network codes (CAM, BAL[3]). The requirements of these network codes have to be known before TSOs can plan the full implementation of the Network Code.

[3] The draft network code on Gas Balancing of Transmission Networks developed by ENTSOG is to be submitted to ACER on November 5th 2012 (BAL network code)

Dispute resolution:

In case, adjacent TSOs are unable to reach an agreement, the relevant national regulatory authorities (NRAs) acting as dispute resolution authorities within their competence shall make every effort to reach a common decision on the dispute. Should the NRAs fail to reach such a common decision, the Agency shall take all necessary measures according to the provisions of Article 8 of Regulation (EC) 713/2009 under the preconditions provided therein.

> **Policy options**

Scope and application + objective:

ENTSOG will follow the same open and transparent development process and procedures for the stakeholders' involvement which have proven successful for the network codes on CAM and Balancing. ENTSOG will co-operate as much as possible with Third Countries' TSOs (for information some Third Countries' TSOs are already active in ENTSOG's organisation as Observer).

Implementation timing:

The Network Code should give the possibility for TSOs to implement on longer implementation timing, where this may be appropriate in consultation with the Stakeholders and with prior consent of NRAs, by defining a clear migration path to a common solution (e.g. data exchange).

Dispute resolution: The process should make clear the powers of the regulatory authorities to resolve such disputes and clarify the regulators' 'area of competence', stating how disputes that fall outside such area will be resolved.

> **Questions for Stakeholders' input**

- Do you think that the proposed development process for the Network Code offers enough room for Stakeholders' involvement?
- Do you think that a migration path towards a common solution can lead to acceptable implementation timings for all market participants (e.g. implementation of common data exchange solutions (network, exchange protocol, format)?
- Do you think that the Network Code should define a timeframe for TSOs as well as a timeframe for the process involving the NRAs to resolve disputes?
- Do you agree that the resolution of disputes between TSOs could alternatively be submitted to a national jurisdiction or alternative dispute resolution forum (either ad hoc or institutional)?

3. Interconnection Agreements

3.1. Introduction / General Requirements

> Framework Guidelines

"The Network Code shall specify that the Interconnection Agreements contain the provisions necessary to facilitate commercial and operational cooperation between adjacent TSOs. Individual Interconnection Agreements shall be established on a mandatory basis by all concerned TSOs at all interconnection points.
As a general requirement, the Network Code shall ensure that Interconnection Agreements respect the following criteria:

- *Impose no restriction to cross-border trade;*
- *Promote the development of competitive and liquid markets at both sides of the interconnection points."*

> ENTSOG's view/ current situation/examples

An Interconnection Agreement (IA) is an agreement established among TSOs, whose networks are connected at a particular Interconnection Point (IP). An IA should be concluded by the relevant TSOs in respect of each IP and should describe the agreed operational and technical rules and principles to be applied at that location.

The Network Code will be required to set out the key provisions that should be included in all IAs in order to promote the necessary level of operational and technical cooperation between TSOs to enable them to deliver efficient transportation services to Network Users.
The 3rd Energy Package draws attention to the importance of cooperation between TSOs in order to facilitate cross-border gas flows and trade[4]. This is exactly the purpose of concluding IAs: Network Users can fully concentrate on their commercial dealings since day-to-day transmission issues at the border are solved between adjacent grid operators according to their IA.

> Policy options

The Network Code development process will need to consider which aspects of an IA should be established on a mandatory basis by all TSOs in respect of all IPs. Further detail on this is provided on this in section 3 of this document.

The Framework Guidelines also require consideration of the key objectives that IAs should fulfil – namely facilitating cross border trade and market development. These criteria mentioned in ACER's text above could be analysed as follows:

- The provisions in the IA should facilitate the safe and reliable transportation of gas across the IP.

[4] Article 4 of Regulation (EC) No 715/2009

- Each TSO's roles, responsibilities and obligations in respect of the IP should be clearly set out in the IA
- The IA should set out the requirements for exchange of information among TSOs and the methods by which such communication should take place.
- TSOs should be required to act as Reasonable and Prudent Operators in relation to the discharge of their functions and obligations within an IA.
- The relevant rules and procedures in the IA impacting on Network Users' activities should be made available by TSOs to any of their Network Users upon request in a transparent and accessible manner.

> **Questions for Stakeholders' input**

- Do you propose more criteria that should be covered by the general requirements of IAs in order to ensure that cross border trade is not restricted and market development is promoted?

3.2. Development process

> **Framework Guidelines**

"The Network Code shall detail the process for the development and conclusion of new Interconnection Agreements.
The Network Code shall specify that Interconnection Agreements are communicated to the concerned NRAs upon their conclusion and amendment, and at the NRAs' request."

> **ENTSOG's view/ current situation/examples**

Currently, NRAs may not be involved in the establishment or amendment of IAs. Sometimes they may not be informed on their content, since IAs set the obligations of each one of the adjacent interconnected TSOs for the smooth cooperation between them. The Framework Guidelines envisage a greater level of NRA oversight of IAs, requiring that the Network Code must oblige TSOs to submit to their NRA on their request:

- a copy of all IAs that the TSO is currently party to,
- a copy of any new IA that the TSO may enter into, and
- details of any amendments made to an existing IA.

In addition, the Framework Guidelines require that the Network Code should set out how TSOs should work together to develop an IA for new IPs.

> **Policy options**

ENTSOG envisages that the requirement for TSOs to submit IAs and amendments thereto to their relevant NRAs should be straightforward to implement in the Network Code.

ENTSOG is more interested in stakeholder's views about what should be included in the Network Code concerning the development process for new IAs. Examples for this could include:

- Where a new IP is to be constructed, TSOs should be obliged by the provisions of the Network Code to agree on the format and content of an IA that will apply at that location.
- The TSOs should commence discussions on the IA at an early stage in the development of the new IP and plan its development as part of their overall project management for the new IP.
- The IA must be signed by the relevant TSOs prior to first gas flows through the new IP.

> **Questions for Stakeholders' input**

- Are there any further details concerning the development process of new IAs that you believe could be included with the Network Code?

3.3. Mandatory Terms

> **Framework Guidelines**

"The Network Code shall outline the mandatory terms of the Interconnection Agreements, including minimum requirements, on at least the following:

- *Modification of Interconnection Agreements*
- *Rules for flow control*
- *Measurement principles of gas quantities and quality*
- *Matching*
- *Rules for the allocation of gas quantities*
- *Exceptional events*
- *Dispute resolution between TSOs"*

> **ENTSOG's view/ current situation/examples**

The proposed list is in line with the existing practices for the content of IAs for some TSOs although for others, amendments would be required. Nevertheless, an IA, as a legal document, has to include more terms and conditions to be a stand-alone contract.

> **Policy options**

IAs could contain the following terms, which include the mandatory terms proposed by the Framework Guidelines:

- Preamble

The Preamble explains who the Parties are and their roles in relation to the IP and the objective explaining what and why the Parties want to establish with the agreement.

- Definitions

Definitions explain the meanings of the terms used by the parties in the IA, which may, for example, include:

  - Interconnection Point
  - Unit of measurement (m^3, kWh)
  - Timing definitions (year, month, week, gas-day, working day, UTC)
  - Business/Operational terms (nomination, matching, Network User codes, OBA or other allocation rules, physical gas flow etc.)
  - Metering and measurement terminology (e.g. Measuring Capacity, Gas Sampling Point, Fiscal metering, Non fiscal metering, etc.).

- Scope

The Scope describes the main rights and obligations of the parties under the agreement to achieve the objective set forth in the Preamble.

- Custody transfer

The custody transfer point for all gas delivered at the IP for transmission in both directions shall be defined between TSOs.

- Business Rules
  - Matching Process (see chapter 3.3.4)

The Matching Process explains how to come to confirmed and identical quantities at both sides of a certain IP.

  - Flow Control/Imbalance handling (see chapter 3.3.2)

The Flow Control/Imbalance handling explains the coordination process to ensure that the total quantities of gas transported are close to scheduled quantities (including, if required, minimum flow, batch flow, ramp-up, ramp-down).

  - Allocation (see chapter 3.3.5)

Allocation explains the allocation regime and the communication of the allocation data.

- Technical Rules
  - Maintenance

Maintenance explains the relevant information on annual/monthly maintenance plans that may be exchanged among TSOs to improve coordination of maintenance activities (see relevant provision in the CAM network code art. 3.1).

- Volume, Energy and Quality Measurement (see chapter 3.3.3)

Volume, energy and quality measurement explains how volume, energy and quality are to be measured and communicated, including measurement equipment, standards and the issues related to control and calibration operations (subject involved, rights and responsibilities etc.).

- Right of Access

Right of Access explains the conditions to guarantee physical access of the involved TSOs representatives to the relevant operational facilities related to the concerned IP.

- Exceptional events (see chapter 3.3.6)

The communication process between adjacent TSOs in case of an exceptional event is defined.

- Delivery conditions

Delivery conditions set out the physical characteristics that gas transported at the IP has to comply with, which in general includes:

  - Gas pressure,
  - Gas temperature,
  - Gas quality: requirements explain which quality parameters (e.g. GCV, percentage CO_2, Wobbe-index, ...) will be specified and in what range these are on-spec (e.g. CO_2 between 0 and 2.5 mol %) (including off-specifications situation treatment).

- Energy conversion

  Energy conversion explains that the conversion from energy to volume and vice versa at the IP shall be performed by using the Gross Calorific Value of the natural gas measured at the Interconnection Point.

- Data exchange: Communication and Online Data Transmission

Data exchange: Communication and Online Data Transmission explains the relevant transmission technology and data protocol, data formats, message contents (normal and back-up)

- Coming into force and Duration

It explains how and when the IA is in force and expires. A separate provision could provide specific cases of termination.

- Confidentiality

Confidentiality explains the information that is to be kept confidential among the parties to the IA, the conditions under which that information may be divulged and to whom.

- Liability and limits of Liability

Subject to the applicable law, the parties decide which liabilities and circumstances excluding liability they have with each other.

- Governing Law and Dispute Resolution

The parties decide under which law the IA shall be governed and construed and how any dispute that may arise out of the terms of the agreement shall be resolved. The governing law should be one of an EU Member State.

- Entire Agreement and contractual framework

This provision explains how an IA and its Appendices may be partially or completely amended. This provision can set forth the documents forming part of the IA and the order of precedence.

- Force Majeure and assimilated event (Force Majeure event)

A Force Majeure event will relate to an event beyond the reasonable control of a party acting as a Reasonable and Prudent Operator in accordance with the standard terms currently defined and which prevent a party to fulfil totally or partially any obligation under the IA. Where an event of Force Majeure occurs, the liability of the party affected is released to the extent and for the duration of the event of Force Majeure.

- Miscellaneous

Other elements may also be included, such as:

  - language and
  - contact details of each party to whom formal notices under the agreement are to be provided.

The above structure can be used as a basis for the TSOs to format new IAs or amend existing ones without implying the definition of default rules unless where it is explicitly required by the Framework Guidelines and to the extent a default rule can be reasonably defined.

> **Questions for Stakeholders' input**

- Apart from those included in the Framework Guidelines, do you see any further provisions that could be included in the proposed list, which are of particular interest of the Network Users?
- Do you believe it is necessary for processes involving Network Users (e.g. those contained in section E. Business Rules above) to always be contained in an IA or can these alternatively be included in national network codes/Network User' transport contracts?

3.3.1. Modification of IAs

> **Framework Guidelines**

***"Modification of Interconnection Agreements**: The Network Code shall specify that Interconnection Agreements define a transparent process for their modification."*

> **ENTSOG's view/ current situation/examples**

Whilst IAs are intended to be long-lived contracts between TSOs, from time to time they may require amendment to be adapted to the needs. The Framework Guidelines require that the process of amendment should be transparent and there is therefore a need to describe how a modification request is made known to the involved parties and the procedure to be followed.

> **Policy options**

ENTSOG's proposal for the IA modification section defines a process which takes into account two elements:

- Reasons for the amendment
- Amendment process

Reasons for amendment

From TSO experience, reasons for amendment could be:

- new National/European laws which have impact on the IA, or
- provisions become ineffective, invalid or unlawful, or
- the parties decide to amend the IA due to system or market modifications, or
- any other reason deemed relevant by both parties to trigger a change in the IA to adapt the agreement to their needs adequately .

Amendment process

Where a TSO or both TSOs has/have to comply with a new legal requirement which affects the IA, the amendment process has to be started in order to get an agreement between TSOs on how to implement it. In the other cases the parties will jointly evaluate the possibility to start the amendment process.

In all the cases, the IA changes need to be agreed by the parties who shall meet and discuss in good faith in order to adapt or amend provisions of the IA in a reasonable time period and to implement the required work or action, if need be. Where no agreement is reached the measures under the Dispute Resolution section would apply.

Where a TSO's national rules prescribe that, under certain circumstances, a consultation should be carried out prior to an IA amendment being effected, that TSO would continue to follow these established processes if mandatory and provided it remains consistent with the

Network Code provisions. Where no pre-existing national rules requiring consultation before amendments to IAs exist, then TSOs will have to agree on any consultation according to the nature of the amendment under discussion. In particular the TSOs should have regard to whether or not the proposed amendment will affect third parties such as Network Users and be obliged to determine the amendment process giving the proper consideration to its effectiveness and transparency.

The amendment should be valid only if executed in writing and signed by a duly authorized representative of each party.

All agreed changes shall be implemented from a defined effective date simultaneously at both sides of the IP.

> **Questions for Stakeholders' input**

- Do you agree that the above proposals meet the transparency requirements for modification of IAs?

3.3.2. Rules for flow control

> **Framework Guidelines**

> ***"Rules for flow control**: The Network Code shall require that IAs set out the rules that require TSOs at the interconnection points to agree on the timing, direction and procedures for flow control."*

> **ENTSOG's view/ current situation/examples**

The purpose for agreeing to rules for flow control in an IA is to facilitate a controllable and predictable flow across the IP for the benefit of both TSOs and Network Users.

Existing practices for flow control terms, usually included in IAs, contain two elements that TSOs should agree upon:

- Which party is responsible to ensure that the flow is as close as possible to agreed quantities for the reference period.

  Both TSOs shall together strive for a high level of accuracy of the flow when compared to the sum of the agreed quantities (including any OBA adjustments). For the predictability of the transportation of gas and also for the Network Users a high level of accuracy is desirable.

- How to handle the flow control at relevant IP (stating the party who shall manage the measurement as well as the party who shall manage the steering of gas flow) in order to maintain the accuracy of the flow control.

The above mentioned rules determine that TSOs agree how to steer the flow and try to minimize the inaccuracies for all Network Users.

> **Policy options**

ENTSOG considers that the Network Code could contain rules which require TSOs to ensure that flows should be as close as possible to targets, based on agreed quantities. However, ENTSOG's initial view is that no particular level of accuracy or definitive rule to govern stability of the flow should be included within the Network Code. This is because TSOs need flexibility to determine parameters such as these according to the physical characteristics of individual IPs.

Similarly, the decision about which TSO should be responsible for flow control should be left upon the involved TSOs.

> **Questions for Stakeholders' input**

- Do you consider that agreed details on flow control might affect Network Users and if yes, how?
- Are there any other rules concerning flow control that you consider should be included?

3.3.3. Measurement principles for quantity and quality

> **Framework Guidelines**

*"**Measurement principles of gas quantities and quality:** The Network Code shall ensure that Interconnection Agreements include provisions on methods and procedures for the measurement of gas quantities and quality, including harmonized conversion factors, as well as rules for the handling of differences in measurement and measurement corrections."*

> **ENTSOG's view/ current situation/examples**

"Measurement principles of gas quantities and quality" is one of the provisions that should be included in all IAs. ENTSOG believes that this section of the Network Code should detail the principles that TSOs should adopt in relation to agreeing measurement provisions. It is not intended to harmonise to the detail of the measurement equipment that should be installed at each IP because each will have its own specific physical characteristics. Therefore these principles are based on TSOs continuing to cooperate in order to maximise measurement accuracy and reliability.

In existing IAs, involved TSOs agree on which one is responsible for the installation, operation and maintenance of the measurement equipment, defining the methodology, frequency, detail, units and manner of metering data exchange. Moreover, TSOs shall agree on the units for exchanging information and on any conversion factors if needed.
For the time being, there are several (European and International) standards covering this topic, which are often revised.

> **Policy options**

The inclusion of measurement principles of gas quantities and quality in the IA guarantees the agreement of these procedures between adjacent TSOs, thus improving the cooperation and coordination between them. Therefore, it is necessary to define general rules and requirements about the content of these procedures, like:

1) Adjacent TSOs shall agree on the measurement principles. There are several European and International standards in force related to the measurement and quality issues that may be taken into consideration.

2) Adjacent TSOs shall agree on:

- which TSO is responsible for the installation, operation and maintenance of the measurement equipment; the means by which volume and energy are to be measured at the interconnection point;
- which gas quality parameters are to be measured;
- for each parameter, the range and uncertainty over which the measurement equipment will operate, the frequency of measurement and in what units the measurement shall be made;
- the manner of data exchange between TSOs in respect of measurement data;
- arrangements that shall apply in the event of failure of the measurement equipment.

3) The measurement validation arrangements and the quality assurance policy should be defined in the measurement principles.

4) Measurement principles within IAs should also contain rules to manage a situation where the volume and energy measurement equipment is found to be in error (either under-reading or over-reading outside of its defined uncertainty range). ENTSOG considers that any subsequent reconciliation involving Network Users should be dealt with under prevailing national rules as this is not within the scope of the Framework Guidelines.

> **Questions for Stakeholders' input**

- Do you agree with the above proposals for measurement principles that should apply at an IP?
- Should anything else be included as a minimum requirement for measurement?

3.3.4. Matching

> **Framework Guidelines**

*"**Matching**: The Network Code shall require that Interconnection Agreements include detailed guidelines regarding communication on the matching process between TSOs, as well as between TSOs and the relevant capacity booking platforms, with a view to assuring that confirmed quantities of gas are equal on both sides of the interconnection point. The Network Code shall define rules applicable to cases of mismatch, whereby the mismatch is either eliminated or otherwise reasonably resolved at least costs for TSOs and users."*

> **ENTSOG's view/ current situation/examples**

Nomination deadlines have already been included in the BAL network code. Deadlines have to respect procedures described within the CAM network code and CMP Guidelines. What is missing from the Nomination/Re-nomination process is the communication part TSO-TSO in order to realise Network Users' requests. This is usually described as a Matching Process.

> **Policy options**

Below is the proposed procedure to be followed for the Matching Process

Matching process for Unbundled Capacity Products

- Matching Rule

Flow is required to be calculated at both sides of an IP on an identical basis. Therefore, for the Matching Process, adjacent TSOs mutually agree to apply a matching rule (for example the Lesser Rule) in the IA.

- Deadlines Matching Process

Adjacent TSOs shall mutually agree in the IA on respective deadlines for the Matching Process within the Nomination and Re-nomination cycle as well as on their roles in the Matching Process. (i.e. which is the Initiating TSO and which is the Matching TSO).

The timing of the communication process among the TSOs at an IP has to take into account the following points:

- The TSOs need to have all necessary data exchanged to inform the Network Users about their Confirmed Quantities before the end of the Nomination/Re-nomination cycle.
- The involved TSO agree in the IA on a process to exchange the necessary data which allows them to do all calculation and communication steps in an accurate and timely manner
- The Matching Process will consider the deadlines which are determined in the BAL network code and the procedures described within the CAM network code and CMP Guidelines.

ENTSOG suggests the following sequential timing for the Matching Process in the Nomination/Re-nomination cycle (in total 2 hours) for stakeholder consideration:

- Within 45 Minutes for calculating and sending of Processed Quantity by Initiating TSO
- within 45 Minutes for calculating and sending of Confirmed Quantity by Matching TSO
- 30 Minutes for Confirmation to Network Users and for scheduling the network by all TSOs

Matching Process for Bundled Capacity Products

The Matching Process for bundled and unbundled products is assumed to be the same, as the Network User sends the Nomination to both TSOs in order to ensure that the flow at both sides of an IP is calculated on an identical basis. The TSO will use the existing communication procedures for the exchange of information. In case of an Exceptional event the TSOs will perform a process similar to the Matching Process to align the changed Processed Quantities.

ENTSOG's initial view is that the parallel use of bundled and unbundled capacity at one IP makes it necessary to design the communication process as set out above. The alternative is the implementation of completely separated processes for bundled and unbundled Nominations in the systems of Network Users and TSOs which could increase costs and risks of errors in this time critical process.

Data exchange and content

The Matching Process implies the use of data communication between adjacent TSOs.
The information contained within the data exchange for the Matching Process shall be harmonised and shall at least contain:

- The sender and recipient identification
- IP identification
- Party(s) / Counterparty(s) Network User Portfolio Identification
- Start (and end) Time for which the matching is made
- Delivery Period (Gas Day)
- Processed/Confirmed Quantities in kWh/d for daily Nominations/Re-nominations) or in kWh/h for hourly Nominations/Re-nominations.

The Confirmed Quantities as result of the Matching Process will be sent to the Network User.

> **Questions for Stakeholders' input**

- Do you see any problems with the proposed Matching Process? If yes, please provide proposals for improvement.
- Do you believe that the "Lesser Rule" fulfils the requirement to "eliminate or otherwise reasonably resolve at least costs for TSOs and users mismatches at IPs"?
- Do you think additional information is necessary for Network Users, e.g. reason for Confirmed Quantities, nominated quantities of counterparty, processed quantities of other TSO, are useful additions? Please supply your reasoning for any additional information requests.

3.3.5. Rules for the allocation of gas quantities

> **Framework Guidelines**

***"Rules for the allocation of gas quantities**: the Network Code shall require that Interconnection Agreements stipulate how TSOs should cooperate and provide where necessary for consistent rules in the allocation of gas quantities to shippers in the interconnection point at both sides, as well as the solutions for managing gas quality differences, as detailed in section 4 below. Furthermore, the Network Code shall require TSOs to agree on business rules linked to the handling of steering differences, with an Operational Balancing Account as a standard preferred option."*

> **ENTSOG's view/ current situation/examples**

Allocation is the process carried out by the TSO, or a third party agent, which consists of attributing amounts of energy to its Network Users at an IP.

Currently, at some IPs, TSOs allocate gas to Network Users equal to their Confirmed Quantities and manage any steering difference via an OBA, or allocate the differences to balancing shippers acting as Network User. In other cases, the Nominations and allocations are separate and the allocation process is either performed on a pro-rata basis or by an agent who provides notification of the allocations to the TSO and the Network Users based on measured flows.

Steering differences and measurement corrections shall be allocated according to the allocation rules contained in the Network Code. There shall be consistency between the rules in the Network Code and the rules detailed in the contracts between TSOs and Network Users.

> **Policy options**

The allocation rules could be one of the following:

- if the steering difference is allocated to the balancing account of the TSOs (OBA), the confirmed quantities will be allocated to the Network Users.
- if the steering difference is allocated to a balancing shipper, the confirmed quantities will be allocated to the non-balancing Network Users.
- otherwise, the metered quantities will be fully allocated on a "pro-rata" basis rule, for example in proportion to Confirmed Quantities or based on pre-defined percentages per Network User.

Responsibility for providing allocations could be given to the Network Users who could appoint an agent to provide allocations to them and the TSOs based on metered quantities.

Where necessary to facilitate the interoperability of networks, ENTSOG considers that TSOs shall ensure allocation rules are consistent at both sides of the IP.

> **Questions for Stakeholders' input**

- Do you propose any other rule for allocation?
- Which allocation method should be used as a default rule?

3.3.6. Exceptional events

> **Framework Guidelines**

> *"**Exceptional events**: the Network Code shall require that Interconnection Agreements include provisions on the way in which TSOs establish contact with the adjacent TSOs, as well as with network users and coordinate necessary actions in case of an exceptional event. The Interconnection Agreements shall in particular define the content and timing of information to be exchanged."*

> **ENTSOG's view/ current situation/examples**

This section of the Framework Guidelines require the Network Code to set out how TSOs and Network Users should work together to resolve Exceptional events, with the focus being on the communications.

A long term planned event (like a yearly maintenance) is out of scope here because all concerned parties have the time to take more appropriate actions like flowing the gas via another way or using balancing tools or decreasing, in advance, the available capacity, etc. The short term planned event (like a daily maintenance) might be treated like an unplanned event because whatever the origin of the situation, the actions could be the same as well as the communication.

> **Policy options**

As the nature of an Exceptional event cannot be defined (as well as the technical difficulties to solve it), it is impossible to define accurate timing for communication. Of course, the priority in case of such an event shall be related to the safety of people and then to the security of the network and finally to the information of the adjacent TSOs and to the Network Users.

The content of the data exchange should be harmonised but open enough to allow local comments or information (the use of free text instead of fixed code should be recommended).

The communication means should be easy-to-use and should allow a fast and simultaneous communication to all concerned parties. The use of electronic message is an option that should be analysed based on the event frequency, on the cost of message development and test and on the benefits of this message: content proof, reception tracking, pan-European

standardisation, fast sending process (usually, less than 5 minutes are needed to send about 100 messages).

This chapter does not cover the financial, commercial, and legal consequences of an Exceptional event. For the purposes of clarity, this includes the impact on a Network User's imbalance position or any compensation mechanism arising from the obligation on TSOs to accept flows up to the firm capacity held by Network Users at the affected entry or exit point. It also does not cover emergency or Force Majeure events.

- Communication and Coordination of Operation

The TSO who has to take immediate corrective actions to solve it and has to declare it by informing without delay the adjacent TSO about the nature, the expected duration of the event, and the possible impact on the available quantities. Both TSOs shall keep each other informed about all relevant issues and the progress in solving the consequences of the event and about any relevant changes in its magnitude. Common target should be to mitigate the consequences of the event as much as possible and finalize it in the shortest possible time.
Both TSOs shall promptly inform their affected Network Users with respect to the relevant IP about the nature and expected duration of the event and consequences for the confirmed quantities.

- Communication between TSOs

The communication means should be adapted to the local circumstances in terms of ease-of-use and efficiency and adapted to the type of action (whether urgency or planned action). The means should be agreed and defined in the IA.

The default means should be for example by phone call for instant and fast information and reliable telecommunication tool (as fax or email or mail) for confirmation in writing.
In any case an alternative means shall be available to prevent any temporary failure.

- Communication between TSOs and Network Users

The communication means should be adapted to the local circumstances in terms of ease-of-use and efficiency. The means should be defined between TSO and Network User.

- Flow Control

The flow control shall be based upon the agreements between the TSOs as a result of their communication about the magnitude of the Exceptional event.

> **Questions for Stakeholders' input**

- What are your views on the proposed policy rules?

3.3.7. Dispute resolution

> **Framework Guidelines**

*"**Dispute resolution between TSOs**: the Network Code shall require that Interconnection Agreements outline a dispute resolution procedure between TSOs."*

> **ENTSOG's view/ current situation/examples**

This concerns the resolution of disputes that may arise from the terms of an IA. The involved TSOs endeavour to settle by negotiation any dispute, controversy or claim arising out of or in relation to or in connection with the IA, including measurement, validity, invalidity, performance, breach, interpretation and termination.

The TSOs shall seek to solve any dispute amicably among experts either neutral experts or representatives of each party.

> **Policy options**

IAs should require TSOs to first use their reasonable endeavours to resolve disputes between themselves. If that fails, all disputes arising out of or in connection with the IA should be finally settled under resolution of dispute rules agreed by the TSOs. The rules shall define at least the timeframe for the amicable phase and process to escalate and submit to the elected forum for final settlement. Where the elected forum does not have a defined framework (procedure, costs, timeframe, legal force, juridical review) the IA shall specify these details.

> **Questions for Stakeholders' input**

- Do you agree with the principle that disputes arising out of an existing IA should be settled by an independent forum where TSOs are unable to resolve between themselves?
- Given that IAs provide rules for the transportation of gas across borders, do you see as relevant to foresee the resort of an international arbitration forum?
- Do you believe that NRAs should be involved in the resolution of such disputes? If so to what extent?

3.4. Adaption of existing IAs

> **Framework Guidelines**

"The above mentioned terms and requirements shall apply to all Interconnection Agreements, as well as to every amendment/renegotiation of such agreements, concluded after the Network Code becomes effective.
The Interconnection Agreements existing prior to the entry into force of the Network Code shall be adapted or complemented, only insofar as the topics listed above are not addressed therein, and the terms and minimum requirements are not met."

> **ENTSOG's view/ current situation/examples**

To the extent that existing IAs do not comply with the minimum requirements for IAs that will be set out in the Network Code, those IAs will need to be adapted to become compliant. Also, when TSOs propose to amend an IA after the Network Code has come into force, the amendment complies with the Network Code.

> **Policy options**

Within a period of 12 months from the entry into force of the NC, the TSOs shall analyse and take appropriate actions to amend existing IAs according to the terms and minimum requirements of the Network Code. During this period, existing IAs continue to be in force.
Amended IAs shall be submitted for information to relevant NRAs on their request. If, for a specific IP, both NRAs involved are of the opinion that terms signed are not in line with the requirements of the Network Code, the NRAs shall ask the involved TSOs to amend accordingly these non-compliant terms of the IA within 12 months. During this period, the existing terms of the IA continue to be in force. In the case that the involved NRAs do not agree, the issue should be escalated to ACER pursuant to the Agency Regulation while the existing terms of the IA continue to be in force.

> **Questions for Stakeholders' input**

- Do you think that certain terms of adapted IAs should be communicated to Network Users and if yes, which ones and why?

3.5. Default Rules

> **Framework Guidelines**

"In addition, the Network Code shall provide for default rules on each of the above topics, to be directly applicable in the event the TSOs fail to reach a mutually acceptable agreement on any of these, within a period of 12 months.
Where a default rule implies that data is exchanged between TSOs or between TSOs and network users, the precise content of the information to be exchanged as a consequence of the default rule is to be set out in the Network Code."

> **ENTSOG's view/ current situation/examples**

As proposed by the Framework Guidelines, the Network Code should contain a minimum list of requirements with default rules to be included in all IAs for each requirement in the event that TSOs cannot agree. This offers a level of flexibility to TSOs to achieve the requested cooperation (according to the set criteria) but at the same time to be able to assure Network Users that the key operational issues are handled according to common mandatory items and that they can concentrate on their commercial role. The question here is to find the right balance between necessary flexibility to adapt to the needs and the right level of harmonization.

The Framework Guidelines ask for default rules "to be directly applicable in the event the TSOs fail to reach a mutually acceptable agreement on any of these, within a period of 12 months". The challenge is to find a rule applicable to all IPs as a default rule.

> **Policy options**

In case of no agreement between TSOs for the establishment of an IA, ENTSOG proposes the development process for the settlement of the dispute (described above) to be applied. NRAs or ACER could ask the involved TSOs to use a default rule (if any) for the mandatory terms, where no agreement is reached.

The Network Code should seek to define to the extent feasible and reasonable a default rule for the mandatory items. The content of the default rules will need to prescribe standard terms leaving where and to the extent necessary the sufficient flexibility to adapt the IA adequately to the needs of the parties involved taking into account any and all relevant specificities applicable at the concerned IP.

> **Questions for Stakeholders' input**

- Under which circumstances would it be appropriate for TSOs to use default rules and under which circumstances would it be appropriate TSOs to use a dispute resolution mechanism?

4. Units

> Framework Guidelines

"A lack of harmonisation with regard to the units used by TSOs along the gas value chain may constitute a barrier to cross-border trade and access to markets. The Network Code shall determine the use of harmonised units at least for energy, volume, pressure and gross calorific value, for the TSOs to use when communicating to counterparties.
Where the harmonisation of units has already been covered by EU legislation[5] or in a Network Code adopted by ENTSOG under Art 8(2) of the Gas Regulation, the Network Code shall not duplicate these provisions, but shall introduce further harmonisation, insofar it is deemed necessary for the purposes of interoperability as defined in these Framework Guidelines."

> ENTSOG's view/ current situation/examples

At present, differences exist between TSOs regarding the units of measurement that they use to manage their networks[6]. As the EU gas market progressively integrates, the use of common units becomes desirable where TSOs and Network Users interface at interconnection points or publish data at a European level. However, for their own internal processes, it is envisaged that TSOs could continue to use their preferred national units and employ the use of conversion factors where necessary.

> Policy options

4.1. Proposed common set of units

The following units for pressure, temperature, volume, calorific value, energy, and Wobbe-index are proposed to be adopted:

- Pressure : bar
- Temperature : °C (degree Celsius)
- Volume : m^3(n) (at 0°C and 1.01325 bar(a))
- GCV : kWh/m^3(n)
- Energy : kWh (based on GCV)
- Wobbe-index : kWh/m^3(n) (based on GCV)

Notes:

- For pressure, it shall be clearly indicated whether it refers to absolute (bar(a)) or gauge (bar(g)).

[5] See, for instance, Commission Decision of 10 November 2010 amending Chapter 3 of Annex I to Regulation 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission networks (2010/685/EU), OJL 293/67,11.11.2010.

[6] For example, 4 different combustion reference temperatures are used within the EU for GCV, energy and wobbe index: 15°C, 25°C, 0°C and 20°C.

- Combustion reference temperature for GCV, Energy and Wobbe-index shall be 25°C[7].

4.2. Proposed extent of application of common set of units

It is proposed that the obligation for TSOs to use the above common set of units shall be limited to operational procedures and information exchange related to transportation of gas across an IP or in respect of the publication of data on a common platform.

- Nominations

For nominations which are made on a common platform or on an IP it is appropriate to use the proposed common set of units.

- Capacity bundled products

For capacity that is offered as a bundled product it is appropriate to use the proposed common set of units to improve interoperability, particularly if this is on a single platform.

- Maintenance Publication

It is proposed that TSOs should use the common units when publishing their maintenance plans at Interconnection Points.

- Communications

For data exchange between adjacent TSOs and between TSOs and Network Users (electronically received communications) in respect of an IP it is appropriate to use the proposed common set of units.

4.3. Utilization of other units

The utilization of other units could be permitted if deemed appropriate by the TSO or required by national rules in force in the TSO's country.

For following processes (non-exhaustive list) the utilization of other units is possible:

- Metering: ENTSOG considers that it is not appropriate, necessary or efficient to change meters used in their countries to work in the proposed common set of units. This would be a considerable cost and change program for very little benefit. For the IPs processes can be put in place to convert between each TSOs standard Units and the proposed common set of units.
- Physical System Operation: ENTSOG considers that there is no need either to physically operate on a common set of units across the network on a national level. This is not required to achieve the aim of improving technical interoperability at IPs across Europe.

[7] 25°C is proposed to be consistent with the transparency requirements within chapter 3 of Annex 1 of the Gas Regulation 715/2009.

- Other processes: billing, operational and commercial systems, system balancing and demand forecasting as they will not affect the aim of achieving technical interoperability at IPs across Europe.

> **Questions for Stakeholders' input**

- Do you agree with the list of items for which common units are proposed? (pressure, temperature, etc.)
- Do you agree with the proposed common units for these items? (bar, °C, etc.)
- Do you agree with the proposed scope within which TSOs would be obliged to use common units?
- Do you think that harmonization of any other units is required and if so what are they?

5. Gas Quality

Currently, different natural gas quality specifications exist across Europe depending largely on the different historical sources of gas and what each Member State has considered to be appropriate for its own particular network. However, with declining European natural gas production and the expected increase in demand in the coming decades, Europe's import dependency is likely to grow, potentially diversifying the sources and quality of gas used. Moreover, the development of renewable energy sources like biomethane is also increasing due to the current legislative framework (Renewable Energy Directive) and it is expected that they will be injected into the European gas system as an additional and renewable energy source, promoting indigenous production, supporting commitments towards sustainability, diversifying energy sources and contributing to security of supply.

In order to address such challenges and promote the interoperability of TSO networks, the EC issued a mandate to CEN to draw up European standards (the widest possible at reasonable cost) for H-gas (Mandate M/400). The standardisation process included a cross-European study, performed by the GASQUAL consortium, on the effect of H-gas quality variations on the behaviour of GAD-compliant gas appliances in terms of safety, emissions and efficiency. In parallel, the EC retained consultants (GL Denton and Pöyry) to undertake a cost-benefit analysis of gas quality harmonisation to provide guidance to the standard-setting process. In December 2011 GASQUAL completed its analysis on appliance behaviour on H-gas variations. This finalizes the Phase I of the CEN work on mandate M/400 aiming to develop a harmonized European standard for gas quality. The GASQUAL analyses on combustion parameters serve as input for Phase II of the CEN mandate: the development of a set of standards for gas quality parameters (including non-combustion parameters) through a forward looking approach. In addition, the CEN standardization process will also have regard to the consultants' final report on the cost-benefit analysis. Final proposals are expected to be completed in 2013/14.

In 2010 the EC issued another mandate to CEN to draft a European standard for biomethane for use in transport and injection into the natural gas grids (Mandate M/475). This decision was primarily driven by security of supply reasons and Kyoto obligations to use biofuels in transport.

This work on gas quality harmonisation is outside the scope of the Framework Guidelines, which requires the Network Code to establish rules to:

- reinforce transparency of gas quality data;
- require cooperation of TSOs in order to prevent differences in gas quality from creating an obstacle to gas market integration;
- require ENTSOG to produce assessments of future changes in the actual gas quality within EU networks; and

- ensure that different odourisation practices among TSOs do not constitute a barrier to the transportation of gas across IPs.

5.1. Handling Gas Quality Differences

> **Framework Guidelines**

"The Network Code shall specify that adjacent TSOs agree where necessary on the handling of gas quality differences at each side of a given interconnection point. The Network Code shall require that TSOs on either side of the interconnection point closely cooperate and work out technically feasible and financially reasonable solutions to handle gas quality issues. Possible solutions might include, but shall not be restricted to, swapping, co-mingling and flow commitments. The solutions shall be such that they support the removal of barriers to cross-border trade resulting from the different gas qualities. TSOs shall jointly determine the solutions facilitating cross-border trade based on a cost-benefit analysis and submit them for approval to the relevant NRAs[8], following a public consultation with the market."

> **ENTSOG's view/current situation/examples**

While the CEN mandate M/400 envisages gas quality harmonisation within the EU, the above quotation from the Framework Guidelines recognise that the eventual standard may not be universally adopted at this stage, hence differences in gas quality specifications at cross border locations may persist. The current specifications for ENTSOG members are summarised in the table in Appendix 1.

In ENTSOG's view, the Framework Guidelines envisage obligations on adjacent TSOs to analyse each IP and assess the potential for gas quality constraints to arise. Where TSOs agree that a solution is required, they shall closely cooperate to work out technically feasible and financially reasonable solutions. TSOs would be required to consult on their potential solutions with relevant stakeholders from both Member States before submission of their proposals to adjacent NRAs for approval.

The Framework Guidelines place the obligation on TSOs to develop solutions on a case by case basis to cross border gas quality differences "where necessary", though it does not define any criteria by which TSOs should make this assessment. Furthermore, even though gas quality specifications may differ at the border, this does not necessarily mean that constraints will result because the actual gas quality may be within the parameters employed on both sides of the IP. There is therefore a judgement to be made, particularly if TSO investment is being contemplated, in order to balance the likelihood and potential consequences of gas quality constraint risks arising against the costs of implementing a

[8] Articles 40 and 41 of the Gas Directive.

solution. In this context, it is worth noting that historically, the number of instances and duration of gas quality related constraints at EU cross border points has been very limited[9].

Some TSOs currently manage differences in gas quality at different IPs however, in the vast majority of the cases TSOs do not provide gas quality treatment as a service. Should TSOs be required to offer such services, this would therefore involve a change in their role and the development of new capabilities within the TSOs' businesses. The only instances of gas quality treatment by TSOs that ENTSOG is aware of are building:

- injection facilities to meet gas quality specification;
- dehydration station on the cross border points in order to meet water dew point specifications.

> **Policy options**

In order to prevent differences in gas quality becoming an obstacle to gas market integration, ENTSOG is tasked with developing rules in the Network Code to reinforce TSO to TSO cooperation.

Gas quality plays an important role in setting the price of gas.

If there is a difference in gas quality specifications at a given IP, and if technically and economically feasible, a gas treatment or natural gas adjustment could be offered by the TSO and/or commercial measures could be implemented.

Adjacent TSOs shall closely cooperate and jointly determine when a solution is required in an Interconnection Point. After that the solution need to be established in such way that it should be bilaterally agreed between both TSOs and followed by a cost benefit assessment and market consultation and finally approved by NRAs. Priority has to be given to the most cost-efficient solution. The most cost-efficient solution would be likely to vary from IP to IP.
However, if TSOs provide gas quality adjustment services, a key principle should be that the NRAs acknowledge the full costs (CAPEX and OPEX) and ensure that they are properly recovered by TSOs via regulated charges.

There are a number of solutions within the scope of present technology and also commercial measures that are able to handle gas sources of varying qualities as described below:

5.1.1. Commercial measures:

- **Flow Commitments:** are contractual arrangements between Network Users and TSOs providing the TSO with the option to request Network Users to manage its input or off-

[9] See "Gas Quality Harmonisation Cost Benefit Analysis Final Report" prepared by GL Noble Denton and Poyry, July 2012, p. 2 par. 12

take in such a way that it results in gas flows within an agreed range at one or more entry or exit points, for the purpose of maintaining existing entry and exit capacities. ENTSOG is not currently aware that TSOs use flow commitment to address gas quality issues, although they could potentially be adapted to do so.

5.1.2. Other potential solutions

- **Swapping:** adjacent TSOs have the opportunity to swap amounts of gas between the market area transition points on reasonable endeavours basis. Swapping nowadays is used mainly for optimization of flows through the networks, but also to minimize the impact of planned maintenance or in case of technical problems. This potential solution is also currently not used to manage physical gas quality differences between Member States.

5.1.3. Natural gas adjustment:

Natural gas adjustment can be achieved by mixing of different gas streams/sources in order to obtain gas which meets national specifications. This can be done by:

- **Blending:** gas that is not compliant with a quality specification can potentially be mixed with other gases so that the resulting mix is within the gas quality specification range.
- **Co-mingling** is a form of gas blending and refers to a situation where two or more gas streams blend fortuitously prior to the gas entering the network on which the gas quality limits apply with the aim of delivering an acceptable 'blended' gas. However where the blend of gases is not compliant, the non-compliant stream may need to be curtailed by the TSO, therefore co-mingling can be thought of as a blending arrangement which the TSO provides no guarantee it can accommodate.

5.1.4. Gas treatment:

Physical treatment of natural gas (injection or removal of certain compounds), needs the installation of specific processing facilities (for example, nitrogen ballasting of high Wobbe gases) for which there are both capital costs (CAPEX) and operational costs (OPEX).

Solution	Parameter to be treated
Swapping	All
Flow commitments	All
Blending/co-mingling	All/WI
Injection of certain compounds (for example nitrogen, LPG injection)	WI, GCV
Removal of unwanted/unnecessary compounds typically provided by specially dedicated treatment facility (for example stripping, chilling gas, sweetening ;…).	Inerts and NGLs removal, H2O DP, HC DP, S, Higher hydrocarbons

The appropriateness and efficiency of the different options listed above will vary from IP to IP and therefore TSOs would need to consider their relative merits on a case by case basis.

> **Questions for Stakeholders' input**

- Do you consider that any differences in national gas quality specifications hamper cross-border trade anywhere within the EU currently? If yes, please provide examples.
- Do you foresee additional cross border issues related to gas quality in the future? Please specify.
- What criteria should TSOs use to judge where a solution is necessary in order to resolve a gas quality issue? Should NRAs have a role to determine this?
- Where a solution requires capital investment by a TSO, what are your views on the method of cost recovery?
- Are there any other potential solutions for managing gas quality differences other than those presented above? Where are those solutions used and who is operating such measures? Who is bearing the cost?

5.2. Short Term Monitoring

> **Framework Guidelines**

"The network code shall oblige TSOs to provide relevant network users with pertinent indicative information on Gas Quality and variations thereto. The network code shall classify the cases where it is necessary or useful to provide further information to end-users or suppliers on fluctuations of gas quality in order to allow them to take preventive measures. The network code shall identify the nature and frequency of submission of such information after duly consulting all concerned parties, so as to allow the concerned parties to take account of the gas quality variations."

> **ENTSOG's view/current situation/examples**

The Framework Guidelines aim to deliver greater transparency by requiring the Network Code to oblige TSOs to provide relevant Network Users with pertinent indicative gas quality information. ENTSOG will need to determine what constitutes a 'relevant' Network User in this context and will need stakeholder input in order to do so. Framework Guidelines state also that Network Code should define cases, where it is necessary or useful for further information to be provided to end–users or suppliers.

Before any information provision service is agreed on, it is important to understand what the proposed stakeholders actually need and why (i.e. what the service requirements are). An understanding of this will form the scope and cost of any potential solution, which may then vary across the EU depending on the nature of stakeholders' operations and the extent to which they are affected by changes in gas quality. TSOs are not best placed to determine this and detailed stakeholder input on this point will be required. In addition, it has to be defined on a national level that will provide further information to end-users or suppliers on fluctuations of gas quality in order to allow them to take preventive measures.

ENTSOG foresees that the Network Code will deliver the requirements of the Framework Guidelines but that the detailed design of such services would need to be done subsequently at national level as stakeholders' requirements may differ from country to country and service solutions will need to be designed accordingly.

At present, in some countries gas quality is rather stable (e.g. Poland, Czech Republic) and in others it can vary significantly based on the sources of supply on a particular day (France 70% of Wobbe index range, Belgium 80%). Stability of the gas quality may be influenced in the future by new gas sources and unconventional energy development (biomethane, shale gas).

It is also relevant to distinguish which parameter to be communicated.

> **Policy options**

TSOs usually do have chromatographs at cross border Interconnection Points and at main comingling sites and services could be potentially developed to enable that data to be made available to relevant Network Users.

TSOs could provide gas quality information services like:

- E-mail
- Phone
- Website
- Dedicated equipment
- Direct connection to local chromatographs
- Information platform

TSO obligations and service level would be a key issue, together with any related liabilities for providing inaccurate information. There may also be confidentiality issues – for example if an off-take were located close to a LNG terminal then notification of a change in gas quality to the off take may well be a direct reflection of the terminal gas quality which may be subject to confidentiality provisions between the TSO and the upstream party.

If TSOs need to invest in order to provide these new services they have to be sure that they will receive appropriate funding arrangements via their NRA and it may therefore be appropriate to subject them to a cost benefit assessment.

> **Questions for Stakeholders' input**

- With reference to the Framework Guidelines text, how should a 'relevant' Network User be defined? For what purposes do you consider that Network Users require notification of in spec gas quality variations? Please justify your answer.

- Which parameters are relevant to be communicated about in spec gas quality variations to Network Users? Please justify your answer and indicate at which network locations (entry points, exit points etc.).
- Which particular types of end-user would benefit from receiving information about gas quality changes in order to take preventative measures?
- Please also provide your views on parameters, frequency and lead time.
- Who is the responsible party to facilitate further exchange of information towards the end-user?
- Do you consider that suppliers (i.e. retailers) need to know about gas quality changes? Please justify your answer.
- Do you agree that the Network Code should set general requirements and that the detail should be worked out at national level?

5.3. Long Term Monitoring

> **Framework Guidelines**

"The Network Code shall propose rules to reinforce transparency as well as the cooperation of TSOs on the issue of gas quality in order to prevent differences in gas quality from creating an obstacle to gas market integration.
[…]
As part of the tasks described in Article 8(3) of the Gas Regulation, ENTSOG shall, based on information provided by TSO's, submit an outlook, reviewed every two years, on the possible changes in gas quality within the major European regions [as defined within the Gas Regional Initiatives] for the next 10 years. "

> **ENTSOG's view /current situation /example**

This part of the FG requires ENTSOG to take on a new role of providing a view about the gas quality that could possibly be transported through TSO networks in the future. TSOs may be able to contribute general views and make assumptions about what this might mean for gas quality (e.g. a growth in biomethane might be expected to reduce calorific value and wobbe index), however this will ultimately be determined by the plans of upstream parties.
Whilst input from upstream parties would therefore be desirable, ENTSOG already experiences with TYNDP difficulties in accessing data beyond TSOs' remit. In addition, the Agency acknowledges the future gas qualities are unknown.
ENTSOG therefore envisages that the report could be developed by building on the TYNDP experience by making additional assumptions about scenarios on the gas quality of every supply source. Given the number of assumptions and permutation used in the modelling, the engagement of stakeholders is vital to ensure value is realized from this report.
Expected results could be the identification of possible trends in the evolution of gas quality together with an overview of the possible evolution of parameter variability at the level of

major European regions. The interpretations of these results will have to be done having in mind their dependence on all the assumptions and methodologies.

> **Policy options**

Based on the experience of TYNDP process, ENTSOG will be able to provide a long term monitoring of gas quality. In order to ensure that such a report will be useful for the industry (see above ENTSOG's opinion), it is important to clearly define stakeholders' expectation in consistent way with information availability. Different options are available both for the process of drafting the outlook and its content:

5.3.1. Drafting process and format

- Institutionalisation of data collection: TYNDP experience has shown the difficulty to have access to reliable data beyond TSOs' remit. In order to ensure ENTSOG ability to produce a meaningful report it appears useful to institutionalised stakeholders participation. This could be a way to ensure ENTSOG access to data required in the production of the report.

- Stand-alone report: ENTSOG TYNDP target is now rather well defined (Supply adequacy outlook, resilience assessment and identification of investment gaps and remedies) and the report already extensive according many stakeholders. Then adding the gas quality outlook, which goal is still to be defined, could deteriorate the readability of both reports.

- Part of ENTSOG TYNDP report: the outlook will use many elements coming from the TYNDP in order to define potential flow patterns defining possible range of gas quality in European regions. These similarities together with the timeframe could advocate the integration of the gas quality outlook within TYNDP.

5.3.2. *Outlook content*

- **Gas quality parameters to be considered.** Gas quality is defined by many parameters. The accuracy of any long-term outlook is decreasing along the timespan then it is important to define which parameters should be considered based on their importance and the ability to have access to data.

- **Forecast vs. Scenario-based approach.** The possible changes in gas quality derive both from flow patterns and composition of gas at the entry into the European gas system. ENTSOG TYNDP already relies on flow patterns as deriving from scenarios, cases and methodologies defined with stakeholders. The approach is based on a range of extreme but still realistic scenarios ensuring the robustness of the report. The outlook of gas quality will require the development of scenarios on each gas quality parameter to be monitored. As for supply availability, it is possible to develop several scenarios for each parameter. In any case, these scenarios could be compared with the review of

parameters value during the timespan between two consecutive reports.

- **Reference for gas quality parameters.** The main challenge in the drafting of the outlook is the definition of gas quality parameters of all the supply entering the European gas system. Three different approaches may be selected:
  - Normative approach based on the national specification of the entering country
  - Historical approach using the specifications of gas entering Europe at each entry point over the last 3 years for example
  - Forecasting approach based on the expected composition of each supply source in the future

> **Questions for Stakeholders' input**

- What do you expect this outlook to deliver and how would it benefit your business?
- Do you think that the methodology proposed, supply scenario approach in combination with a battery of flow patterns and sensitivity studies, is a correct way to avoid barriers to market integration regarding gas quality?
- Could you provide the input data regarding gas quality for the import for 10-year range as is required for applying the methodology proposed in the report?
- Do you consider that ENTSOG can discharge this obligation meaningfully without information from upstream parties? If yes, please specify how.
- Do you agree that upstream parties may wish to keep their projections about future gas qualities commercially confidential?
- What kind of assumptions ENTSOG should use in absence of inputs from relevant parties? In the absence of such data do you see a risk to have a low quality report?
- What information about future gas quality is appropriate to be made public in this way?

6. Odourisation

> Framework Guidelines

"The network code shall ensure that cross-border flows are not hampered by differences in odourisation practices between adjacent systems.
The network code shall encourage TSOs at each interconnection point to reach an agreement to address effectively barriers resulting from differences in odourisation practices. The network code shall specify that, if the relevant TSOs, within six months after the entry into force of the network code, fail to reach such an agreement or if the agreement is deemed by the concerned NRAs to be not sufficiently effective in addressing barriers resulting from differences in odourisation practices, the TSOs, by cooperating with relevant Member State Authorities, are required to define, within the following twelve months, a detailed plan to implement a shift towards physical flows of non-odorised gas at the specific cross-border interconnection point, using the most cost-effective option. The assessment leading to the choice of option for shifting towards physical flows of non-odorised gas shall take the implementation time into account and be submitted to the concerned NRAs for approval. The network code shall indicate that Article 7(4) of Regulation (EC) No 713/2009 applies to the determinations of NRAs referred to above."

> ENTSOG's view/current situation/examples

At present, there are different odourisation practices in Europe systems. Most of the countries do not odourise gas at the transmission level, but on the distribution level. However, there are some countries that do odourise gas at transmission level due to safety issues and/or economic reasons (France, Spain, Ireland and Hungary). This may be perceived as causing interoperability issues.

Where NRAs judge that barriers are created by the different odourisation practices, the FG requires that relevant TSOs work to resolve them either via bilateral agreements or by taking steps to facilitate a shift towards transportation of non-odourised gas at the relevant IPs.

> Policy options

ENTSOG considers that the following options are available to the relevant TSOs to meet the requirements of this aspect of the Framework Guidelines:

- Bilateral agreements whereby TSOs with odourised/non-odourised gas in their networks agree to accept all kinds of non-odourised/odourised gas.
- To deodorise gas at IPs: if an acceptable and cost-effective technology to deodorise gas at cross-border interconnection points is identified. (The above two options would allow those Member States that odourise the gas in transmission to continue to do so.)
- To change national policy on odourisation: this is a national issue; therefore it should be the responsibility of the relevant NRAs, TSOs and Member State's competent

authorities to progress this option in the event that bilateral agreement have failed to address the particular situation.

> **Questions for Stakeholders' input**

- What criteria should define the existence of a barrier in the context of odourisation?
- What criteria should be used to judge whether or not a bilateral agreement between TSOs effectively addresses odourisation issues?

7. Data Exchange

This section will be used to support the evaluation and decision making process to create the Network Code part for Data Exchange, as described in the Framework Guidelines.

The Framework Guidelines require that the Network Code shall foresee a common solution for the electronic exchange of data between TSOs as well as from TSOs to relevant counterparties.

The exchange of data is a fundamental aspect in all areas of cooperation. In addition, the development of agreed common standards and protocols for exchanging data is a key enabler in facilitating a European market for gas and enhancing interoperability amongst interconnected networks.

It is the view of ENTSOG that it is difficult to draft detailed provisions in the Network Code specific solutions to be adopted by TSOs and relevant counterparties with respect to data formats, data network and exchange protocols. Indeed the legal framework and amendment process applicable to the Network Code are hardly compatible with the new of a constant and fast adaptation on such issues.

Additionally certain issue are closely linked to the final content of the CAM and BAL network codes not yet in force.

Consistent with the Framework Guidelines requirement for the Network Code to "foresee" a common solution for Data Exchange, the Network Code should therefore focus on establishing processes with stakeholder involvement where necessary that can lead to an EU-wide "Data Exchange solution" and an industry wide agreed migration path that facilitates the aims of regulation EC 715/2009 in supporting the other network codes to promote the completion and functioning of the internal market in natural gas and cross-border trade in the European Union.

The ideal situation would be to integrate the agreed migration path within the existing individual technology roadmaps of all TSOs and relevant counterparties taking account the existing IT projects and the natural refresh and replacement cycles of IT systems.

It is important that we test any Data Exchange proposals against the business process interactions that they are intended to support. To define Data Exchange protocols and mechanisms in isolation of understanding the various communications they need to ultimately support means we may have to constrain the overall solution and ultimately risk a failure to fully comply with the European network codes.

The selection of any solution can only come after following the sequence:

Requirements -> Capabilities -> Technical Assessment -> Cost/Benefit -> Solution.

This can only be achieved once the new business processes arising from the CAM and BAL network codes are fully understood.

This should not prevent an early consideration of the options available for data formats, data networks and exchange protocols. Such consideration will help stimulate discussion within our own companies and in shared forums and help all stakeholders in reaching the goal of implementing the migration path towards a common "Data Exchange solution".

In the following paragraphs, the topics mentioned above will be treated.

7.1. Areas and Counterparties

> **Framework Guidelines**

*"Without prejudice to existing legislation, these framework guidelines aim at extending harmonisation of Data Exchange solutions to **all areas** where TSOs exchange data among themselves or **communicate** data to **counterparties.**"*

> **ENTSOG's view/ Current situation/examples**

7.1.1. Areas

Today TSOs and their counterparties exchange already vast amounts of data for operational purposes for the planning of the flow schedules and for the balancing of their networks.

The areas for which the Network Code section on Data Exchange will be applied are all areas where the third energy package requires TSOs to exchange between each other and with their counterparties. During the development of each business process, the solution that is most appropriate to fulfil the required functionalities for that business process shall be chosen amongst the Data Exchange solutions that are supported, resulting from the Network Code.

7.1.2. Communication

The **communications** with respect to Data Exchanges, investigated in the context of the Framework Guidelines on, will be focused on **electronic** Data Exchanges from a TSOs perspective. Other types can be considered as fall-back or supporting options in case of failure, but they are not considered as primary communication channels for Data Exchange.

7.1.3. Counterparties

The following parties are identified as communication partners for Data Exchanges with TSOs:

- TSOs (within EU, not exempted from the provisions of the 3rd Package)

- Other TSOs (non EU TSOs, or exempted from the provisions of the 3rd Package)
- Network Users
- Other infrastructure operators (SSOs, LSOs, DSOs)
- Producers
- Platforms (e.g. capacity auctioning platforms)

> **Policy options**

The introduction of a common solution for Data Exchange will also have an impact on the current Data Exchanges. The proposed solutions have to be able to cover also the existing Data Exchanges which are not covered by the other network codes. The migration to one common solution for all Data Exchanges is challenging within the time frame and also for the considerations included in the Framework Guidelines that shall be taking into account (the potential for discrimination of small shippers or new market entrants, the synergies with current electricity Data Exchange rules, the compatibility with counterparties' Data Exchange solutions, etc).

> **Questions for Stakeholders' input**

- ENTSOG has identified the above list of counterparties, do you consider that all the communications between TSOs and all these actors should be harmonised? Which are the benefits? Please specify your answer.
- How do you see the roadmap to migrate to one common solution for Data Exchange with TSOs? Please clarify your answer, detail the different step, timeframe etc.

7.2. Data Exchange Solutions

> **Framework Guidelines**

"The network code shall foresee a common set of data formats, data network and exchange protocol ('Data Exchange solution') for the reliable, secure and smooth exchange of information among TSOs, as well as from TSOs to relevant counterparties."

> **ENTSOG's view/ Current situation/examples**

This section will treat the following topics:

- Evaluation criteria to meet the Framework Guidelines
- Data Exchange types
- Data networks
- Data Exchange protocols
- Data Exchange formats

7.2.1. Evaluation criteria for "Reliable, secure and smooth exchange of information"

ENTSOG identified the following criteria for the evaluation and selection of the underlying technologies that are needed to set up a reliable, secure and smooth information exchange for the gas market.

7.2.1.1. Reliable and secure

- Timely delivery of information
- Message life time: Remove/Delete outdated messages
- Support Push and Pull message exchange patterns
- Performance limitations(number of Data Exchange/minute, size of messages and payload)
- Confidentiality: Encryption of messages
- Identification of counter party (Signature of messages, user or system password,…)
- Non repudiation [Proof of Receipt]
- Acknowledgement of message receipt and message processing
- At least one message delivery
- Traceability (time and content)
- Allow use of Firewall
- data integrity: no loss of data, no unauthorized manipulation
- Directory services

7.2.1.2. Smooth

- Run over the Internet (good accessibility)
- Certification of standard products
- Duplication Detection
- Message routing
- Data compression

The criteria listed above will be applied on the different solutions identified in the following paragraphs, depending on the communication type.

7.2.2. Data Exchange types

ENTSOG identified the following types of Data Exchange with TSOs and their counterparties:

- Document based Data Exchanges
- Integrated Data Exchanges
- Interactive Data Exchanges

7.2.2.1. Document based Data Exchange:

Document based Data Exchanges concern exchanges of information whereby data is exchanged through file transfer between IT systems. These files contain the data that need to be exchanged by both parties in a predefined format. In addition, these files can be used in case of disagreement about the data that have been sent between both parties. File

transfers can take some time to be performed, depending on the bandwidth of the networks, the protocols used, the applied security mechanisms and the load of the sending and receiving systems. Transmission times can vary from a few seconds up to several minutes.

In general, the initiative for the Data Exchange can be taken by the sender of the information as soon as the information becomes available. However, in some cases the initiative can be taken by the receiver of the information whereby the sender prepares the information and makes it available on a predefined location. When the sender is ready to handle incoming data (or at predefined intervals), he will pick it up on the agreed location and process the data.

This type of Data Exchange can in principle be applied for any application whereby data has to be exchanged between computers directly. It is suited for big data volumes and large number of messages, that cannot be handled manually or when time critical deadlines have to be respected, with human intervention. Document based information exchanges allow easy traceability of the exchanged data.

Taken into consideration the complexity and the cost for implementation and maintenance, this type of Data Exchange is not suited for small volumes of data that have to be exchanged at low frequencies.

7.2.2.2. Integrated Data Exchange:

Integrated data Exchange concerns the exchange of information between applications directly (e.g. system A queries systems B for a given set of data).

The communication type that is covered in this paragraph concerns exchanges of information (even including document exchange) residing on different IT systems. Such differences can be due to the use of different technological standards (e.g. different Operating Systems, different representation of the information, different programming languages, etc.) and/or because data is produced in one physical location and it is needed in another location.

The main characteristics of Integrated Data Exchanges are the flexible data structures for frequently changing data exchanges queries and formats, and the handling of different types of protocols for the exchange of messages (SOAP, XML-RPC, REST) and transport (http, https, jms, smtp, ftp).

Regarding data volumes, this alternative is similar to Document base Data Exchange.

7.2.2.3. Interactive Data Exchange:

The communication type that is covered in this chapter concerns exchanges of information whereby users initiate a dialog from a PC or an application. The whole process is based on an interactive dialog controlled by the initiator of the communication.
This system is suited for small users who manipulate small amounts of data. This kind of interaction can also be considered as a limited fall back solution in case the automated Data Exchange is unavailable.
The disadvantage of this solution is human overhead (labour intensive, potential errors by human mistakes) and it is not suited for big data volumes.

Any uploading and downloading functionality of an Interactive Data Exchange has to be in line with the data format solution as presented in chapter7.2.5.

7.2.3. Data network

A fundamental element when dealing with Data Exchange is the underlying physical network that will be used to carry all the exchanged information between IT systems.

ENTSOG identified the following communication network possibilities that allow IP based Data Exchange between market participants:

7.2.3.1. Private data networks

A privately managed network is built on different underlying connectivity technologies (leased lines, dial-up lines, ...). Availability and management of these kinds of networks will be major hurdles, seen the geographical spread that needs to be covered.

7.2.3.2. Public data networks

Access to these networks is open to the general public making it ideal for widespread usage and fast implementation. Security is attention point when operating over public networks.
Internet
The internet consists of thousands of internet service providers (ISP) who provide access to individual users and companies. ISP's operate extensive high-speed backbone networks that are interconnected with each other at exchange points (EPs) where end-user traffic from ISP#1 can transfer over to ISP#2 to reach a host computer/network that is connected to ISP#2.

The internet offers:

- geographical spread of the parties involved in the international gas market
- an easy and fast, flexible and worldwide accessibility
- operator independent network connections seen the geographical spread
- reliability (proven availability) and up-time of the network

7.2.4. Data Exchange protocols

7.2.4.1. Document based Data Exchange

The following Data Exchange protocols have been identified as potential candidates for document based Data Exchanges.

- ebXML, ebMS

An ISO protocol standard, ebXML (electronic business XML) is a set of open public XML based standards sponsored by OASIS & UN/CEFACT. The ebXML Message Service Protocol is one of 5 XML specifications that make up the ebXML Protocol standard.

ebXML Messaging Service Protocol (ebMS) provides the advanced level of security and reliability functions required when dealing with sensitive information over the internet. It is similar to other EDIINT (EDI over the Internet) specifications specifically AS2/AS3. ebMS supports the push/pull delivery of any payload over the internet and is based on SOAP with attachments, i.e. using web services to send and receive files over the internet. ebMS addresses four requirements for any Internet based document exchange solution:

- Authentication - digital certificates to identity the sender & receiver
- Privacy - document encryption
- Data Integrity - document signing
- Non-Repudiation – use an acknowledgement & digital signature.

We will be focusing on the ebXML Messaging Service (ebMS v3.0) specification in the evaluation of the different technical solutions.

- Applicability Statement 2 (AS/2)

AS/2 is what is called an Applicability Statement. It is not a new protocol or a protocol on its own but rather it explains how existing protocols can be put together to achieve the goal of message based exchange of information. It builds upon HTTP (HyperText Transfer Protocol) and other standards to provide for a type-independent message exchange. AS/2 is type-independent because it will carry XML (Extensible Markup Language), EDIFACT (Electronic Data Interchange For Administration, Commerce and Transport) or plain text documents and pictures just as easily. It deals with the pure transport of messages, how the message exchange is secured and how message delivery receipts are handled. Within the IETF the Applicability Statement 2 is referenced as RFC 4130 or MIME (Multipurpose Internet Mail Extensions) based secure peer-to-peer business data interchange using HTTP.

- Applicability Statement 4 (AS/4)

Building upon ebMS v3, AS4 will deliver an ebMS v3 conformant profile constraining options that ebMS leaves open. Like AS2 it defines preselected options and sub standards to narrow down the possible alternatives and options that exist within ebMS. When setting up

communication with ebMS, the choice of options still has to be made before the first message can be exchanged. If implementations adhere to the AS4 profile of ebMS there is a greater chance of interoperability success as opposed to using different and varying sets of options in regular ebMS.

7.2.4.2. Integrated Data Exchanges – Web Services:

Web Services is a communication method based on the adoption of a collection of open standards and protocols which are used to exchange data and information between systems. The organisations OASIS and W3C are responsible for the definition of the architecture and regulation of Web Services. With the aim of improving the interoperability between different Web service implementations, an organism WS-I (Web Services Interoperability Organization) has been created to manage the development of different profiles in order to make these standards be defined more exhaustively.
Web services can also be used for Document based Data Exchanges like ebMS.

7.2.4.3. Interactive Data Exchange – Web browser:

A website is a set of related web pages containing content such as text, images, video, audio, etc. A website is hosted on at least one web server, accessible via a network such as the Internet or a private local area network through an Internet address known as a Uniform Resource Locator (URL).

Providing Interactive Data Exchange trough websites allows low cost for implementation on the users side (no application cost, only a PC is required) and the speed to start-up the business communication. Moreover, websites offer more freedom in terms of accessibility and resources than standalone applications.

The main delays to set up this type of Data Exchange are configuring the security parameters (username, password, certificates etc.).

7.2.5. Data formats

Data Exchange depends on the business for which the Data Exchange is required. The language used to model the Data Exchanges for a business process is called UML (Unified Modeling Language).

Once the content of what needs to be exchanged as information in a business process is defined, we still need conventions on the structure of the documents we will exchange between parties. The reason for this being that the processing of these documents in many cases will be automated and this automation is only possible when the structure of these documents is well defined.

As far as technology goes, there are a multitude of standards defining how we can apply structure to a document. And as with many technologies you have older standards and newer standards. The formats we see used for the moment within the gas market largely depend on the time they were developed and installed.

Another element that is important in choosing the right standard for document structuring is the ICT tooling at hand in the different business systems of all the parties that need to exchange documents. Because automation of the processing will need to be developed at either side, the ease by which this can be integrated in existing systems is crucial. It goes without saying that a standard like XML for structuring documents is widely supported in many different development environments.

We also need to make a difference between standards that define how you can structure a document and the structure itself. To give an example: XML defines how you can structure a document; EDIG@S uses XML to produce a standard structure of an order document. EDIG@S and XML are both standards but do not standardise the same thing. We should remember that both are needed to be able to communicate.

The next paragraphs give an overview of the data formats used today. Both structure and content formats will be listed.

7.2.5.1. Structure formats

- CSV format

CSV or Comma Separated Value data formats are commonly used between parties to exchange numerical data and text, mainly to be processed automatically.
The strength of this format is flexibility which is at the same time its weakness. Till today, no standardisation took place for CSV formatted data files with respect to business processes. No standardisation leads to chaos and reduce the stability of the application. CSV formats cannot be considered as a preferred solution for Data Exchange formats for business critical applications.

- XLS-files

In some cases, Excel files are used for Data Exchanges with TSOs. The structure and content has to be agreed bilaterally (unless they are defined by the NRAs) in order to allow an automated generation and processing of these files by the sending and receiving systems. Excel files can be very useful when data have to be uploaded or downloaded from websites in cases where manual processing of data is required.
Excel files are not really a data formatting standard but they are commonly used as a tool for exchanging data. Furthermore Excel allows to import or export different file formats (e.g. CSV, HTML,…).

- EDIFACT (Electronic Data Interchange For Administration Commerce and Transport)

EDIFACT defines more than only the structure, but on the structure it is a fairly simple format. It provides for text based documents with a few levels of hierarchy (Interchange, message, segment, composites and elements). There is some provision for mandatory and conditional information. The format is quite rigid and not extensible. One of the major advantages over newer formats is the size of the messages. The overhead of the structuring is quite low.
EDIFACT format is a widely spread standard for Data Exchanges in the industry. The work of maintenance and further development of this standard is done through the United Nations Centre for Trade Facilitation and Electronic Business.

- XML (Extensible Markup Language)

In parallel with the upcoming of the internet, a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable has been developed. The design goals of XML (Extensible Markup Language) emphasize simplicity, generality, and usability over the Internet. It is a textual data format with strong support via Unicode for the languages of the world. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services.
Many Application Programming Interfaces (APIs) have been developed for software developers to ease the processing of XML data and several schema systems exist to aid in the definition of XML-based languages. XML data formats are commonly spread within IT applications and XML parsers are widely available in the industry and have the advantage of lower setup cost.

Although XML formatted messages are considerably bigger in size than EDIFACT formatted messages due to its formatting structure, this disadvantage is compensated by the progress made in the technology to increase network and computer capacity.

7.2.5.2. Content formats

- Free format Text document

Simple text based documents are unstructured free formatted documents in written or electronic form. This kind of documents can only be used in case of human communications. Since there is no standardisation for text based formats, it is very complicated to process free text data in an automatic process. Text format based messages are generally use in combination with e-mail (electronic form) or fax (written form).

- EDIG@S

EDIGAS is a standard of data content for the gas business, which is based on a subset of the EDIFACT standard. Currently, EASEE-gas is taken care of the developments. The first 4 versions of EDIGAS messages are based on EDIFACT structure format.

When the group envisioned carrying the documents over the internet, the structuring format was shifted from EDIFACT to XML. The version 4 messages of the Edig@s specification were structured following both the EDIFACT and XML structuring format. As from version 5 only the XML structure will prevail.

> **Policy options**

- Data Exchange types:

Today, all types of Data Exchange are implemented by TSOs in Europe. Document based Data Exchange and Integrated Data Exchange are applied in most parts of Europe for communication with TSOs. For certain applications websites are used on an individual basis (e.g. data publishing, nominations).

- Data formats

Standardisation of Data Formats and Data Contents is mandatory for a reliable and smooth exchange of information. No standardisation will lead to bilaterally agreed data structures that are different for each communication partner. This will increase the cost for implementation and maintenance of the Data Exchange structures since the number of different structures will be customized per communication partner.

- Data network

A network is a fundamental element in the electronic Data Exchange process. Accessibility, availability and reliability are very important requirements to guarantee a good communication system.
ENTSOG's opinion is that the communication systems of all market participants that communicate with TSOs are supposed to be permanently reachable.

> **Questions for Stakeholders' input**

ENTSOG will be open for all suggestions and recommendations to select an appropriate solution.

Evaluation criteria see section 7.2.1:

- Do you agree with the proposed evaluation criteria?
- Do you see other criteria to take into consideration?
- Which criterion for the selection of a communication solution do you see as most important?
- What do you consider as acceptable as transmission delay for the data, i.e. the time needed for sending the data? Please clarify your answer with examples and figures in seconds or minutes for normal circumstances (95%) and in case of extreme high load (5%). Please describe the business process context and the expected data volumes for each case.
- Do you see a need for "pull" information from a TSO? Please give examples and

explain how you use this feature today.

Data Exchange types, see section 7.2.2 and 7.2.4:

- Which solution would you prefer for Data Exchanges with TSOs? Please clarify your answer.
- What is your company currently using for Data Exchange with TSOs?
- Do you prefer a single technology for Data Exchanges or should it be possible to use different technologies in parallel?
- In addition to service providers, do you consider websites as an alternative a good solution to prevent discrimination (cost and time for implementation) of small shippers or new market entrants? What other options do you see to meet this requirement?

Data Network, see section 7.2.3:

- Which alternative do you prefer for data network (public data networks, private data networks, physical networks)? Please specify your answer.
- Do you see other networks for Data Exchange with TSOs? Please explain the alternative and for which Data Exchanges are you using it.
- Do you think that TSOs and their counterparties have to be connected permanently on the network (permanent reachable)? Please clarify your answer.

Data Exchange format see section 7.2.5:

- Which standards would you prefer for both the content format and the structure for:
  - Document based Data Exchange solution
  - Integrated Data Exchange solution
  - Data Exchanges with websites for uploading and downloading of information
- Which data format is your company currently using for Data Exchange with TSOs?
- What kind of flexibility do you expect from standardized data formats? Please clarify your answer.
- What kind of responsiveness do you expect for changes to standardized data formats? (What is the time period you expect to create a new Data Exchange format standard for a business application)? Please clarify your answer.

7.3. Selection of Data Exchange solution

> **Framework Guidelines**

"The selection of such a Data Exchange solution by ENTSOG shall be based on a cost-benefit analysis subject to public consultation. This analysis, as well as the subsequent selection process will take into account in particular the following considerations:

- *best available technologies, particularly in terms of security and reliability;*
- *the actual spread (whether the solution considered is widely used) of the solutions considered;*
- *the volume of data traffic required to transfer information;*
- *the costs of first introduction and cost of operation;*
- *the potential for discrimination of small shippers or new market entrants;*
- *the synergies with current electricity Data Exchange rules;*
- *the compatibility with counterparties' Data Exchange solutions."*

> **ENTSOG's view/ Current situation/examples**

7.3.1. Cost-benefit analysis

The selection of a Data Exchange solution by ENTSOG shall be based on a cost-benefit analysis. It should be ensured that the benefits of this harmonisation on a European scale can be demonstrated by the selection of the cost effective solutions. A suitable time frame and the development of a roadmap to migrate to one common solution will help to achieve this goal.

This analysis includes the following steps:

- Step 1: Solutions in scope

The cost-benefit analysis will be applied to all the technologies identified in the previous sections on the Data Exchange Types (Section 7.2.2), the Data Network (Section 7.2.3), the Data Exchange protocol (section 7.2.4) and the Data Format (Section 7.2.50).

ENTSOG shall define a set of Data Exchange solutions as a stack of items in the set of data formats, data network and exchange protocol.

- Step 2: Identification of Costs and Benefits

ACER has suggested the main topics to consider while performing the cost-benefit analysis. ENTSOG will take these into consideration while performing the cost-benefit analysis. A core issue to consider will be the costs of first introduction and the cost of operation and maintenance in order not to discriminate small shippers or new market entrants. Such discrimination can be avoided by considering the actual spread (whether the solution considered is widely used) of the solutions subject to the Cost-Analysis. Another issue to be

considered in the evaluations is the synergies with current electricity Data Exchange rules and the compatibility with counterparties' Data Exchange solutions.

- Step 3: Collection of data

The data for the valorisation of costs will be collected for each possible solution. The collection of such data can be done in term of impacts (i.e. by defining a set of possible cases with a limited set of answers).

- Step 4: Valorisation and evaluation of costs and benefits

This phase consists in the global valorisation of all the Costs and the Benefits for each possible solution. It will be up to ENTSOG to perform this task and define a scoring model for the final evaluation.
The following sections will sum up the situation of both the Data Exchange solutions and the data formats used nowadays by the European TSOs.

7.3.2. Best available technology

Please refer to section 7.2

7.3.3. Actual spread of solutions

Different solutions are currently used in Europe reflecting the different histories, market models and degrees of interconnectivity between neighbouring systems.
Currently, all types of Data Exchange Solutions (Data Exchange types, data networks and Data Exchange formats) are implemented in the different areas of Europe, and in particular:

- AS2 is being increasingly adopted as the exchange protocol by some TSOs, particularly in the North-West for communication processes involving the exchange of data files (document based Data Exchanges) and is therefore the closest Europe has to a shared protocol.
- Some TSOs base their communications with stakeholders not in the exchange of document based Data Exchange but in web services.

Many TSOs and Network Users (mainly in North-West Europe) use data formats developed by the Edig@s working group, though the voluntary nature over the adoption of these formats means that different and sometimes incompatible versions of Edig@s (EDIFACT /XML) are currently in use.

The current situation is that there are many different Data Exchange solutions in use though some clusters of shared solutions can be found, particularly in the continental North-West.

ENTSOG has started to undertake the process of determining the actual spread of solutions. The support from the stakeholders to have a clear idea on the current spread of solutions is very important.

7.3.3.1. Data volumes

All figures collected by the survey are related to TSO operational activities today. These activities are independent from EU requirements since no network code is in force yet.

Today, TSOs reported an average of 12000 messages per day. The reported numbers of messages vary from 200 messages per day up to 26100 messages per day. In addition, hourly peak capacities vary from 20 to 1000 incoming messages and from 40 to 4300 outgoing messages today. These figures give an idea about the magnitude of the messages in big transmission systems going from 10000 up to 26000 Data Exchanges per day. However, this situation can change dramatically with the implementation of the network codes.

The solution to be put in place to cover the future TSO communication needs has to be "expandable" without structural changes when a higher capacity for Data Exchanges is required in order to cope with future business activities.

7.3.4. Cost of first introduction and cost of operation

The overall cost for a new Data Exchange system depends on the number of different types of messages that have to be implemented, the cost of a new communication protocol that has to be implemented and the number of parties involved.

7.3.4.1. Cost of first introduction

The individual cost for the implementation can vary very much, depending on the system that is already installed. One approach to evaluate the cost of first introduction is to start from scratch and evaluate the cost for setting up the communication environment, without considering the cost for integration in the business application environment. This comparison can be "relative" i.e. expressing the "degree of complexity" for each implementation step of a specific solution.

7.3.4.2. Cost of operation

As Operational costs we can identify the following elements:

- Cost for maintaining the data formats (message content, code lists etc)
- Cost for setting up communications with new parties
- Cost for maintaining security at required level (renewal of certificates, security patches, forcing password updating policies etc)
- Cost for monitoring and tuning the system, problem solving, testing,…
- Cost for 24/7 support

7.3.5. Potential for discrimination of small shippers or new market entrants

In order to allow small market participants and new market entrants to communicate with TSOs, ENTSOG propose to offer a web site based "Interactive Data Exchange" solution as described in paragraph 7.2.2.3. Please refer to this paragraph for more information.

7.3.6. Synergies with current electricity Data Exchange rules

7.3.6.1. Data Exchange format and electricity Data Exchange rules

ENTSOG will during the evaluation take the possible synergies between both electricity and gas systems into consideration based on the criteria defined in paragraph 7.2.1.

Changes due to updates in common data formats for one industry will also impact the other users that are not concerned. This would have as a consequence that the overhead cost to manage and maintain the data formats would increase dramatically.

7.3.6.2. Data Exchange platform MADES (Market Area Data Exchange Standard) – Communication platform developed by ENTSO-E.

MADES is a specification for a decentralized common communication platform based on international IT protocol standards:

- From a Business Application (BA) perspective, MADES specifies software interfaces to exchange electronic documents with other BAs. Such interfaces mainly provide means to send and receive documents using a so-called —MADES network. Every step of the delivery process is acknowledged, and the sender can request about the delivery status of a document. This is done through acknowledgement, which are messages returned back to the sender. This makes MADES network usable for exchanging documents in business processes requiring reliable delivery.
- MADES also specifies all services for the Business Application (BA); the complexities of recipient localisation, recipient connection status, message routing and security are hidden from the connecting BA. MADES services include directory, authentication, encryption, signing, message tracking, message logging and temporary message storage.

A MADES network acts as a post-office organization. The transported object is a message in which the sender document is securely repackaged in an envelope (i.e. a header) containing all the necessary information for tracking, transportation and delivery.

7.3.7. Compatibility with counterparties' Data Exchange solutions

Compatibility can be seen from a functional or a technical point of view. From a functional point of view the different Data Exchange solutions can be compatible when they meet the same requirements as described in chapter7.2.1.
However, different solutions that are compatible from a functional point of view can be incompatible from a technical point of view, mainly because they are based on a different technology.

ENTSOG identified the following cases:

- Different Data Exchange for electricity and gas sector
- Different Data Exchange solutions used by TSOs in Europe for Data Exchange with

their counterparties

- Different Data Exchange solutions used by market participants for communications not related to TSO activities

7.3.7.1. Other market participants

- EFET

Some market players have developed an own solution for their business needs. This is the case for trading activities developed by EFET (European Federation of Energy Traders). The EFET solution is based on ebMS (ebXML V2.0).

- Capacity Trading

Today multiple capacity trading platforms are active in Europe. Most of them use website (browsers) for communication with the Network Users. For communication between the platform and the TSOs integrated Data Exchange or document based Data Exchange with EDIG@S messages are used.

> **Policy options**

The Framework Guidelines require a "smooth exchange of information". This implicitly means that all parties have to be able to communicate with each other. The cost benefit analysis shall also take into consideration the following options:

- The same communication solution is used by all market participants. This solution can be an existing one or can be based on a technology that is considered as "state of the art" based on the evaluation described in this document.
- Multiple communication solutions based on different technologies co-exist and are supported by all market participants according to their needs.
- Central Communication platforms could be installed to interface the different communication solutions that are in use.

> **Questions for Stakeholders' input**

- Do you agree with the proposed approach for cost-benefit analysis? Please explain.
- Do you see other costs in the process of implementing a new Data Exchange system?
- Do you see a way to minimize the cost for implementation and operation? Please explain
- Do you see benefits to use common rules, common data formats and a common communication solution for Data Exchange for the electricity and gas market? Please clarify your answer.
- In case different communication solutions would co-exist, what would be your preference:
  - Market participants have to build interfaces and solutions according to their business needs
  - If communication platforms have to be installed to convert Data Exchange solutions accordingly. Who should fund, build and maintain th(ese)(is) interface(s)?

- Do you have any other recommendation or question regarding Data Exchange?

Appendix 1 Table with current national gas quality specifications

Quality parameters for natural gas

General	Units	Republic of Ireland Min	Republic of Ireland Max	GERMANY Min	GERMANY Max	FRANCE Min	FRANCE Max	DENMARK Min	DENMARK Max	UNITED KINGDOM Min	UNITED KINGDOM Max	ITALY Min	ITALY Max	AUSTRIA Min	AUSTRIA Max
Wobbe	MJ/m³(n) at 25°C/0°C	12.7	15.2	13.6	15.7	13.6	15.66	14.1	15.5	13.82	15.05	13.86	15.33	13.5	15.5
GCV	MJ/m³(n) at 25°C/0°C	10.1	13.1	8.4	13.1	10.67	12.77			10.81	12.39	10.24	13.27	9.9	12.8
Density		0.55	0.7	0.55	0.75	0.555	0.7	0.555	0.7	-	-	0.5548	0.8	-	-
Total S	mg/m³(n)		50		30		30		30		52.75		158		120
H2S + COS (as S)	mg/m³(n)		5 (Excl. COS)		5 (Excl. COS)		5		5		5.27		6.96		6.8
Mercaptans	mg/m³(n)		-		6		6		6		-		16.35		16.9
Oxygen	Mole %		0.1		3 - 0,5		0.01		0.1		0.001		0.6		0.02
CO2	Mole %		2		6		2.5		2.5		2.5		3		2
Water dewpoint	°C at 70 bar abs		-		Ground T°		-5		-8		-10		-5		-8
Hydrocarbon dewpoint	°C at 1-70 bar abs		-2		Ground T°		-2		-2		-2		0		0

General	Units	SPAIN Min	SPAIN Max	BELGIUM Min	BELGIUM Max	THE NETHERLANDS Min	THE NETHERLANDS Max	POLAND Min	POLAND Max	NORWAY Min	NORWAY Max	THE CZECH REP Min	THE CZECH REP Max	GREECE Min	GREECE Max
Wobbe	MJ/m³(n) at 25°C/0°C	13.368	16.016	13.65	15.78	13.860	15.000	12.500	15.806	13.416	14.667	12.700	14.500	13.100	16.370
GCV	MJ/m³(n) at 25°C/0°C	10.23	13.23	9.61	12.79	10.970	12.500	8.600	-	10.583	12.138	9.400	11.8	10.200	13.71
Density		0.555	0.7	-	-	-	-	-	-	-	-	-	0.7	0.56	0.71
Total S	mg/m³(n)		50		150		30		40		<30		30		80
H2S + COS (as S)	mg/m³(n)		15		5		5		7		5		6		5.4
Mercaptans	mg/m³(n)		17		6		6		-		-		-		-
Oxygen	Mole %		0.01		0,1 to 0,5		0.0005		<0.2		<0.0002		<0.2		<0.2
CO2	Mole %		2.5		2.5		2.5		2.8		2.5				3
Water dewpoint	°C at 70 bar abs		2		-8 to -10		-8		-5				-7		5
Hydrocarbon dewpoint	°C at 1-70 bar abs		5		-2		-2		0				0		7

General	Units	PORTUGAL Min	PORTUGAL Max	SWEDEN Min	SWEDEN Max	BULGARIA Min	BULGARIA Max	FINLAND Min	FINLAND Max	SLOVAKIA Min	SLOVAKIA Max	ROMANIA Min	ROMANIA Max	HUNGARY Min	HUNGARY Max
Wobbe	MJ/m³(n) at 25°C/0°C	13.38	16.02	13.60	15.81			14.000	15.810	13.500	15.500	10.500	15.720	13.370	16.030
GCV	MJ/m³(n) at 25°C/0°C			10.10	13.20					10.700	12.8	9.614		9.080	13.26
Density		0.5549	0.7001	0.555	0.7	-	-	0.555	0.7	-	-	0.55	0.7		
Total S	mg/m³(n)		50		10		20		100		21.46		100		100
H2S + COS (as S)	mg/m³(n)		5		5		2		15		2.15		6.8		20
Mercaptans	mg/m³(n)				6		5.6		25		6	8			
Oxygen	Mole %				0.1				<0.5		-		0.02		0.2
CO2	Mole %				2.5		1		1.5		3		8		
Water dewpoint	°C at 70 bar abs				-8						-7				
Hydrocarbon dewpoint	°C at 1-70 bar abs				-2						0		0		

Appendix 2 Glossary

The terms referred to in the present Launch Documentation and capitalised are defined hereafter:

'Confirmation Notice' means the message issued by a TSO notifying to the Network User the Confirmed Quantity on Gas Day D.

'Confirmed Quantity(-ies)' means the quantity of gas confirmed by a TSO to be scheduled or rescheduled to flow on Gas Day D. At an Interconnection Point, the Confirmed Quantity (-ies) will take into account the Processed Quantity (-ies) and the Matching Process.

'Exceptional event' means any unplanned event that may cause, for a limited period, capacity reductions, affecting thereby the quantity or quality of gas at a given interconnection point, with possible consequences on interactions between TSOs as well as between TSOs and system users **'Gas Day'** means the period from 5:00 to 5:00 UTC for winter time and from 4:00 to 4:00 UTC when daylight saving is applied **'Initiating TSO'** means the TSO initiating the Matching Process by sending necessary data to the 'Matching TSO'.

'Interconnection Agreement or IA' means an agreement entered into by and between adjacent TSOs, whose systems are connected at a particular Interconnection Point, which specifies terms and conditions, operating procedures and provisions, in respect of delivery and/or withdrawal of gas at the IP with the purpose of facilitating efficient interoperability of the interconnected transmission networks **'Interconnection Point'** means a cross-border interconnection point, whether it is physical or virtual, between two (2) or more Member States as well as interconnection between adjacent entry-exit-systems within the same Member States, in so far as these points are subject to booking procedures by registered Network Users being active at that IP.

'Lesser Rule': the 'lesser rule' principle means that in case of different Processed Quantities at both sides of the IP for a Network User and its counterparty, the Confirmed Quantity will be the lower of the two Processed Quantities.

'Matching TSO' means the TSO performing the Matching Process and sending the result to the Initiating TSO.

'Matching Process' is the process of comparing and aligning Processed Quantities of Network Users at both sides of a specific Interconnection Point, which will result in the Confirmed Quantity for the Network Users.

'Mismatch' means the difference in Processed Quantities between the delivering and receiving Network User at the two sides of an IP identified by the Matching Process.

'Network User' means a customer or a potential customer of a TSO, and TSOs themselves in so far as it is necessary for them to carry out their functions in relation to transmission

'Nomination' means the prior reporting by the Network User to the TSO of the actual flow that the Network User wishes to inject into or withdraw from the system (ref. Regulation 715).

'Nominated Quantity' means a quantity of gas nominated by a Network User for exchange on an IP with a Network User in an adjacent transmission system for a Gas Day.

'Operational balancing account' means an account between two adjacent TSOs, to be used to manage steering differences at an IP in order to facilitate the allocation of gas to Network Users in accordance with Confirmed Quantities

'Processed Quantity' means the quantity of gas that the TSO is scheduling for flow, which takes into account the Network Users Nomination, contractual provisions and Technical Capacity available.

'Re-nomination' means the subsequent reporting of a corrected Nomination.

'Steering difference' means the difference between the quantity of gas that the TSOs schedule to flow and the actual measured flow.

'Technical Capacity' means the maximum firm capacity that the TSO can offer to the Network Users, taking account of system integrity and the operational requirements of the transmission network.

'Transmission System Operator' or 'TSO' means a natural or legal person who carries out the function of transmission and is responsible for operating, ensuring the maintenance of, and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transport of gas .

UTC' Coordinated Universal Time is the used time reference in this document. UTC is defined and recommended by the International Radio Consultative Committee (IRCC), a predecessor organization of the ITU-T, and maintained by the 'Bureau International des Poids et Mesures' (BIPM). (CCIR Recommendation 460-4, or ITU-T Recommendation X.680 (7/94), contains the full definition). UTC is equivalent to mean solar time at the prime meridian (0° longitude), formerly expressed in GMT