Impact analysis of a reference to the EN16726:2015 in the network code on Interoperability and Data Exchange

Focus on the entire gas value chain in all relevant Member States

Contents

1. Executive summary

ENTSOG has concluded a detailed impact analysis of EN16726 as requested by EC and recommends not to amend the Interoperability network code. This conclusion is consistent with the announcement of EC at Madrid Forum on the 7th of October 2016.
The analysis has shown that a whole EU chain implementation of the EN16726, despite providing certainty on the rules and removing any contracting difficulties, would face significant legal barriers and produce widespread negative impacts across segments and Member States.

According to stakeholder input to the process, security of supply would be compromised by a reduced access to existing or new sources and supply routes whose qualities are accepted today but would be rejected if the standard is applied (e.g. 20% of UK supplies in 2015). Sustainability of gas sector may not improve and could be worsened by posing unintended barriers to biomethane injection. Competitiveness could be impaired by less-efficient cross-border trade and reduced available gas sources and market liquidity.

From a safety standpoint, many end users expressed concerns on the uncertainty and potential exposure to undesired quality ranges as specified in current national standards/regulatory frameworks, independently from the examined scenarios.

In this process as well as in the monitoring of the INT NC, as of today, no evidence of cross-border trade restrictions in normal conditions has been revealed. An amendment of the network code to include a reference to EN16726:2015, as an option for removal of cross-border trade restrictions, though more proportionate than a whole EU chain approach, is not needed. It would bring little added value and perhaps limit the possibility to adapt the standard to future needs.

Second public consultation has shown that a revision of the values in the standard would not substantially increase its acceptance. However, a key question is whether when applying the standard higher flexibility should be considered for specific requirements (e.g. CO2, O2 limits for sensitive customers) and for any other parameter in general both at entry and exit points.

Whereas public consultations have confirmed the lack of support, as concluded by the European Commission, for binding provisions, the voluntary adoption scenario may not be risk free. If the standard were to be adopted at national level a careful examination of implications for the whole chain, including IPs, is advisable.

Finally, the lack of clarity on the future legal framework may introduce uncertainty in the complementary standardisation work being carried out by CEN to find a European agreement on Wobbe Index. A definition of this parameter is key for safety and necessary

for a complete gas quality standard. Elaborating on regional bands, as acknowledged in the Madrid Forum, an examination of current practices and a vision of future supplies are generally welcomed by the stakeholder community.

2. Introduction

On 18 December 2015 the European Commission invited ENTSOG to carry out an impact analysis and subsequently draft an amendment to the Network Code on interoperability and data exchange rules (INT NC) in conjunction with the CEN standard EN 16726:2015.

In their invitation letter, the Commission foresaw a binding reference it in the INT NC to the new standard, recently approved without an agreement on Wobbe Index.

In accordance to Regulation (EC) No. 715/2009, the Commission invited ENTSOG to prepare a detailed analysis on the impacts of the standard and the consistency with the provisions of the INT NC, covering the whole gas value chain in relevant EU Member States; and, based on the result, submit to ACER an amendment proposal.

Implementation timing and scope were identified as key substantive elements resulting from the analysis, for which a broad involvement of stakeholders was considered crucial.

ENTSOG replied to Commission on 10 February accepting the invitation and immediately started the preparation, in close cooperation with key EU stakeholder associations[1] across the value chain, of the first public consultation, which was presented in Cologne on 28 April and open to 15 July.

Results were presented in the second public workshop on 13 September in Cologne. A second public consultation on refined scenarios followed, which was closed on 21 October. Already by 7 October EC announced at the Madrid Forum its intention not to pursue legally binding provisions for the standards. On 16 November, ENTSOG presented results of second public consultation and draft conclusions.

Public consultations had a great level of involvement from all segments across the chain with more than 111 replies for the first one and 68 for the second one.

[1] The so called 'prime movers group' included: CECOF, CEDEC, CEFIC, CEN, EASEE-gas, EBA, EFET, EHI, EUROGAS, EUROMOT, EUTURBINES, GIE, IFIEC, IOGP and Marcogaz.

3. Object and scope

The purpose of this document is to fulfil the commitment of ENTSOG to deliver the detailed impact analysis requested by the Commission on December 2015 and confirmed at the 29th Madrid Forum.

The scope of the study is the impacts that a binding reference to the gas quality standard in the INT NC would have on the entire gas value chain in all relevant Member States as well as the issues associated with codifying the standard in the network code.

The findings, assessments and conclusions are based on the dialogue with the prime movers; the replies received to two different public consultation processes carried out by ENTSOG; and the work of ENTSOG member transmission system operators (TSOs) in the Gas Quality Kernel Group and the Interoperability Work Group.

This document is focused on the main consequences of a potential amendment of the network code. Comprehensive summaries of all impacts and concerns as reported in the consultation processes can be found on ENTSOG website[2].

4. 29th Madrid Forum conclusions on Gas Quality

On 7th October 2016, the Commission announced legally binding provisions for the standard at this stage will not be pursued due to the lack of support. However, ENTSOG has been invited to finalise the present analysis.

Once CEN work on an agreement for the Wobbe Index, possibly including regional differences, is finalised, the Commission will reconsider harmonisation.

In light of the Commission decision, this report may be used for both the purpose of explaining the reasons for the absence of support for a binding application of the standard and to reflect on the issues that any future harmonisation initiative may face.

5. The CEN gas quality standard EN16726:2015

The European standard *specifies gas quality characteristics, parameters and their limits, for gases classified as group H that are to be transmitted, injected into and from storages, distributed and utilized*.

The following table summarises the requirements of the standard:

[2] http://www.entsog.eu/publications/interoperability#GAS-QUALITY-STANDARD-IMPACT-ANALYSIS If further information were required, please contact Antonio Gómez Bruque (antonio.gomez@entsog.eu) or Jef De Keyser (jef.dekeyser@entsog.eu)

Parameter	Unit[3]	Min	Max
Relative density	-	0,555	0,700
Total sulfur without odourant	mg/m^3	-	20 (30*)
H2S + COS	mg/m^3	-	5
Mercaptan sulfur	mg/m^3	-	6
Oxygen	mol/mol	-	10 ppm to 1%
CO2	mol/mol	-	2.5% to 4%
HC dew point	°C (up to 70 bar)	-	-2
Water dew point	°C (at 70 bar)	-	-8
Methane number	-	65	-

Regarding total sulfur, it shall be noted that the limit refers to gas at high pressure networks and on interconnection points. For those transmission systems where the gas is odourised, a limit of 30 mg/m^3 will apply

For oxygen and carbon dioxide, the standard provides flexibility in the maximum value: *At network entry points and interconnection points the mole fraction of carbon dioxide* (oxygen) *shall be no more than 2,5%* (10 ppm 24h moving average). *However, where the gas can be demonstrated not to flow to installations sensitive to higher levels of carbon dioxide, e.g. underground storage systems, a higher limit of up to 4%* (1%) *may be applied.*

As for dew points*: Under given climatic conditions, a higher water dew point and hydrocarbon dew point may be accepted at national level.*

CEN standard was approved on September 2015 and had to be adopted as national standard by CEN members no later than June 2016.

As the standard states, responsibility and liability issues in the context of this European standard are subject to European or national regulations. Therefore as long as the standard is not referred in regulation its application is voluntary.

[3] Reference conditions for metering are 15 °C and 101,325 kPa

6. Existing mechanisms in the INT NC for gas quality restrictions

Title of Article 15 is 'Managing cross-border trade restrictions due to gas quality differences'. In brief, when gas quality is identified as a restriction for cross-border trade it's managed locally by the parties involved.

TSOs are required to submit to their NRAS a joint proposal based on a cost benefit analysis followed by a public consultation in order to identify the most feasible solution (e.g. flow commitments, gas treatment), without changing the gas quality specifications.

In addition to Article 15, it is relevant to note the following:

- Recital 4 states that obligations In the INT NC regarding gas quality and odourisation are *without prejudice to the competences of Member States.*
- Recital 5 states that solutions on Article 15 are provided *without prejudice to the adoption of a European-wide standard for high-calorific gas as is being developed by CEN pursuant to the standardisation process under mandate M/400*.

7. Identified policy issues

This chapter describes the most outstanding policy issues considered by ENTSOG. In the first public consultation all different possible approaches for each of the issues were presented and stakeholders across the gas value chain were requested to provide their views. Once the feedback was collected, ENTSOG presented a set of refined scenarios with a clear description of the policies that would be applied in each different scenario.

7.1. Scope of the amendment

When analysing the interrelation between the standard and the INT NC, one of the outstanding issues is the difference in the scope of application of both documents. While the standard is aimed to cover all the value chain from entry to exit points, the network code is mainly circumscribed to interconnection points[4]. It is worth noting that the application to connection points to third countries is subject to the decision of national authorities.

According to the legal analysis carried out by ENTSOG, in principle, the scope of the network code can be widened for specific purposes (e.g. Articles 13, 17 and 18). However, it is questionable whether an amendment to the INT NC could constitute the most proper way for a whole chain implementation.

[4] 'interconnection point' means a physical or virtual point connecting adjacent entry-exit systems or connecting an entry-exit system with an interconnector, in so far as these points are subject to booking procedures by network users.

Regardless of the chosen regulatory tool, the scope of application will implicitly define who is responsible for delivering the gas compliant to the standard. The public consultations of ENTSOG proposed a number of scenarios based on different potential scopes for a binding application of the standard, which would naturally lead to different costs and benefits.

7.2. Proportionality and subsidiarity

The principle of subsidiarity applies only to subject matter where there is a shared competence between the Union and the Member States. According to Art 5(3) of the Treaty on European Union (TEU) for an intervention by EU institutions in line with the principle of subsidiarity three prerequisites shall be met: the non-exclusivity, the necessity and the presence of an added value.

Here, it is important to underline that the principle of subsidiarity must be respected not only with reference to content of the proposal but also with reference to the choice of the more suitable “instrument” (regulation, directive, decision, recommendation, opinion).

When considering non-exclusivity, gas quality is not contemplated by Regulation (EC) No. 715/2009, apart from two rapid references contained in the definition of “system integrity”, provided by Art. 2, n. 9, and in Annex I, Guidelines on the Definition of the technical information necessary for network users to gain effective access to the system, under 3.1 letter h).

In addition, Recital No. 43 of Directive No. 2009/73/EC entitles Member States to ensure that when they are connected to the gas system, customers are informed about their rights to be supplied with natural gas of a specified quality at reasonable prices.

In conclusion, while gas quality is recognised in EU law, effectively MSs are competent on the matter of gas quality and from an historical point of view MSs have had a role justified by safety and security needs. Such an appraisal is clearly confirmed by Recital no. 4 of INT NC.

Finally, the necessity and added value, which are evaluated in different chapters of this report, will determine whether the subsidiarity and proportionality principles have been respected.

7.3. Implementation timing

In the design of the scenarios different options were considered in this respect: fixed timing equal for all segments; flexible by segment and/or region; or as decided by national authorities.

Based on the input received in the first public consultation, a given timing option was chosen for each scenario. The assessment chapter will define the required duration of the transition period in each case.

7.4. Interaction with INT NC

In case the NC was amended two different options could be considered. The first one proposed not applying, after the transition period, article 15 for the parameters covered in the standard. The other option made the application of the standard subject to the cost-benefit analysis and public consultation process described in the article 15. In the second public consultation, it has been also analysed whether, within the second option, CEN standard should be applied when TSOs fail to agree.

7.5. Allowance for off-spec gas and flexible limits

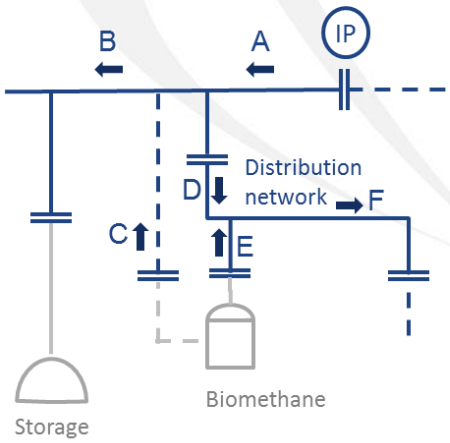
For the configuration of the scenarios, different possibilities have been studied for applying flexibility around the EN16726 requirements.

A first aspect is whether gas meeting EN16726 should be always accepted or may be refused by operators if national legislation sets stricter requirements for the parameters included in the standard.

Second, when gas does not meet EN16726, it has been consulted whether operators should be able to agree less strict limits or otherwise obliged to refuse the gas.

As for the flexibility contained in the standard for oxygen and carbon dioxide, the proposal of ENTSOG was to set the limits on a case by case basis.

As an example, in the graph below, flow in C would be restricted so that flow in B is below the agreed limit; while flow in E would be restricted so that flow in F is below the highest limits allowed in the standard.



7.6. Conflicts with national legislation: A-deviations

Standards set out a technical agreement as to what constitutes best practice. However, when a standard is adopted, National Standards Bodies (NSBs) may need to advise that for their country different requirements should apply. There could be a technical reason – for example due to the effects of a particularly cold or hot climate- or a conflict with national legislation.

If the reason is technical then the Member State should register a Special National Condition (SNC) with CEN; if an obstructing law then an A-Deviation is required. An A-Deviation forms part of a CEN standard as an 'Informative Annex' detailing the conflicting requirements for the relevant Member State.

There are legal precedents establishing that when a standard falls under any Directive of the EU, A-Deviations are unlawful technical barriers to trade (Judgement of the European Court of Justice of 2 December 1980, in case 815/79 regarding Council Directive 73/23/EEC (Low-voltage Directive), following which the Commission issued a communication on 15 December 1981 (OJ C 059, 09/03/1982 p. 0002-0008)).

CEN guidance document[5] on "National regulations – Possible conflict with CEN work (A-deviations)" confirms this approach:

"3.4 Attention should be paid in particular to those cases where the national regulation in question is in conflict with EU harmonization legislation:

- *in case the transitional period (if any) of the EU harmonization legislation has not yet ended, A-deviations due to conflicting national regulation can be asked for and remain valid until the end of the transitional period;*
- *in case there is no transitional period or the transitional period of the EU harmonization legislation has ended, NO conflicting national regulation is allowed in EU (EEA) countries. If it is the case, the European Commission (EC) has to solve the problem.*

[…]

3.7 CEN cannot go against national regulation even if they are wrong and not correct. when ENs are produced in fields that are not covered by EU harmonization legislation, A-deviations remain valid until the adjustment of the related national regulation."

Consequently, when a standard is enforced by EU harmonization legislation, an A-Deviation does not protect the obstructing national law. On the contrary, it is a signal to the MS that

[5] http://boss.cen.eu/reference%20material/Guidancedoc/Pages/NationalReg.aspx

its relevant national law needs to be amended or removed before the end of the transition period, otherwise infraction proceedings with associated fines should be expected.

By contrast, a SNC indicates something that cannot be removed or amended to allow a MS to comply with a standard because the problem is technical in nature and not one of regulation. Indeed, there does not have to be an obstructing law in place for a SNC to be adopted. If a standard goes forward for use in legislation a SNC will be examined by CEN but if the reason stands up to scrutiny then SNC will be retained regardless of the transition period.

Finally, it is worth noting that the NC INT is not an EU directive but a Commission regulation, directly applicable in each Member State with no need to implement it by national statutory law. So if there are national laws containing different values for parameters covered by EN16726:2015, these national rules would automatically not be applicable as far as the concrete requirement is covered by CEN standard. However, for the sake of clarity, it would be highly recommendable to change the national law.

7.7. Parameters not yet or insufficiently covered by the standard

ENTSOG's understanding of the current legal framework for technical standards is that their adoption is voluntary unless it is enforced by European or national legislation.

The safe use of gas is not completely defined by the EN16726:2015 due to the lack of any Wobbe Index (WI) requirements. Furthermore, when defining the total sulfur content, the standard acknowledges that "*on distribution networks the odourization is considered as a national safety issue*" and, consequently, limits the scope of the requirement on the standard to "*high pressure networks and on interconnection points*".

Therefore, even in case of a European standard that is made legally binding, Member States' specifications for parameters not covered by the standard should still be valid and operators be entitled to refuse gas that meets the standard but not the relevant national requirements for such parameters.

That complementary approach would not only apply to Wobbe Index or sulfur in the end use, but also to any other parameter Member States deem necessary such as hydrogen or methane content.

The table below summarises this approach, which is has been used as basis for the assessment of the "Whole EU chain" scenario.

Parameter	National specification	EN16726:2015	Harmonised national spec.
Relative density	0.6 – 0.65	0.55 – 0.7	**0.55 - 0.7**
Wobbe Index	14.00 – 15.20	No value defined	**14.00 – 15.20**
Hydrogen	2%	No value defined	**2%**

7.8. Governance of changes

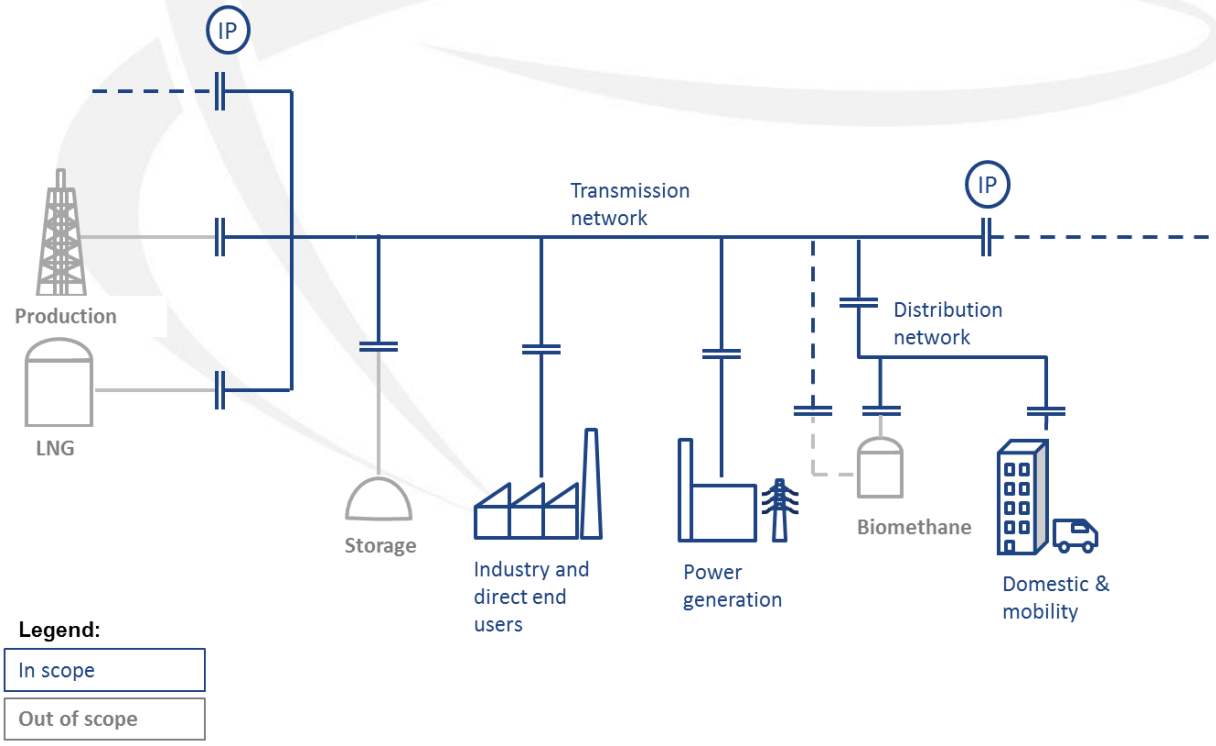
To provide stability in the legal framework, ENTSOG has proposed any reference to the standard in the network code to be linked to the 2015 version, preventing any revision to become automatically binding. In the second public consultation of ENTSOG the option to make a dynamic reference (i.e. not linked to any given revision) was also analysed.

8. Proposed scenarios

In the following section three scenarios of a possible implementation of the CEN standard are introduced. Those scenarios have been configured according to the results of the first public consultation and used as basis for the assessment of impacts. The explanation of the scenarios includes illustrations of the gas value chain for greater comprehensibility.

8.1. Whole EU chain

The first scenario called “Whole EU chain” implied that parties injecting gas in gas networks need to ensure compliance of the gas with the CEN standard.



Consistently with section 7.7, national requirements/network code would be fully valid and enforceable for parameters not included in the standard, e.g. Wobbe Index, sulfur in end-use (also for end users directly connected to TSOs), hydrogen and any other.

The scope of application would therefore be exactly as described in EN16726: *gases classified as group H to be transmitted, injected into and from storages, distributed and utilized*.

TSOs, Storage system operators (SSOs) and all downstream segments would receive gas compliant to the standard. It should be noted that, in order to ensure whole chain application within the EU, the standard should also apply at all entry points to Member States, including third countries.

Impacted parties would include, on one hand, producers or infrastructure operators delivering gas into TSO or DSO networks (all gas supplies) and, on the other, consumers or infrastructures receiving gas from those networks.
The implementation timing after NC amendment would be fixed and equal for all countries and segments. Once the transition period is finished article 15, would not apply for the parameters covered in the standard and all conflicting national legislation automatically overruled (see 7.6).

Any gas meeting the standard should be accepted provided that national requirements for additional parameters are also met. On the contrary, Any gas not meeting the standard shall be refused.

For any parameter which is not included in the standard, national law or the network code respectively will be fully valid and enforceable (e.g. Wobbe Index, hydrogen content and any other). The implementation after the amendment of the Network Code will be done in a transition period of a fixed duration which is yet to be consulted. After this transition period, Article 15 of the INT NC will no longer be valid for parameters covered in the standard.

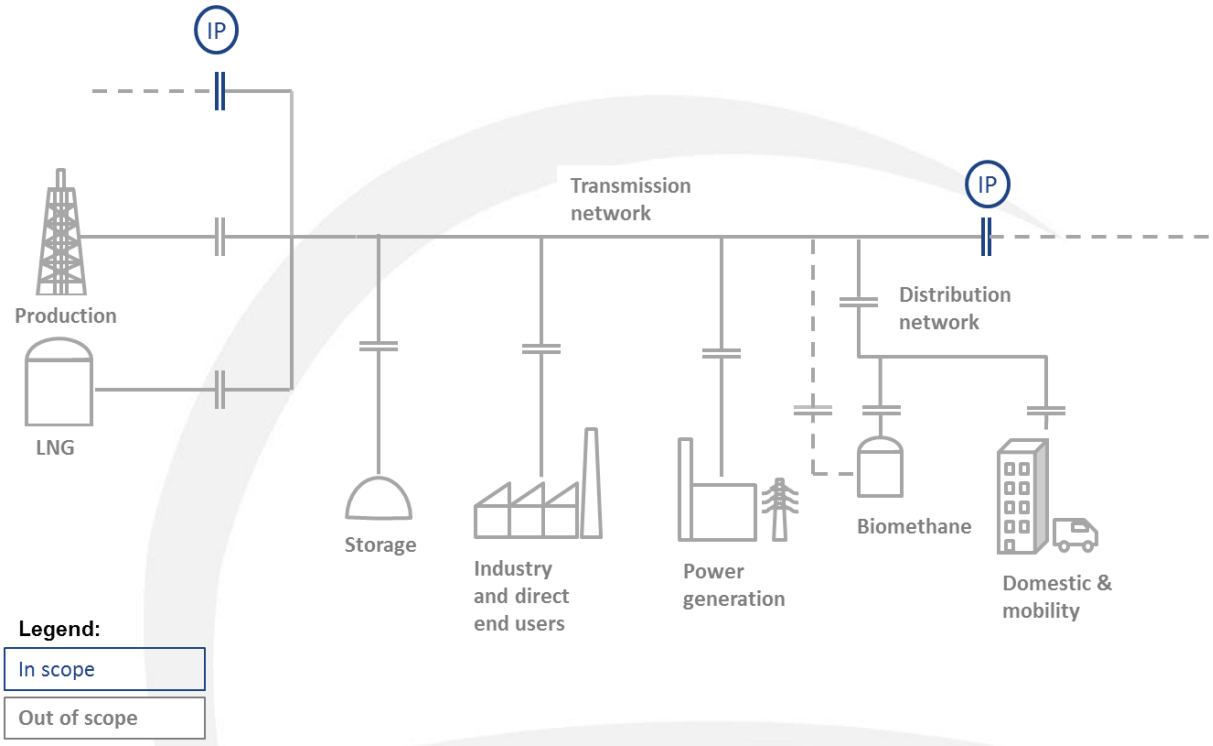
Flexible limits for oxygen and carbon dioxide would be applied as described in 7.5

8.2. At IPs only

Given this scenario, the scope of application would be limited to interconnection points (IPs) between EU Member States. Only when restrictions in cross-border trade are recognised, the affected TSOs operating this IP should analyse, via the process set out in Article 15, feasible solutions (e.g. flow commitments, gas treatment) *without changing the gas quality specifications* (Art 15 (2a)), and as another possibility, adopting EN16726:2015 for the conflicting parameter.

It shall be distinguished that this scenario did not have as a prerequisite a full harmonisation of national legislation.

TSOs, having the new obligation to analyse the application of the standard, would be therefore the only impacted parties by this scenario.



Under this approach, CEN standard would neither substitute nor act as a fall-back (default rule) for Article 15. On the contrary, the application of the standard for the parameter causing the restriction, together with retaining national specifications, would be subject to the cost-benefit analysis and public consultation process described in the network code.

As described in Article 15, the best timeframe would be determined on case by case basis by the involved TSOs and competent authorities.

If the CBA results in the adoption of EN16276 for the conflicting parameter as the optimal solution, any gas meeting the standard shall be accepted given that national requirements for any other parameter than the one causing the barrier are met. At the same time, TSOs would retain flexibility they have today to cope with gas not meeting the standard by swapping or co-mingling (Article 15(1)).

A-deviations would not be applicable when considering the application of the standard. Otherwise, there would be no alternative on the table for the national specifications.

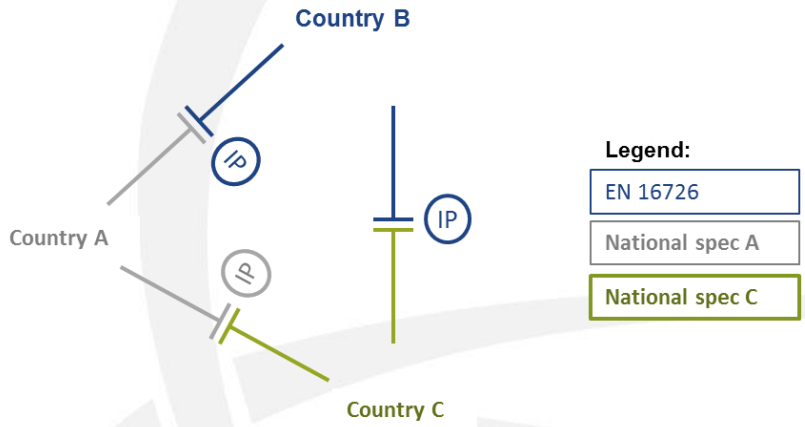
As for the flexibility for oxygen, carbon dioxide or any other parameter, the cost benefit analysis would determine the required level.

The table below summarises the different cost benefit analyses that TSOs should carry out, without limitation to investigate others:

Applicable specs	Flow commitments	Gas treatment	…
National requirements	CBA 1	CBA 2	
EN16726:2015 (without A-deviations)	CBA 3	CBA 4	

8.3. Voluntary adoption

In this scenario, the Interoperability Network Code wout not be amended. If there is any cross-border trade restriction due to gas quality, Article 15 of the Network Code will be applied as it is.



9. Status of cross border trade issues related to gas quality

9.1. Results of first public consultation

First public consultation included the following question: Are you aware of any cross-border trade barrier related to gas quality at interconnection points or EU import points?

While the received responses by segment and Member State varied, a majority of respondents gave a negative answer (77 vs 24). In general, the existence of barriers was questioned by producers and traders while among operators and users there were divided views, with many seeing differences in specs across borders as a risk.

All reported barriers were linked to differences in specifications across-borders rather than actual trade restriction. Some respondents referred also to Wobbe Index or odourisation, aspects which are in any case beyond the scope of the current standard.

Conversely, stakeholders declaring not to know of any barrier added that the INT NC already provides the necessary mechanisms to solve potential issues. Market found solutions to the existing barriers in the past (e.g. ballasting) in the view of some other respondents of this group.

9.2. INT NC monitoring results

Following obligations under Article 25 of the INT NC, ENTSOG fulfilled by 31 September 2016 its monitoring obligations[6]. In the questionnaire, elaborated in cooperation with the ACER, the following question was placed:

- *Article 15: Is there any cross-border trade restriction due to gas quality that cannot be avoided by the standard operations of the TSOs and that has been recognised by NRAs?*
- *Article 19: Is there any cross-border trade restriction due to differences in odourisation practices that cannot be avoided by the concerned TSOs and that has been recognised by NRAs?*

Only one potential instance for each case was reported by TSOs. Regarding gas quality, the potential issue is not subject to the procedure of Article 15 (2) but solved by mutual cooperation of adjacent TSOs. Regarding odourisation, for the reported case flows are not actually restricted as the IP is unidirectional and gas can only flow from the adjacent TSO's non-odourised transmission system to the odourised one.

10. Assessment of scenarios

In the present chapter, main findings in terms of benefits, negative impacts, barriers, costs, timing and feasibility for the three refined scenarios are summarised.

The contents of this section are based on the information provided by stakeholders in the two public consultation processes of ENTSOG and are not necessarily supported by the Association.

For the sake of readability, a representative sample of outstanding issues, facts and figures have been selected for each scenario. As a result, the view presented might be incomplete or partial.

Section 13 contains all relevant links to public consultation non-confidential replies and reports, where detailed information on reported issues can be found.

[6] For more information on monitoring results, see INT NC implementation monitoring report

10.1. Whole EU chain

Benefits

A whole EU chain implementation of the CEN standard could bring certainty in the rules to apply for all involved parties, ensuring **safety** and reliability in gas transmission to all downstream systems.

In case of a **security of supply** event there would be no barriers for reverse flows and all contracting difficulties would be eliminated. For some storage operators, integrity would be guaranteed thanks to the requirements of the standard for oxygen, carbon dioxide and hydrogen sulphide.

Certainly, natural gas would be standardised as a product for new suppliers arriving to EU **markets**.

A common note to all reported benefits is perhaps their intangible character and the difficulty to monetize them.

Impacts

However, the application of the standard would also eliminate flexibility to apply less stringent criteria at entry points or more stringent at exit points.

The requirements of the standard could shut-in indigenous production; hamper the development of conventional and non-conventional fields, with the consequent reduction of **security of supply**.

Competitiveness could also be affected by reduced port-folios and less efficient cross-border trade due to restriction of flows in interconnectors (e.g. UK-IE) while sulfur, H_2S and O_2 (10 ppm) limits might pose a barrier for LNG imports, due to different factors, e.g., current values in standard contracts.

From a **sustainability** standpoint, costs of biomethane injection might increase due to the oxygen limit (10 ppm).

At the end of the value chain, the requirements of the existing national regulations (WI, sulfur, etc.) are unsatisfactory for energy intensive and chemical industry **end users** exposing appliances to safety risks, performance issues and higher emissions (NOx). The whole EU chain scenario would fail to address or solve this problem.

For greater completeness, the following table presents an overview of the reported impacts in both consultations per parameter, country and segment.

Parameter	AT	BE	DK	DE	HU	IE	IT	LT	NL	PL	ES	UK	NO	RU	EU
Relative density					P										
Total sulfur	S	IC		M	P		I D		L	P		L			W H
H2S					P										
Mercaptan sulfur															
O2		S	B	B	P					P		PL		P	
CO2	S			B	P							P	P		
HC dew point					P					P	IC				
Water dew point	S				P					P					
Methane number			P												M
Unspecified parameters								IC							W, I

S: Storage
IC: Imports
B: Biomethane
M: Mobility
D: Distribution
L: LNG
P: Production
I: Industry
W: power generation
H: Domestic

Only countries reporting specific impacts are included
EU column accounts for additional impacts reported by EU assocs

Barriers

The potential welfare loss linked to premature field abandonment constitutes a significant economic barrier. From an operational point of view, additional equipment and monitoring activities across the network would be needed to ensure required parameters are met. In addition, the blending and mixing capability of transmission systems may not be sufficient to meet the requirements of the standard.

It is also questioned whether this initiative would lay within the scope of the INT NC and the legal basis within the third package. For example, it is uncertain how this scenario might work at EU borders, as non EU countries cannot be compelled to apply the EN16726.

The requirements set in the standard might create additional barriers as, for example, in the case of different limits for sulfur depending on odourisation (20 vs. 30 mg/m^3), which could be seen as an unjustified asymmetry.

Finally, several Member States would see their national legislation overruled and would need to adapt it for the sake of consistency and clarity. The table below summarises that situation.

Parameter	AT	BE	HR	DK	DE *	FR	HU *	IE	IT	LT	NL *	PL	ES	UK
Relative density														
Total sulfur														
H2S														
Mercaptan sulfur														
O2														
CO2														
HC dew point														
Water dew point														
Methane number														

Legislation is more strict

Legislation is less strict or not specific

Costs

The application of the lower limits for O_2 (10 ppm) and CO_2 (2.5%) to the entry points of UK transmission network would have resulted in 2015 in the rejection of 15.9 bcm (13.8 and 2.1 bcm respectively), accounting for €2 billion or 20% of UK supplies, from existing developed offshore fields in the UK and Norway. It shall be noted that those are the applicable limits unless gas can be demonstrated not to flow to installations sensitive to higher levels of carbon dioxide/oxygen (e.g. underground storages).

Gas that is currently accepted would also become off-spec at import points. In Spain, for instance, 15 bcm of imports would have failed to meet the water dew point requirement.

Estimates of the necessary investments at production fields and upstream terminals have been received (e.g. an amine sweetening unit for a production field in Hungary would require in a CAPEX of 350€/(m^3/h) and an OPEX of 0,031€/m^3). Several figures received on confidential basis indicate that such costs would be prohibitive for existing fields.

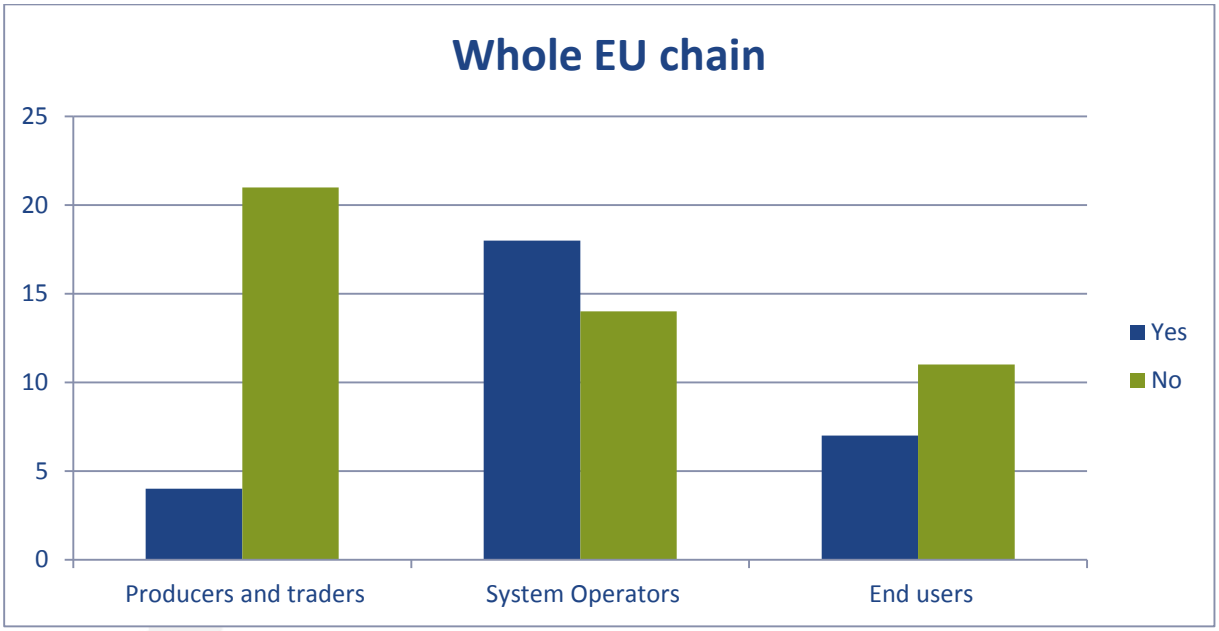
In sum, while only a minority of stakeholders detailed the costs, there is enough evidence that costs could be significant.

Time

There is a wide variety of estimations in this respect ranging from 3 to 5 years (period required for adapting existing contracts or building treatment facilities) to the inability to achieve the scenario before mid-20s, according to the Norwegian oil and gas association.

Feasibility

The graph below summarises the feasibility of this scenario as perceived by key groups[7] of segments, according to the second public consultation.



10.2. At IPs only

Benefits

This scenario would allow the upstream sector to feed in gas of deviating qualities as entry points to the system would not be affected. In addition, at those IPs where gas not meeting the CEN standard is currently accepted, a suboptimal application of EN16726 would be avoided.

Being the application of the CEN standard subject to the assessment process set out in Article 15, the "At IPs only" scenario would achieve the compatibility between the two instruments that Recital 5 advises.

The standard would be inserted in the current regulatory framework in a natural way granting a proportionate application.

Impacts

While it is acknowledged that any unintended consequences of the whole EU chain scenario would be avoided, the added value of a weak reference to the standard would be limited.

[7] Producers and traders include also shipper/suppliers and biomethane producers.
System Operators includes TSOs, LSOs, SSOs and DSOs
End users include: power generation, industry, domestic appliances and mobility

Although the INT NC states that solutions in Article 15 should be developed "*without changing the gas quality specifications*", it is argued that nothing prevents TSOs to consider the current version of the standard or any other as a potential solution. Furthermore, predefining the application of CEN standard might predetermine suboptimal solution and create a tunnel-vision that rules out more innovative solutions.

From an operational point of view there would be no secured uniform entry-exit specs at national level.

Finally, end users who are currently negatively affected to undesired wide quality ranges would face the same situation.

Barriers/Costs

No immediate costs would be incurred by any given segment unless a restriction triggers the application of Article 15.

That could be the case in Germany if EN16726 compliant gas arriving at one IP was not able to meet at the same time national requirements at exit points (e.g. 6 to 8 mg/m^3 total sulfur for CNG fuelling stations). In such case a gas treatment facility could amount to 75M€ assuming a capacity of 500,000 m^3/h.

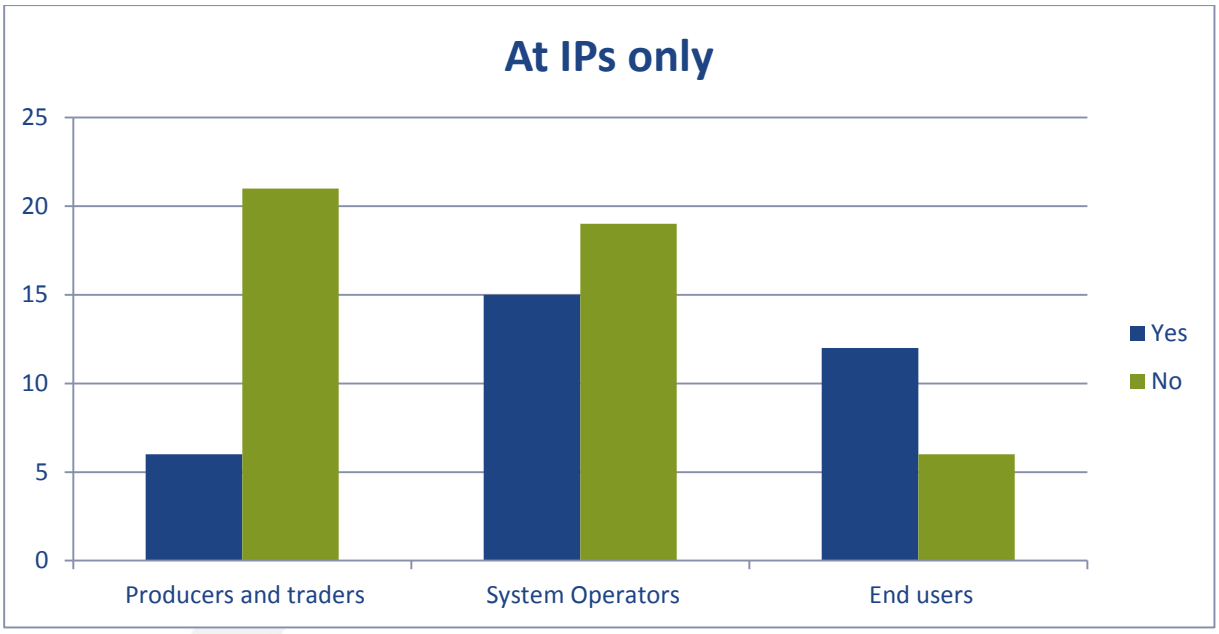
Time

Once INT NC is amended, no implementation lead-time would be required. If article 15 is triggered, the time required to build a gas treatment facility may vary depending on the given requirement taking at least 3 to 5 years based on estimates received for projects under the whole EU chain scenario.

Feasibility

The graph below summarises the feasibility of this scenario as perceived by key groups[8] of segments, according to the second public consultation.

[8] Producers and traders include also shipper/suppliers and biomethane producers.
System Operators includes TSOs, LSOs, SSOs and DSOs
End users include: power generation, industry, domestic appliances and mobility



10.3. Voluntary adoption

Benefits

In favour of this scenario, which ENTSOG presented as status quo, it has been argued by some stakeholders that competent authorities in Member States are best placed to take proper account of consumer safety, security of supply and the relevant national regulatory framework. Standard would be anyways ready to be used if so decided, without introducing unnecessary barriers.

Impacts/barrier/costs

In principle, there would be no direct negative impact. Flexibility and access to supply sources would be retained.

According to the heating industry, voluntary adoption would grant higher environmental protection thanks to the fact that requested A-deviations would be retained.

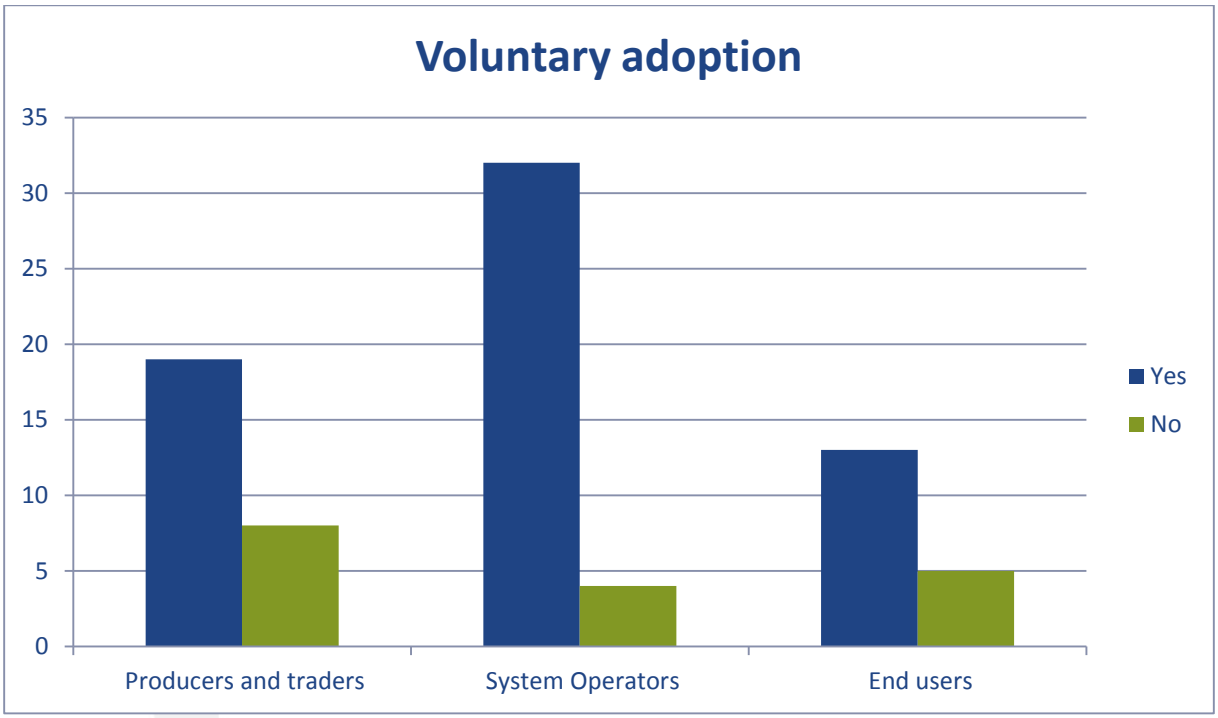
Notwithstanding, Member States wishing to adopt the standard should conduct a cost benefit analysis as the application of standard would eliminate flexibility at entry points, including IPs, for the same reasons exposed in 10.2.

Potentially, the costs and barriers of voluntary adoption would be those of the whole EU chain scenario but on a national scale.

Once again, industrial end users expressed the concern that this scenario could lead to even more uncertainty and risks and/or infringement on European competitive level playing field. Mitigation measures for wide gas quality ranges would still be needed.

Feasibility

The graph below summarises the feasibility of this scenario as perceived by key groups[9] of segments, according to the second public consultation.



[9] Producers and traders include also shipper/suppliers and biomethane producers.
System Operators includes TSOs, LSOs, SSOs and DSOs
End users include: power generation, industry, domestic appliances and mobility

10.4. Summary table

	Scenario 1: Whole chain implementation	Scenario 3: At IPs only	Scenario 4: Voluntary adoption
Benefits	Clear rules for whole EU chain Standardised gas in EU No barriers in SoS crisis Storage integrity	Certainty on a proportionate application of the standard Flexibility retained	Maximum MS flexibility Avoids immediate unintended consequences
Impacts	Elimination of flexibility Indigenous production shut-in Restrictions at interconnectors and import points Barrier for biomethane and LNG End user uncertainty	No immediate impacts Limited added value Unsymmetrical entry-exit specs Risk of biasing Article 15 (nothing forbids now considering EN16726) End user uncertainty	No immediate impacts If the standard is adopted, loss of flexibility, scenario 1 at national level. End user uncertainty
Barriers	Economic, operational, legal (conflicts with national specs and outside third package scope)	No barriers	No barriers
Costs	Welfare loses > €2 billion @2015 Prohibitive for small fields and some storages Reduced market liquidity	No immediate costs Depending on CBA for Article 15 triggered projects (reported example costs of 75 M€ per IP)	No immediate costs Depending on national situation if the standard is adopted
Time	From 3 to 10 years Not reachable until mid 20s in some corridors	Immediate 3 to 5 years for Article 15 triggered projects	No time, status quo. Up to 5 if standard is adopted
Feasibility	Not feasible for the majority of producers /traders and end users	Not feasible for the majority producers/traders and SOs	Feasible for the majority of stakeholders

11. Suggested improvements

This section contains concerns and improvements to the proposed scenarios that were expressed by the participants of the survey. These comments are no exact quotes but summarised statements.

11.1. Definition of the scenarios

Regarding the definition of the proposed scenarios, concerns were raised that a standard should be made on good quality data if it is developed to be a legally binding one. Also a suggested improvement was to give the TSOs an incentive to use the flexibility given by their system for co-mingling and blending. An addition to the scenario of the Whole EU chain proposed multiple times is that operators still should be allowed to accept off-spec gas if involved parties agree on it.

11.2. Implementation of the reference to the EN16726

To the question whether the reference should be fixed to the 2015 version of the standard, the most common reply was that an automatic reference to any revision of the standard is not an optimal solution. It was remarked that a standard which is not yet written should not become binding via the network code by default, but rather that each revision should undergo a fair assessment. Some of the participants, who were in favour of a static reference to the standard, still were raising their concerns that it should not be the current version of 2015. A legally binding standard should include a range for Wobbe Index and/or Gross Calorific Value according to a good number of comments. Only one respondent argued that revisions can only improve and thus reference should be dynamic.

11.3. Standard as the default rule for “At IPs only” scenario

Defining the standard to be a default rule, even if subject to a CBA, could predetermine a certain suboptimal solution according to some statements. It could also discourage innovative solutions; put one of the negotiating parties in an advantage, therefore hinder the negotiation process leading possibly to a non-consensual resolution as some participants pointed out.

11.4. Revision of the standard

For parameters of the standard, such as relative density, total sulfur or methane number, the range of values was asked to be narrower on the one hand by end users and on the other hand to be wider by producers. According to these contradictive wishes no clear recommendation to change the standard in one or another way can be made.

Other comments to the standard were regarding the clarity of the definition of a sensitive site and how the flexibility on oxygen and carbon dioxide should be settled, such as, for example, who should bear the burden of proof.

In line with the potential scope of the CEN SFGas WG Gas quality, the parameter total sulfur was requested by several stakeholders to include sulfur from odorant too. Inclusion of absolute water content was also reported as necessary.

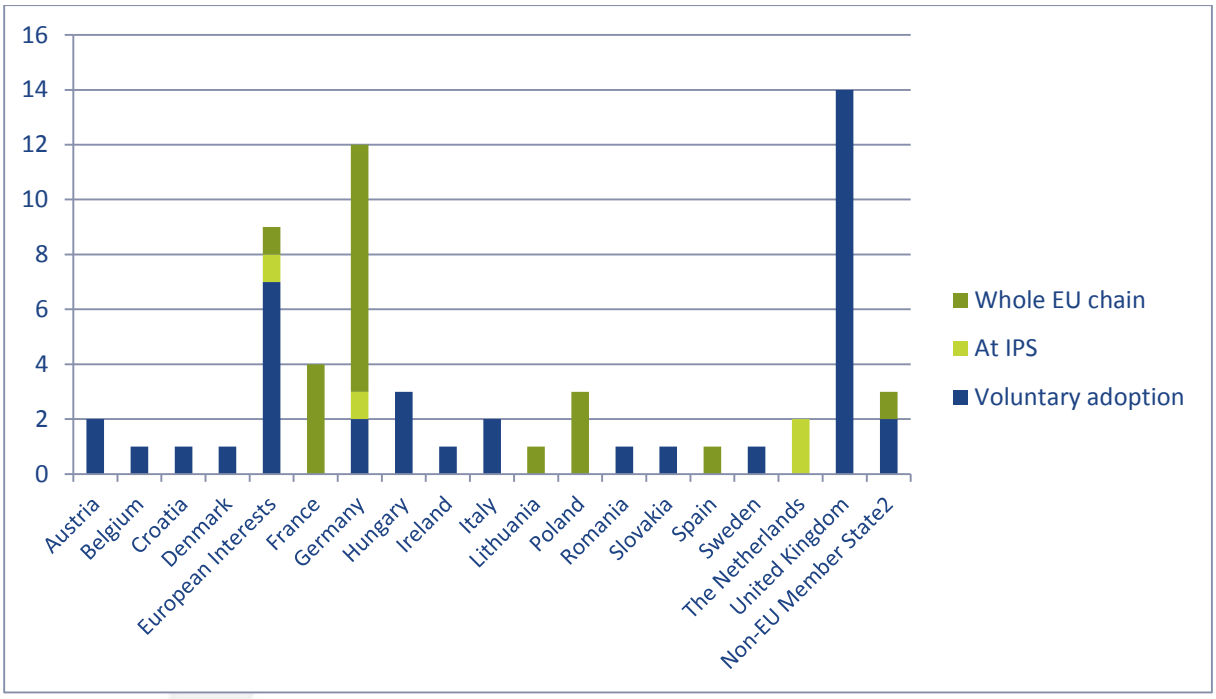
Finally, the improvement suggested most often was that additional parameters like the Wobbe Index or hydrogen content should be included in the standard.

Remarkably, even assuming every stakeholder was able to rewrite the standard in the desired direction the overall acceptance of an amendment of the network code would not change significantly.

More details can be found in the consultation report and published non-confidential answers.

12. User preference for different scenarios

Being the lack of support put forward as the reason not to pursue further harmonisation activities, the expressed preference of different segments and Member States deserves a careful examination, for which the following graphs might serve. However, it shall be noted that a public consultation is not necessarily a statically representative sample of the stakeholder community, even more when that sample is divided into several categories. During workshops stakeholders expressed their concern on the fact that a consultation on impacts might have inherently a negative bias.


16
14
12
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8
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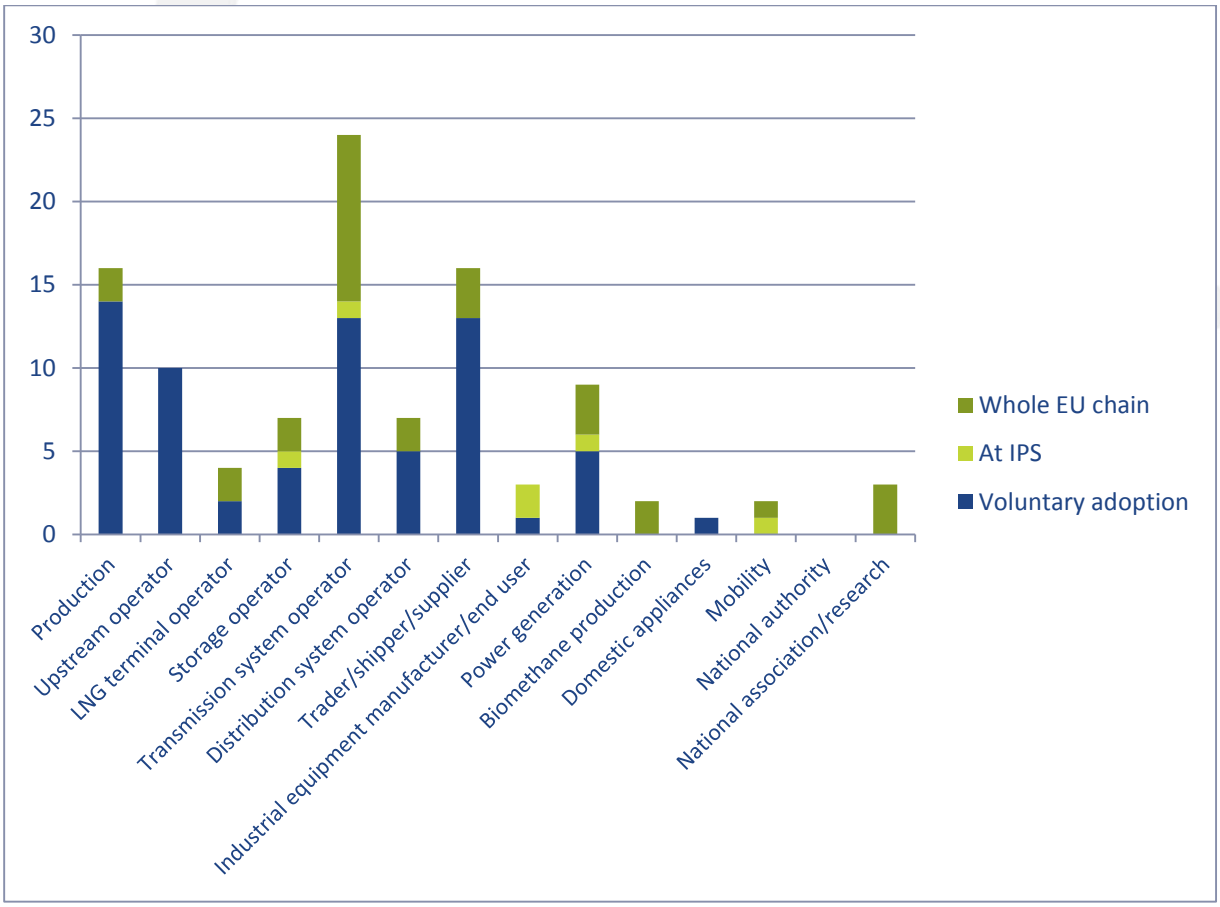
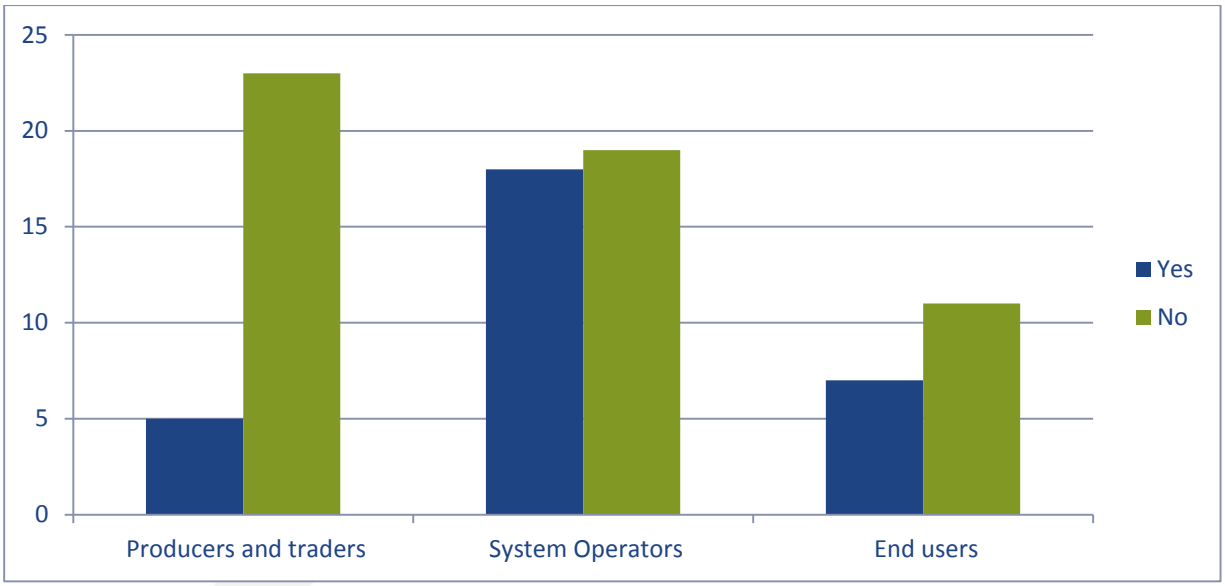
Austria
Belgium
Croatia
Denmark
European Interests
France
Germany
Hungary
Ireland
Italy
Lithuania
Poland
Romania
Slovakia
Spain
Sweden
The Netherlands
United Kingdom
Non-EU Member State2
Whole EU chain
At IPS
Voluntary adoption


30
25
20
15
10
5
0
Production
Upstream operator
LNG terminal operator
Storage operator
Transmission system operator
Distribution system operator
Trader/shipper/supplier
Industrial equipment manufacturer/end user
Power generation
Biomethane production
Domestic appliances
Mobility
National authority
National association/research
Whole EU chain
At IPS
Voluntary adoption



The graph above represents the agreement of the key groups of stakeholders to amend the code. While it is questionable if this questionnaire was fulfilled in full awareness of the Madrid Forum conclusions (most of answers arrived by 21st October), the question above might be interpreted as indication for future steps.

Comments on this question remarked the fact that the standard was approved as a voluntary one, the lack of legal basis, the need for a WI agreement prior to any binding provisions, the potential reduction of diversity of supply and the need for a vision of the future of EU gas transmission as prerequisite to set the requirements.

13. Links to public consultation results

First public consultation:

- Non-confidential responses
- Full consultation report
- Summary

Second public consultation:

- Non-confidential responses
  - Index of respondents
- Full consultation report
- Summary