entsog

european network
of transmission system operators
for gas

Brussels 18 August 2016

Outcome of CEN standard consultation

Gas Quality KG

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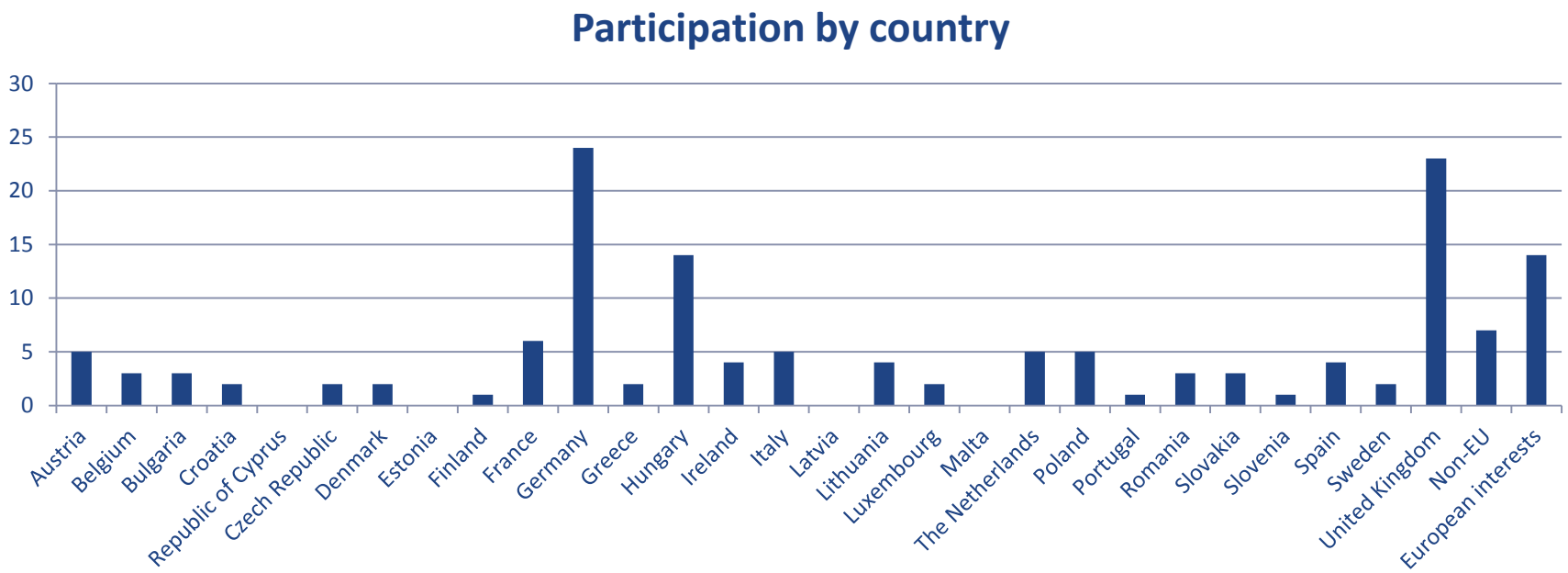
Image Courtesy of Thyssengas

Participants

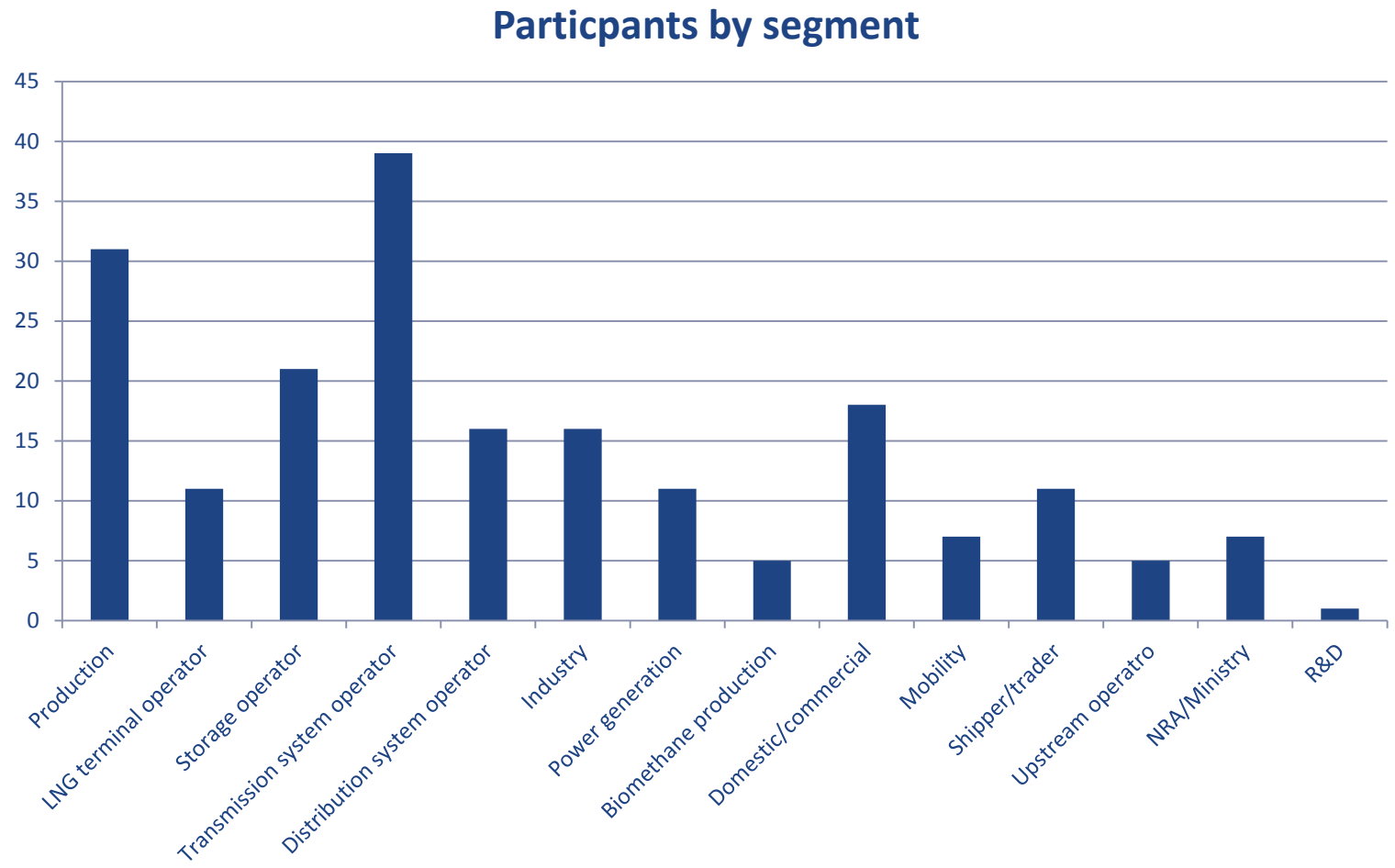


Participation summary

> 111 valid and complete answers received

> 19 EU member states directly taking part

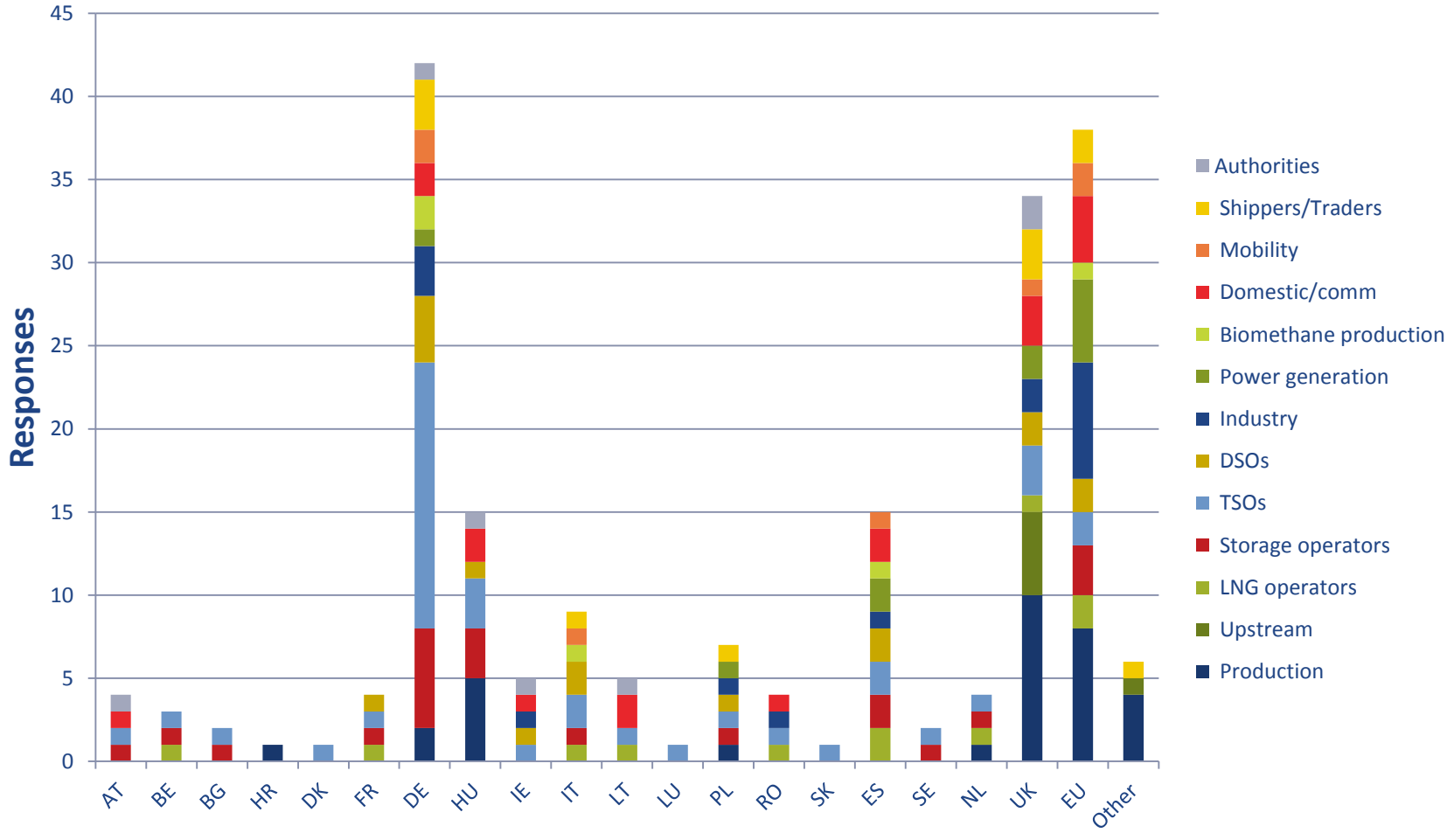
Participants



**It should be noted that some respondents may be included in more than one category*

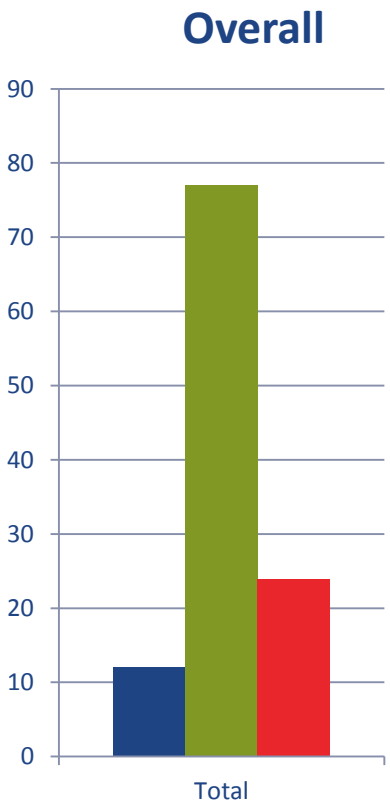
Participants

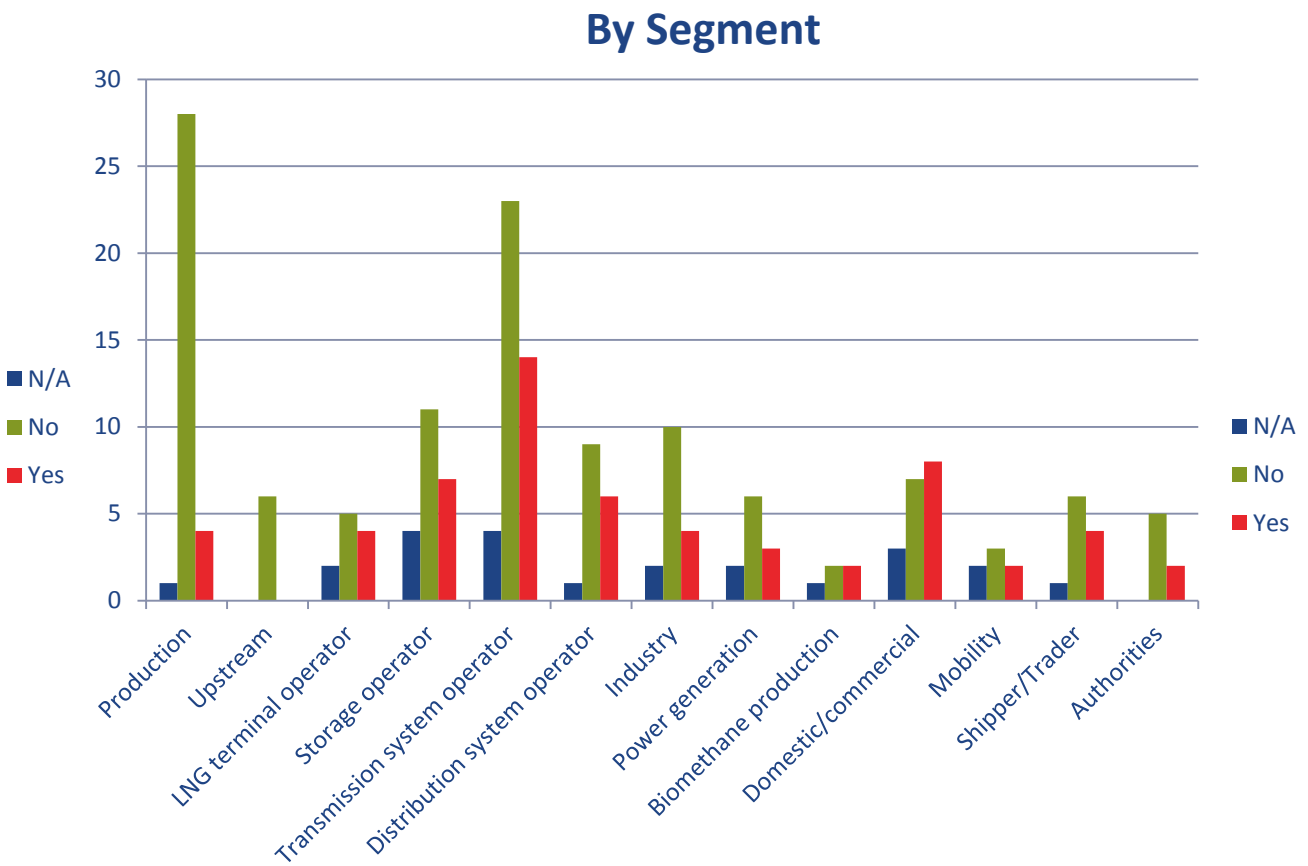
Segment representation per country



Section 1: General Questions

6. Are you aware of any cross-border trade barrier related to gas quality at interconnection points or EU import points?





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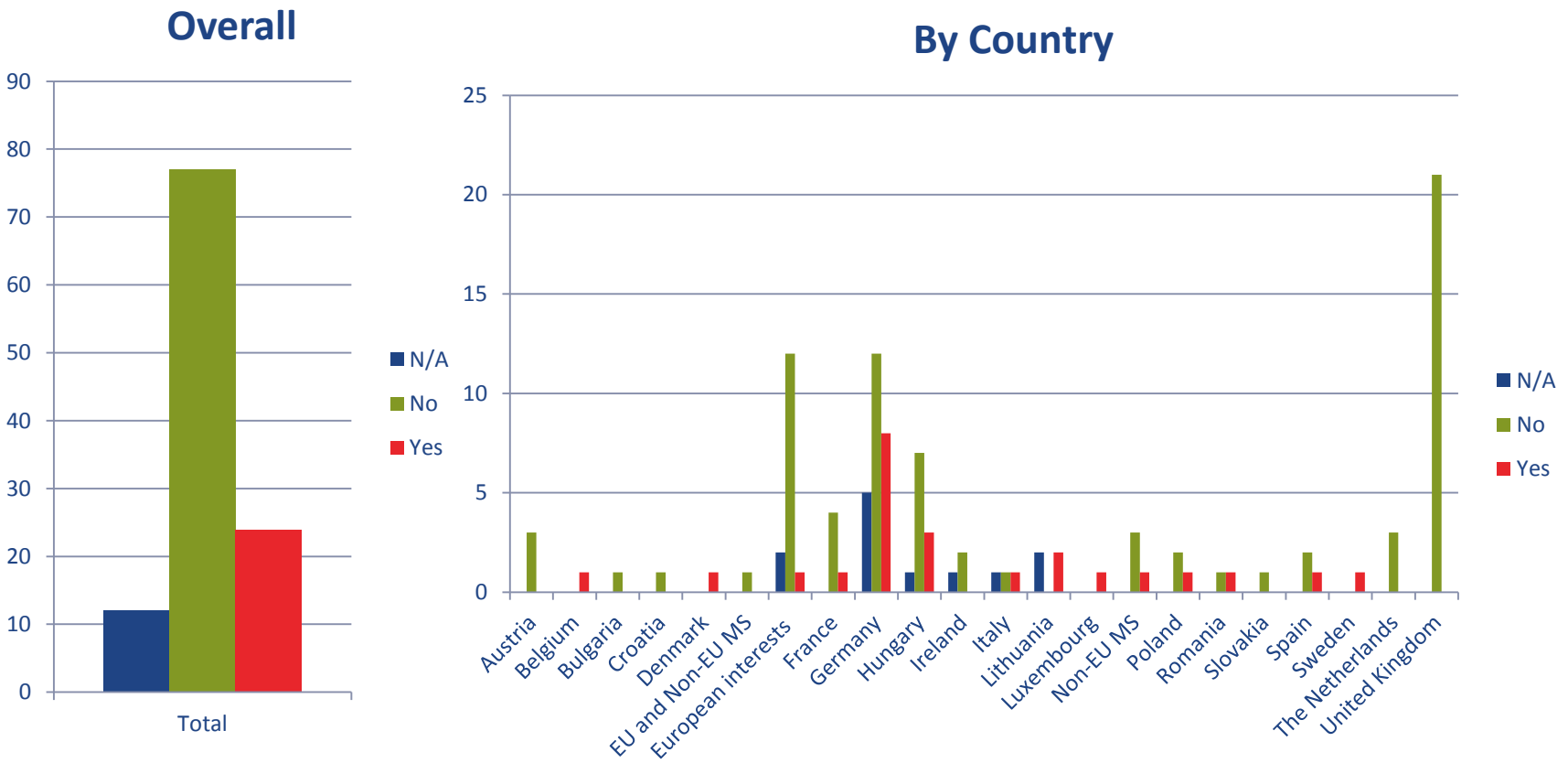

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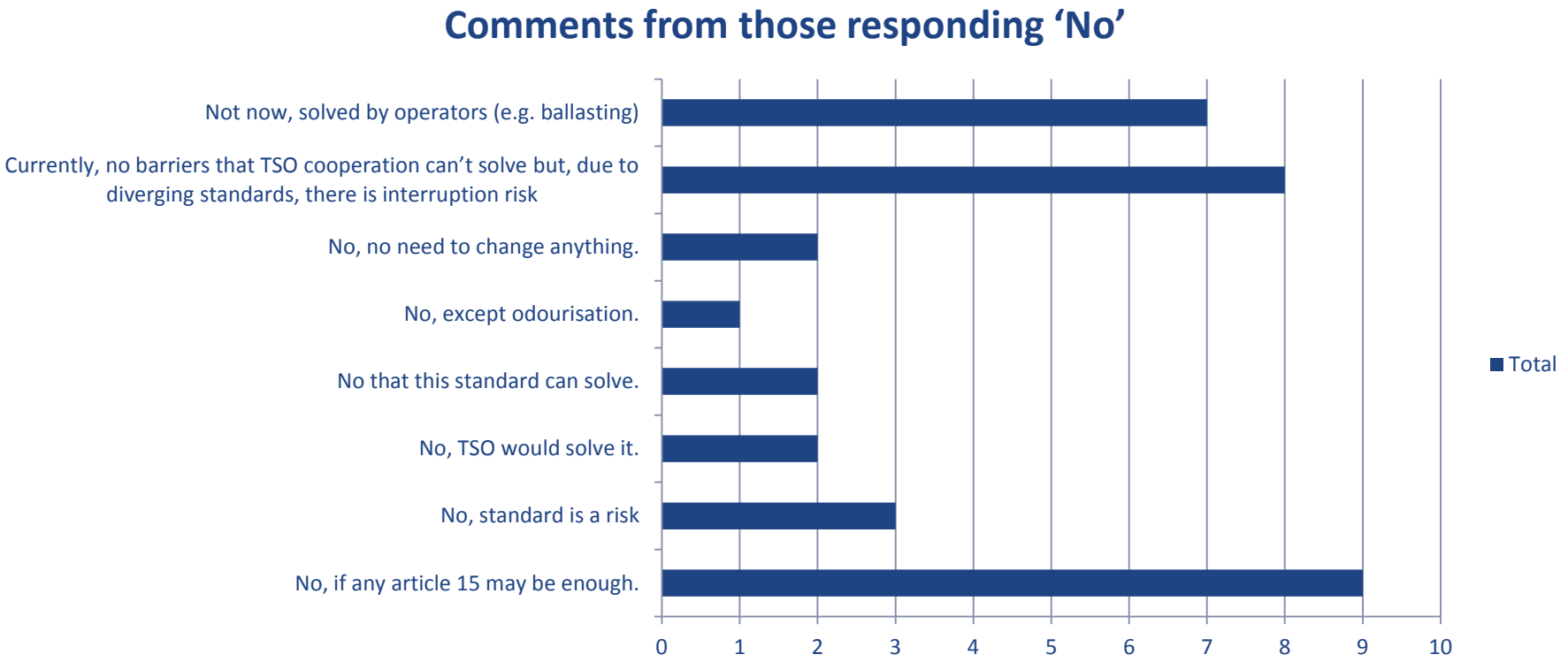
6. Are you aware of any cross-border trade barrier related to gas quality at interconnection points or EU import points? What parameters are involved?



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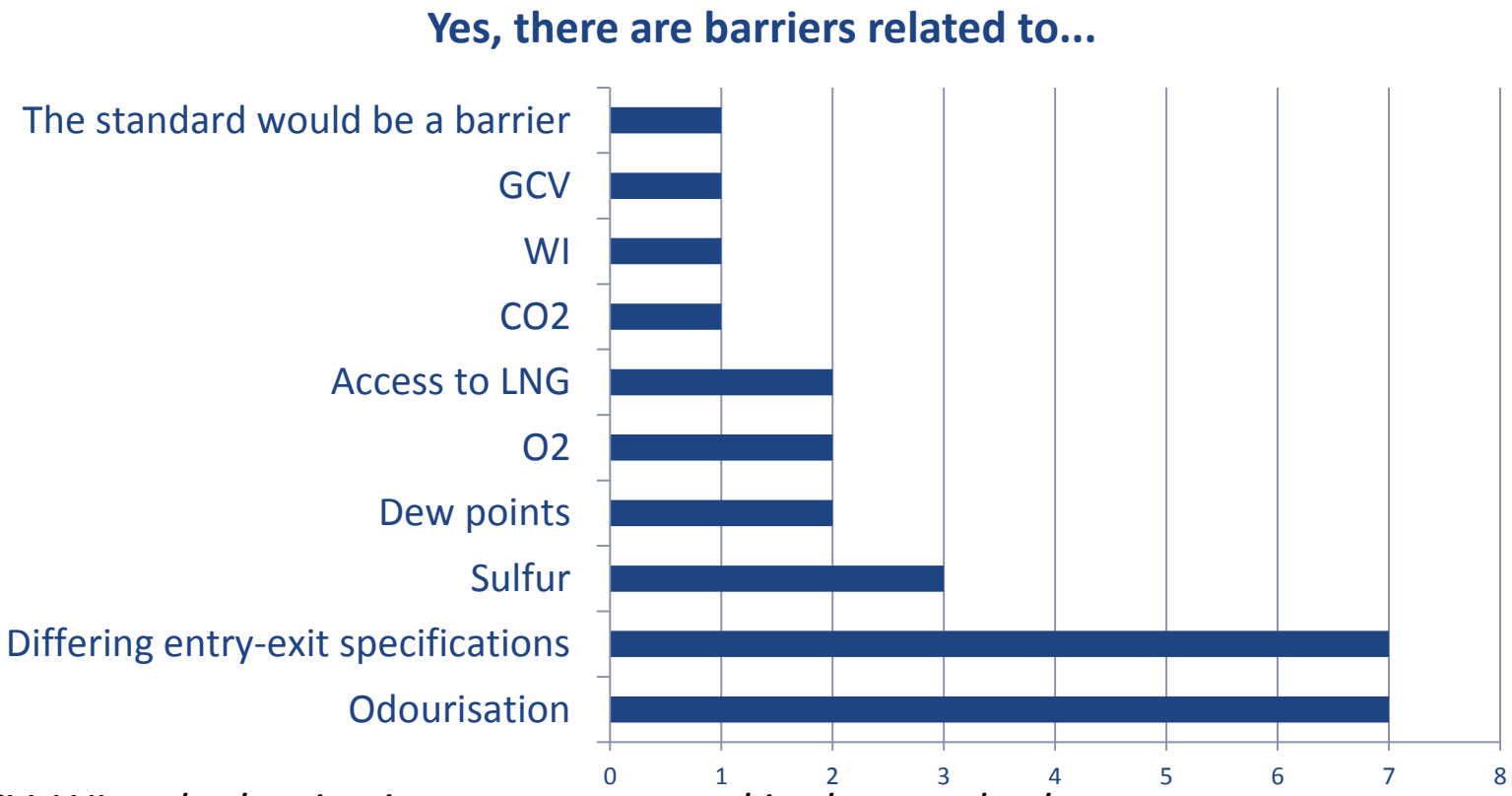
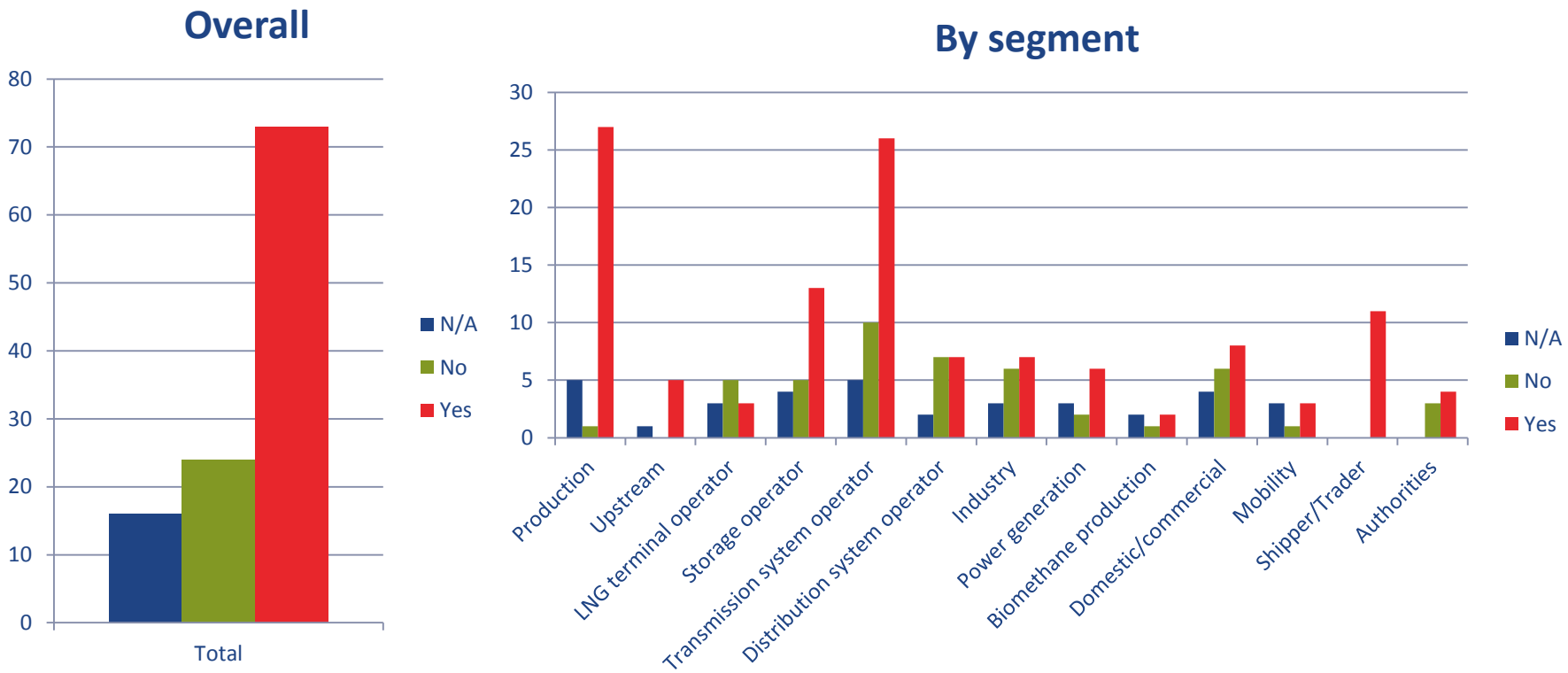


**GCV, WI and odourisation are not covered in the standard*

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard?



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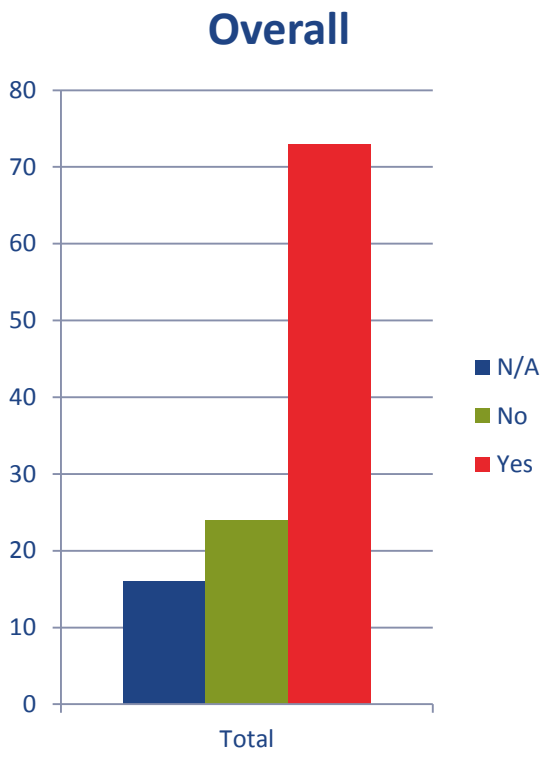

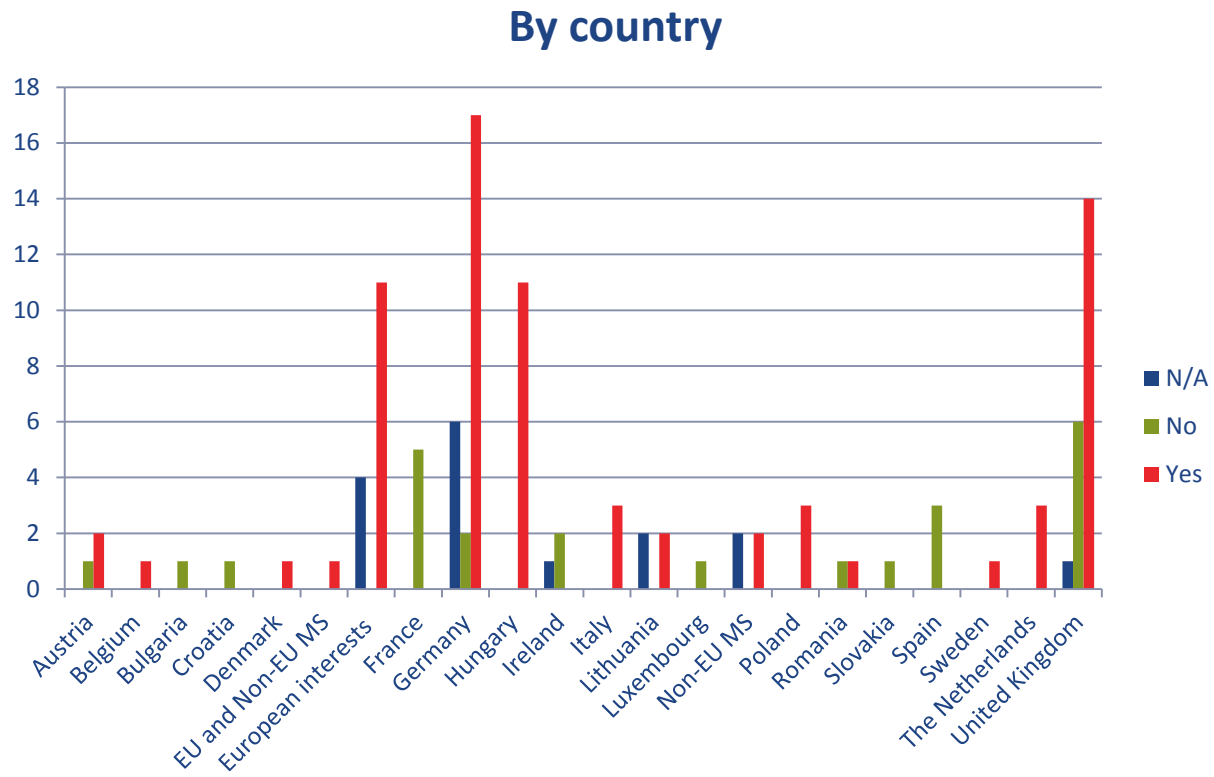

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by Member State*

> **Austria**

- Water dew point (-8° C at 70 bar), more stringent than Austrian regulation (-8° C at 40 bar) require investments in gas drying systems for storage outputs
- Carbon dioxide (2,5%) is higher than regulation in Austria (2%) leading to corrosion in storages
- Sulfur content (20 mg/m3) is higher than regulation in Austria (10 mg/m3) leading to corrosion in storages, building of sulfuric acid and increasing SO2 emissions

> **Belgium**

- Total sulfur requirement may impact EU import points
- L-gas shall be specifically excluded
- In case of flow changes storage output may not meet the 0,001% requirement
- A-deviations undermine the use of the standard as a tool to remove barriers

Section 1: General Questions

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> **Denmark**

- MN and O2 requirements may limit North Sea production and biomethane injection and hence security of supply

> **Germany**

- Mobility: German regulations requires lower total sulfur (6/8 mg/m³) content than the CEN norm when the gas is delivered to the end consumer.
- Biogas: Rules referred in German law allow a higher Oxygen and sulfur content than the CEN norm for biogas injected to the natural gas network.

> **Hungary**

- Production:
  - Hungarian domestic gas production shut-in
  - Upstream application reduces system flexibility to co-mingle or blend
  - TSOs' responsibilities on gas quality can't be defined in the INT NC
- Storage facilities are compliant with Hungarian legislation, less strict than CEN as reported in A-deviation

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by Member State*

- **Ireland**
  - New indigenous sources may be impacted
- **Italy**
  - Transport: A-deviations and difference in odourisation practices in transport may hamper transit of gas even between EN 16726 compliant countries
  - Distribution: If the standard is revised to include sulfur from odorants, there might be a conflict with Italian regulation on odourisation. Big variations of gas quality may affect invoicing
- **Lithuania**
  - Industry: Gas composition as feedstock not specified in the standard (LT regulation specifies 90% minimum Methane)
  - End users: Wobbe Index very important for users but not included
  - Leave space to MS to set requirements on WI and composition

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by Member State*

- **The Netherlands**
  - Conflicting requirements as documented in A-deviation (Total sulfur, O2, CO2, dew points
  - LNG:
    - Relative density requirement sets a cap of 55,3 MJ/m3(n) for WI, excluding most of the world's LNG sources
    - The sulfur value might also be a barrier for LNG supplies
  - Production: see comments by segment
- **Poland**
  - Production: regulation in Poland is less stringent for sulfur (40 mg/m3), water dew point (3.7 to 5 °C at 5.5 Mpa) and oxygen. See comments by segment
- **Spain**
  - Shippers**:** gas quality parameters included in gas long term contracts can exceed the range contemplated in the CEN Standard EN 16726

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by Member State*

> **Sweden**

- Biogas in Sweden transmission network has higher oxygen content than allowed in the standard
- Methane number requirement will limit security of supply

> **United Kingdom (I)**

- It is anticipated the lower CO2 and oxygen limits would apply in the UK due to underground storage facilities being classed a sensitive installations
- Impacts on security of supply, electricity market, gas market liquidity, competition, emissions (gas treatment) and costs to customers
- Security of supply:
  - If, during calendar year 2015, GB supplies were to have been restricted to:
    - 2.5% CO2 content; and
    - 0.001% O2 content
  - Then approximately 20% of UK supply would have been refused entry to the NTS
  - O2 (0.001%) and sulfur (total and H2S) requirements may be a barrier for US LNG

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by Member State*

> **United Kingdom (II)**

- Production:
  - CO2 (2,5%) and sulfur (20 mg/m3) impair Central North Sea production
  - Development of future indigenous sources including shale gas also at risk
  - The flexibility of the current framework (Gas Safety Regulations + specific Network Entry Agreements) would be lost if the standard is applied strictly. Some NEAs already allow 4% CO2
- Market:
  - If gas processing were implemented to fulfil the standard, costs will increase to costumers and electricity generators
  - Reduced efficiency in cross border trade arbitrage between UK an the continent
- Commercial segment: If H2 becomes normative, performance of co-generation and gas turbines will be affected
- Manufacturers: calorific value is not specified

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by non-EU countries*

> **Norway**

- If the flexibility to extend the CO2 threshold to 4 % was removed, this would be particularly impacting for the Norwegian production that has a CO2 content above 2,5 % that would become off-spec and at risk of being rejected by UK
- A rigid application of the standard will have an adverse effect on deliveries through the upstream pipeline network to the extent that the present ability to handle gas quality issues operationally in a dialogue with TSOs (as is the case today) will be restricted unnecessarily

> **Russia**

- Obligatory application of the CEN gas quality Standard leads to the gas flow interruption risks since it is difficult to guarantee complete oxygen exclusion, for example as a result of major maintenance works on the pipelines of big diameter and significant length

Section 1: General Questions

7. Is there any segment, region or circumstance whose specific conditions don't allow the application of the standard? Why? Is that related to any given parameter of the ones included in the standard? – *Summary of comments by segment*

> **Production**

- Lack of good quality historic data makes it difficult to assess impact
- Production of gas that does not meet the CEN standard could be shut-in
  - Potentially ,20% UK supply rejected (CO_2>2,5%, O_2>0,001%)
  - Loss of development of future indigenous conventional and non-conventional sources
  - Sulfur and O_2 limits could act as a deterrent to LNG supplies, in particular from the US
- Application of the standard could restrict the flow of gas across **interconnections**
- No legal basis for EC in third package to set rules on gas quality
- Gas quality standards are important for the end use. Upstream application reduces the flexibility of the system. Short-term variation need to be solved locally
- TSOs' responsibilities on gas quality not defined in EU legislation. It can't be done simply by amending the INT NC

Section 1: General Questions

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> **Transmission system operators**
  - The extent of change required to contractual and operational arrangements, with associated costs, could be extensive, dependent upon how the standard is applied.
  - More details can be found in summaries by country

> **Traders**
  - Application of the CEN standards at EU import entry points will represent a challenge to gas producers
  - Also the potential inclusion of a narrow WI range would cause LNG sources to be refused in entry points which as of today are being received without problems

> **Domestic/commercial users**
  - A-deviations do not allow an effective application of the standard

Section 1: General Questions

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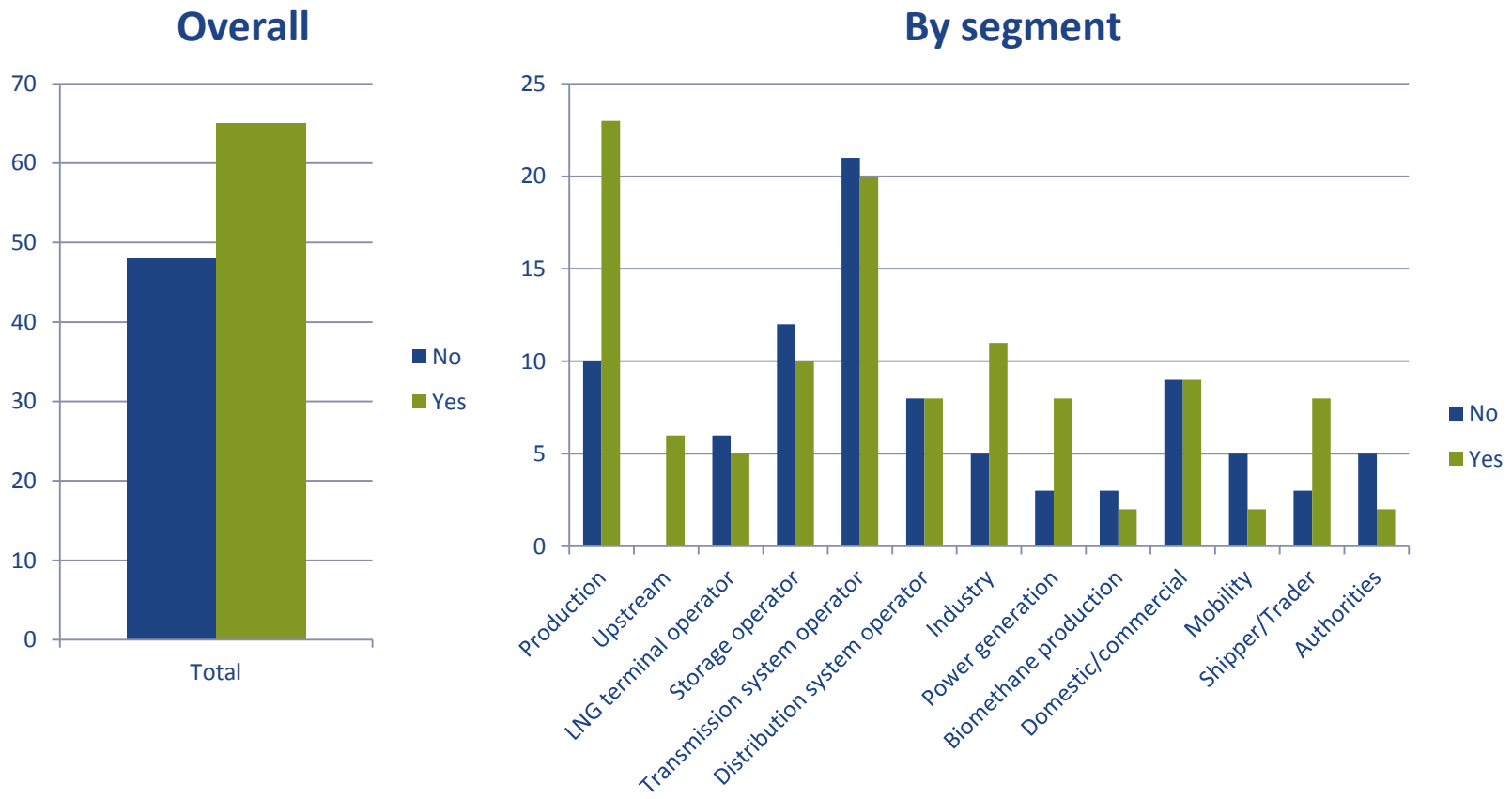
> **Industrial end users**
  - No WI (nor its speed of variation) means safety and efficiency of end use of gas not covered
  - Gas composition is very important is gas is used as feedstock. This is not specified in the standard

> **Engine manufacturers**
  - The current standard allows a Wobbe Index range between 46.6 and 54 MJ/m3, via the values given for the relative density d and the Methane Number.
  - Restrictions have to be put on the local range in WI, the speed of change and plug flow has to be avoided
  - Further, the wide WI range disturbs an accurate determination of the energy flow by means of gas meters
  - The figures for sulfur show no ambitions for reducing emissions in the EU and corrosion and rapid catalyst deterioration

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified?



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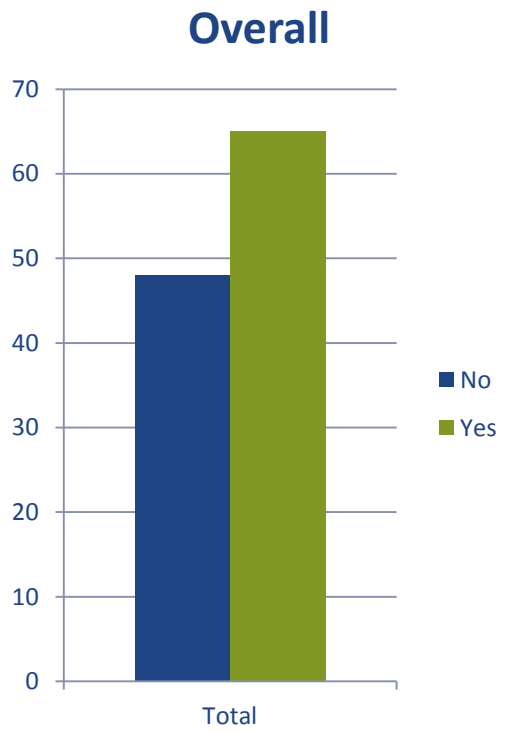

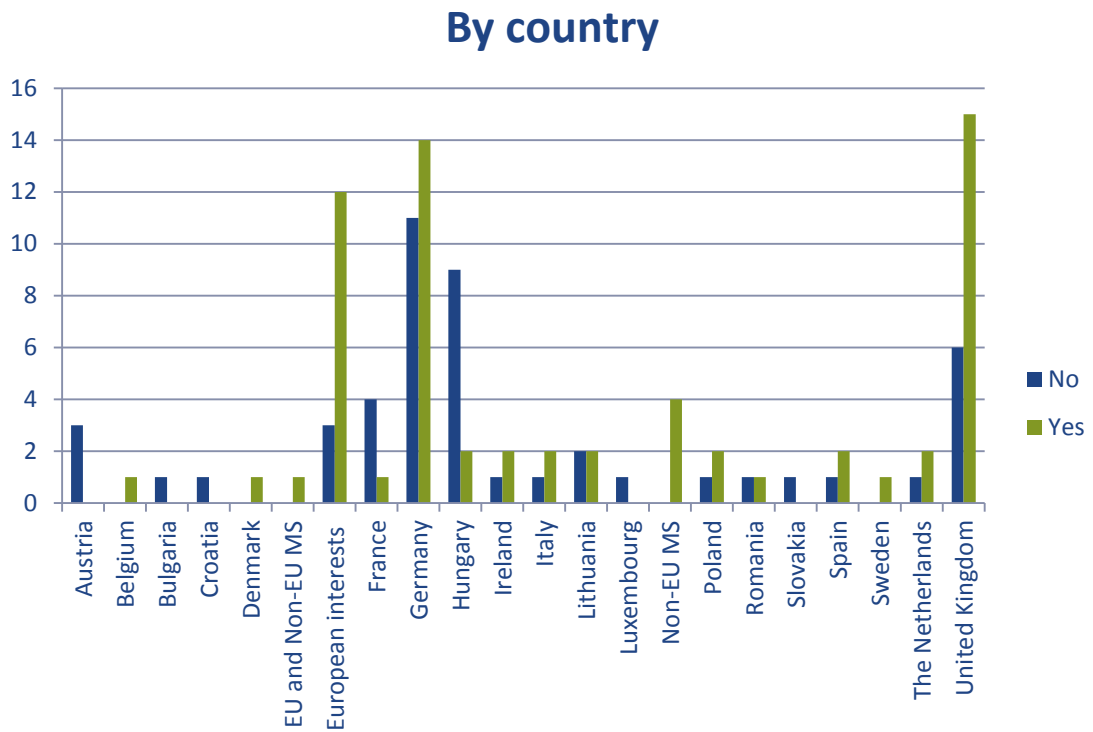

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by Member State*

- **Belgium**
  - For the parameters not covered in the standard, the amended INT NC should specify that any gas not meeting applicable national requirements will be automatically considered not compliant
- **Denmark**
  - The low limit on oxygen has not been technically justified and will be a major barrier for decarbonisation
  - Standard was developed to be voluntary as all CEN standards
- **France**
  - Other EU directives might have an impact on the application of this standard:
    - Reg EU/994/2010: Security of gas supplies
    - Dir 2009/28/EC: Energy from renewable sources
    - Dir 2014/94/EU: Infrastructure for alternative fuels
    - Dir 98/70//EC: Quality of petrol and diesel fuels
    - Dir 2009/142/EU: Gas appliances
    - Dir 2009/125/EC: Ecodesign

Section 1: General Questions

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> **Germany**

- A new scenario (1a) is proposed:
  - Similar to “whole chain”, with network users’ flanges side in blue
  - Injecting network user needs to ensure compliance of the gas with the CEN standard
  - TSO would need to ensure compliance of the gas with the CEN standard delivered to direct customers
  - Advantages:
    - Safe transmission from/to any segment.
    - Flexibility for national situations. Examples:
      - TSO may accept biogas injection as long as gas in the system remains within CEN standard values.
      - Fuel stations: if sulfur is above (6 or 8 mg/m3) DSO or connected station will be immediately informed by TSO

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by Member State*

> **Hungary**
- INT NC should be only modified if there is an agreement on WI
- Contracts between neighbour countries for transit supply
- Application on entry points from third countries should be delayed at least 3 years

> **Ireland**
- Standard didn't undergo a rigorous assessment as network codes did
- It would open a way for overriding national specifications contrary to the EU subsidiarity principle
- There is no issue to be solved by making the standard binding
- Compulsory application will limit flexibility to respond to market requirements
- Robust CBAs should be considered if cross-border trade is affected in a given region

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by Member State*

> **Italy**
  - Not all potential parameters defining the quality of gas are included in the standard
  - The sulfur limit must consider the total quantity regardless its origin (odorant or natural sources). Otherwise, limitations to cross-border flows may arise

> **Lithuania**
  - In case CEN standard becomes mandatory, it has to be made clear that national rules will still apply for Wobbe index and the content of methane

> **The Netherlands** (see Q7 summary)

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by Member State*

- **Poland**
  - Clarity on the objectives of this project is essential in ensure the work can be resolved in a timely outcome
  - Furthermore, Wobbe Index (W) must be reflected in the EN16726 standard, because W is the fundamental parameter for each part of gas value chain
- **Spain** (see Q7 summary)
- **Sweden**
  - The low limit on oxygen has not been technically justified and will be a major barrier for decarbonisation

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by Member State*

> **United Kingdom (I)**

- Objective or what is the problem to be solved is not clear
- A cost-benefit case has not been demonstrated
- MS competence overriding/EU subsidiarity principle compromised
- A standard binding by law will inhibit flexibility to adapt it to future market needs
- The proposed change will only increase uncertainty and deter investment
- No logical reason to change a system that has served the UK and Europe well
- Department of Trade and Industry determined gas quality specifications should not change until 2020 at the earliest
- It should be left to TSOs to determine what flexibility they have
- Introduction of incomplete standard undermines confidence in EU regulation
- The standard was developed as a voluntary one
- Its application would prevent the entrance of gas that was previously accepted without problems

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by Member State*

> **United Kingdom (II)**

- Gas quality monitoring equipment adequacy should be assessed
- Supply flexibility in gas deficit emergency may be reduced
- Consideration should be given to the objective of maximizing economic recovery from the UKCS, the economics of field developments, operating costs of offshore platform and onshore terminals and the timing of cessation of production from existing fields
- Impact on associated oil production
- This standard might become a barrier for decarbonisation with hydrogen
- European bodies should focus on the compatibility of gas quality across borders, not 'one-size-fits-all' harmonisation, and on removing any barriers to cross-border trade if they emerge
- ENTSOG should take into account:
  - Dir 2009/142/EU: relating to appliances burning gaseous fuels
  - Dir 2009/125/EC: Ecodesign
- See also summary of production sector

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by non-EU countries*

> **Norway**

- The application of the standard would prevent the entrance of gas that was previously accepted without problems
- The standard was developed as a voluntary one
- Objective of CEN standard is not clear
- No significant benefits for the market
- The need for implementation of the standard should be examined for in depth
- Article 15 should be assessed first

> **Russia**

- The process of analysis and summarizing of the public consultations shall be based on the clear and transparent procedure of the final position development

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by segment*

> **Production**

- The objective for making the CEN standards legally binding is not clear
- The binding application would not bring any significant benefits to the market but would significantly impact upstream production
- First there should be an assessment of the functioning of the existing and less prescriptive mechanism already provided by the Interoperability Network Code
- Additional policy issue that should be considered as they could be significant include:
  - security and flexibility of gas supply;
  - creating barriers to the economic development of future gas fields;
  - increasing the cost of gas supply;
  - emissions associated with additional gas processing

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by segment*

> **Infrastructure operators**

- If amended, the INT NC must specify what to do with parameters not contained in the standard;
- Since biomethane is above the O2 limit (10 ppm), full implementation will be a major barrier for decarbonisation. At the same time, oxygen may cause problems in storage facilities

> **Transmission system operators**

- From the question and answers document at the ENTSOG website
  - In case a binding reference to the standard was made in the future, national requirements on Wobbe Index should still be valid and enforced
  - Odourisation is considered a national safety issue and it is outside of CEN standard scope. Therefore, total sulfur content at the end user side will be influenced by different policies applicable on national grounds
- More details can be found in summaries by country

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by segment*

> **Distribution system operators**

- Clarity on the objectives of this project is essential in ensure the work can be resolved in a timely outcome.
- We are also aware of the following legislation, which Entsog should consider in terms of impact on this work:
  - Dir 2009/142/EU: relating to appliances burning gaseous fuels
  - Dir 2009/125/EC: Ecodesign
- During the Koln meeting, EC clearly said that they don't need the inclusion of DSOs into the Network Code

> **Traders**

- Capacity products don't contain quality conditions. If gas quality became likely to affect flows, adequacy of operational provisions in network access agreements and implications on balancing should be considered.

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by segment*

> **Industrial end users**

- Gas quality should be user lead
- If amended, INT NC should address provisions on what Wobbe Index requirements will apply
- Responsibilities and liabilities of actors should be defined, if not, gas quality at exit points should remain within typical values
- Different policies regarding exit point gas quality jeopardize competitiveness and will lead to discriminatory
- The responsibility for potential off-spec gas should not be shifted to the network users on basis of the adjusted NC INT

> **Power generation**

- Influence of gas quality variations in emissions compliance and efficiency of gas turbines
- Only the inclusion of WI will allow a serious and meaningful discussion on the INT NC amendment. Until then voluntary adoption should be the scenario.

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by segment*

> **Engine manufacturers**
  - TSOs should be obliged to treat the gas to deliver the common EU standard
  - EU standard should have common limits on sulfur and dew points and a limitation on local WI and rd width
  - TSOs should be allowed to sell residual gases such as propane

> **Domestic/commercial users**
  - As EN 16726 is not completed –no WI- the discussion on including the standard into the Interoperability Network code is redundant.

Section 1: General Questions

8. Is there any other policy issue you think should be considered in addition to the ones already identified? – *Summary of comments by segment*

> **National authorities**

- Without any further explanation the scope options leave much room for interpretations. This makes it difficult to form an opinion on the options. A supporting document with more detailed information on the options would have been helpful.
- *Specific remarks on national situations can be found in summaries by country*

> **Technical gas industry associations**

- A way should be drawn up how information about the gas quality travels along with the gas
- CEN standard was meant to be voluntary
- Oxygen level could be a barrier for decarbonisation

Section 2: Scenario definition

Policy 1. Scope

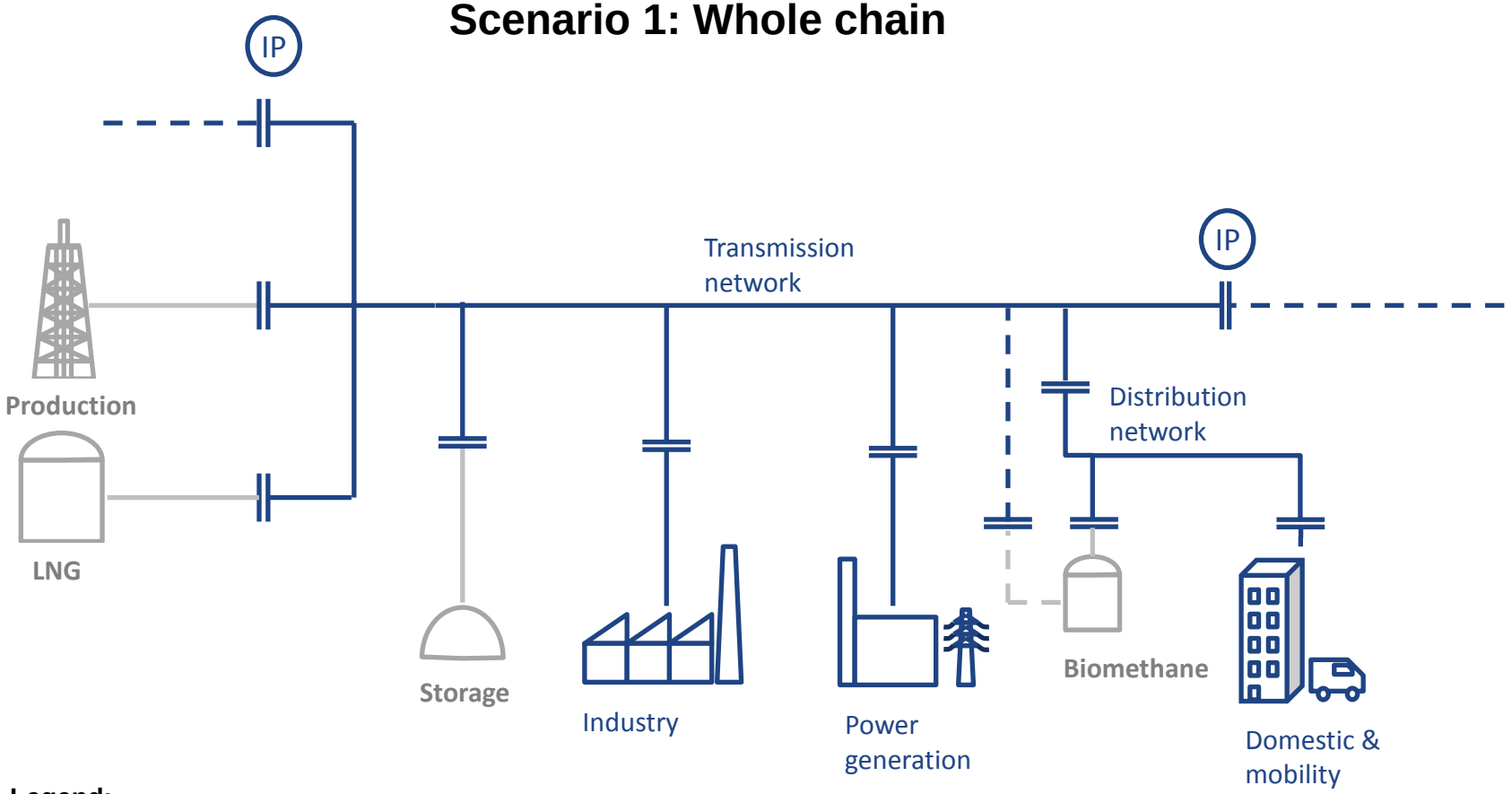
- Scope of application of EN16726:2015: *This European standard specifies gas quality characteristics, parameters and their limits, for gases classified as group H that are to be transmitted, injected into and from storages, distributed and utilised. This European standard does not cover gases conveyed on isolated networks*.*
- Scope of INT NC: *This Regulation shall apply at interconnection points*… But it also applies to transmission networks (Article 18) and to entry and exit points to third countries subject to NRAs' decision.
- Options considered:
  - **Whole chain:** same scope as EN16726. That starts at entry points
  - **Transmission networks only**
  - **At IPS only**: meaning connection points between two different TSOs and balancing zones
  - **National application** on a voluntary basis

Note: all options could allow regional exceptions, see policy issue 2.

*network where transmission, distribution and utilisation of gas are combined and which is physically unconnected to other networks (EN16726)

Section 2: Scenario definition

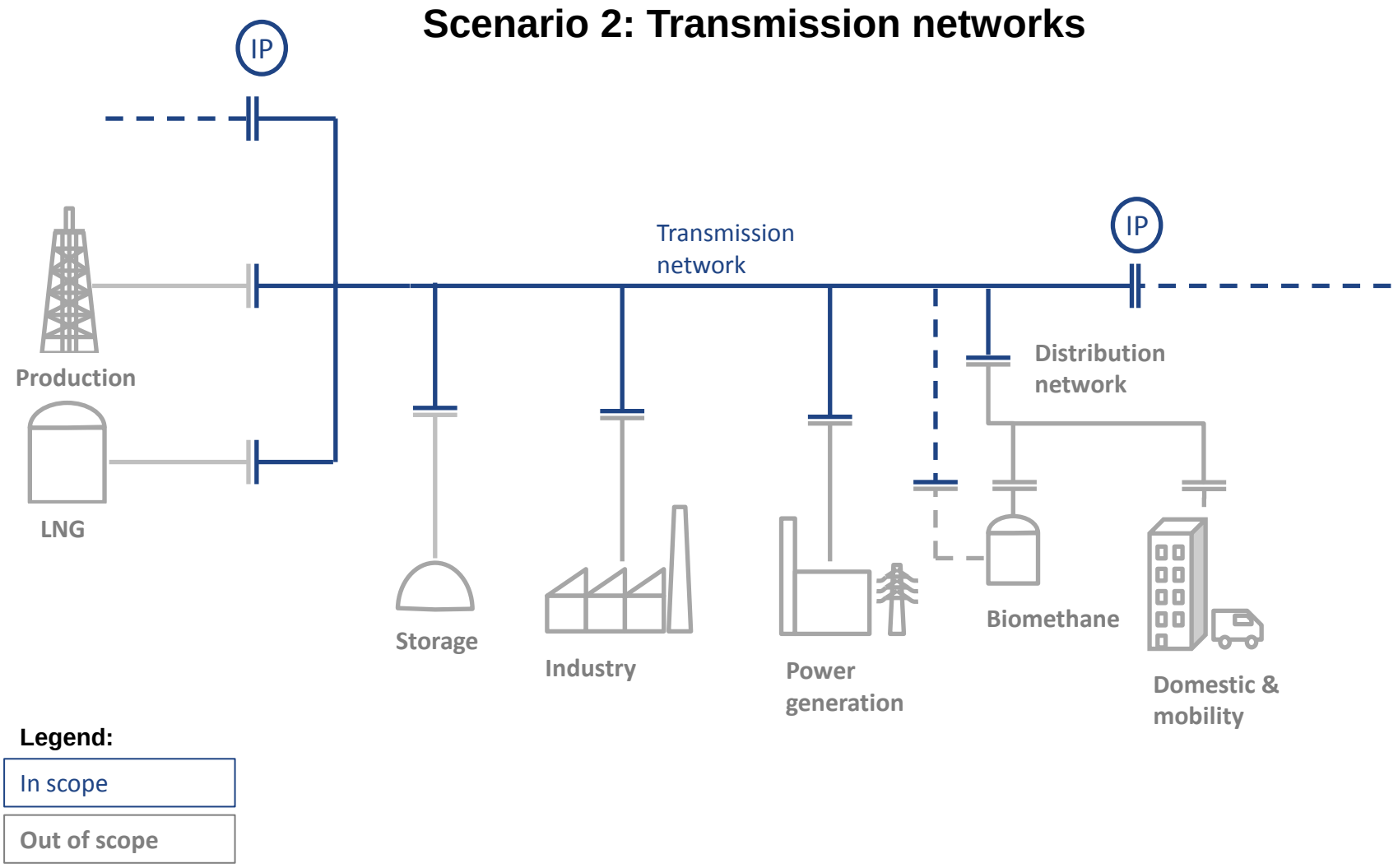
Scenario 1: Whole chain



Legend:

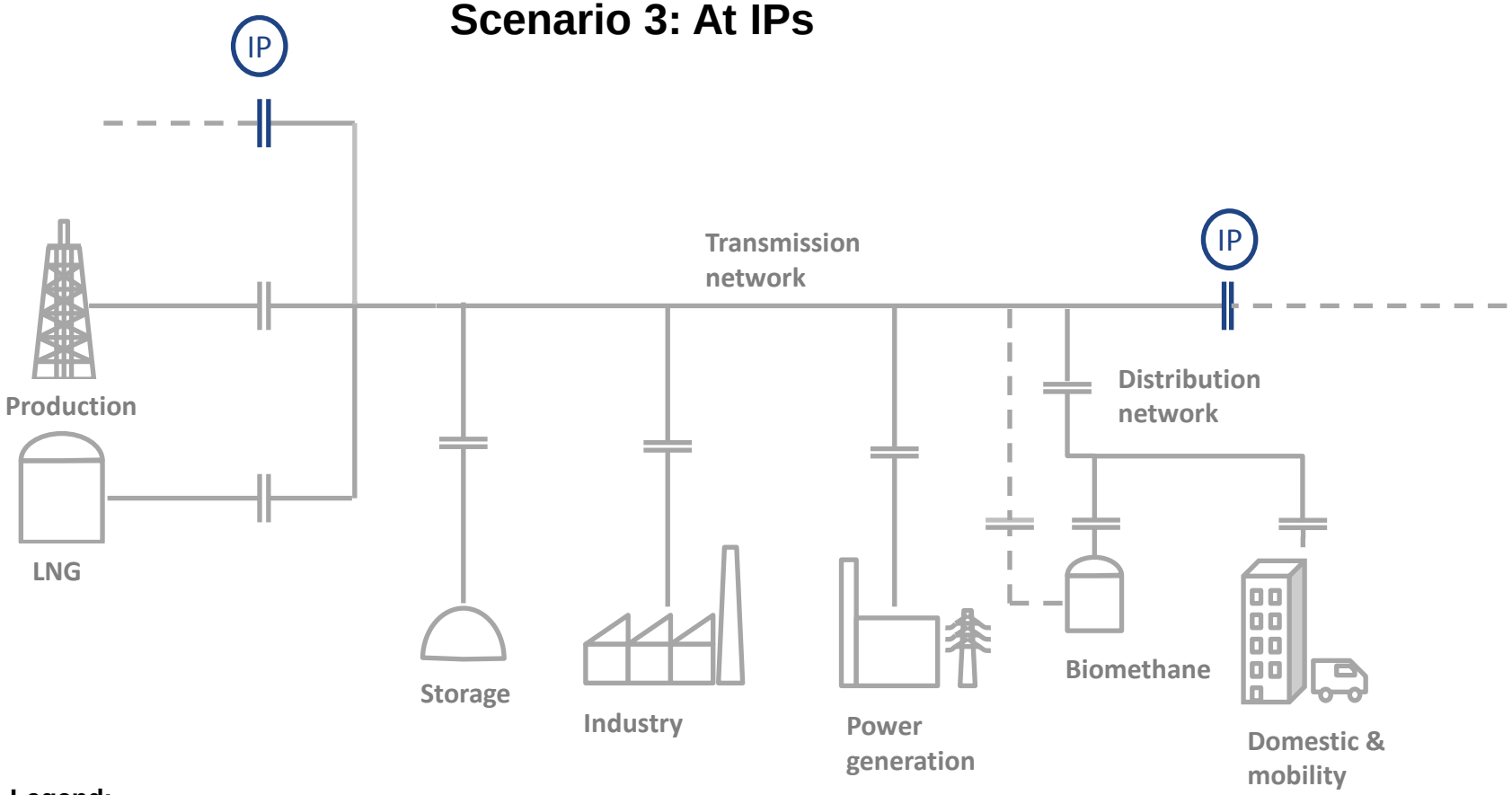
In scope
Out of scope

Section 2: Scenario definition



Section 2: Scenario definition

Scenario 3: At IPs



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In scope
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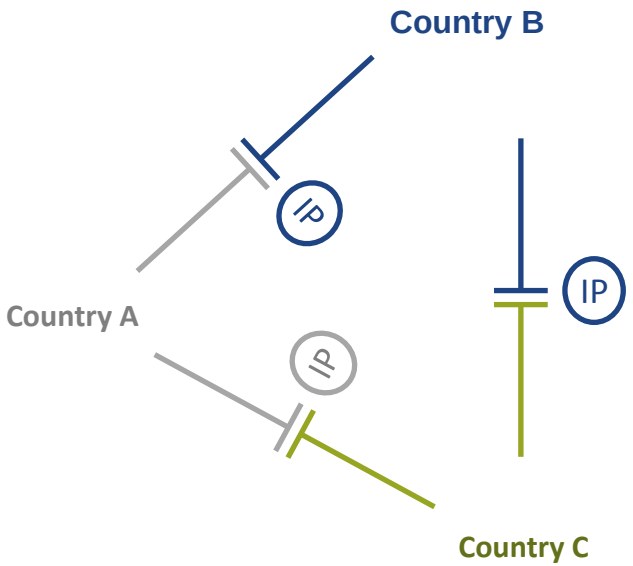
Section 2: Scenario definition

Scenario 4: Voluntary adoption

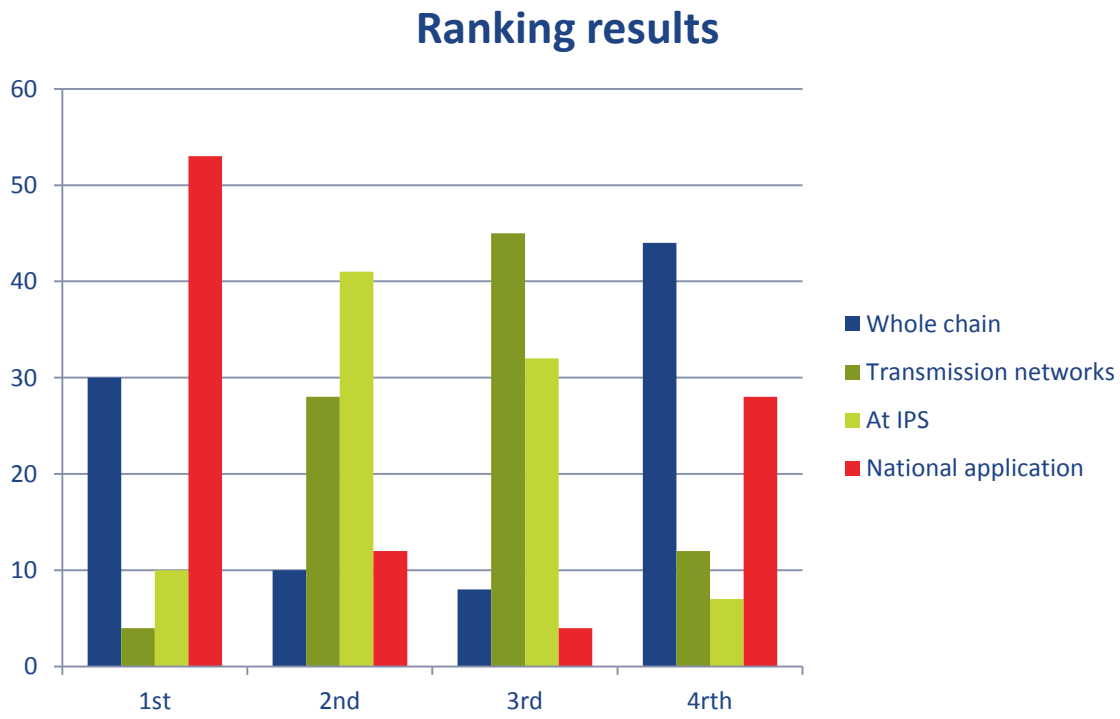


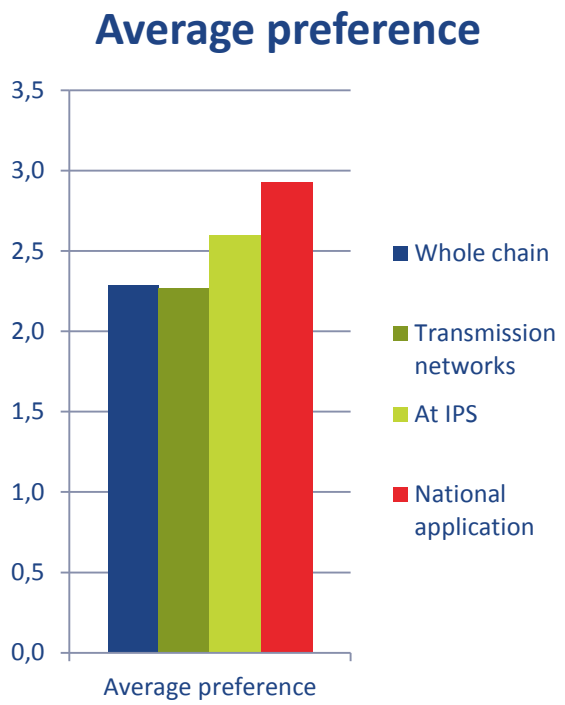
Legend:

EN 16726
National spec A
National spec C

Section 2: Scenario definition

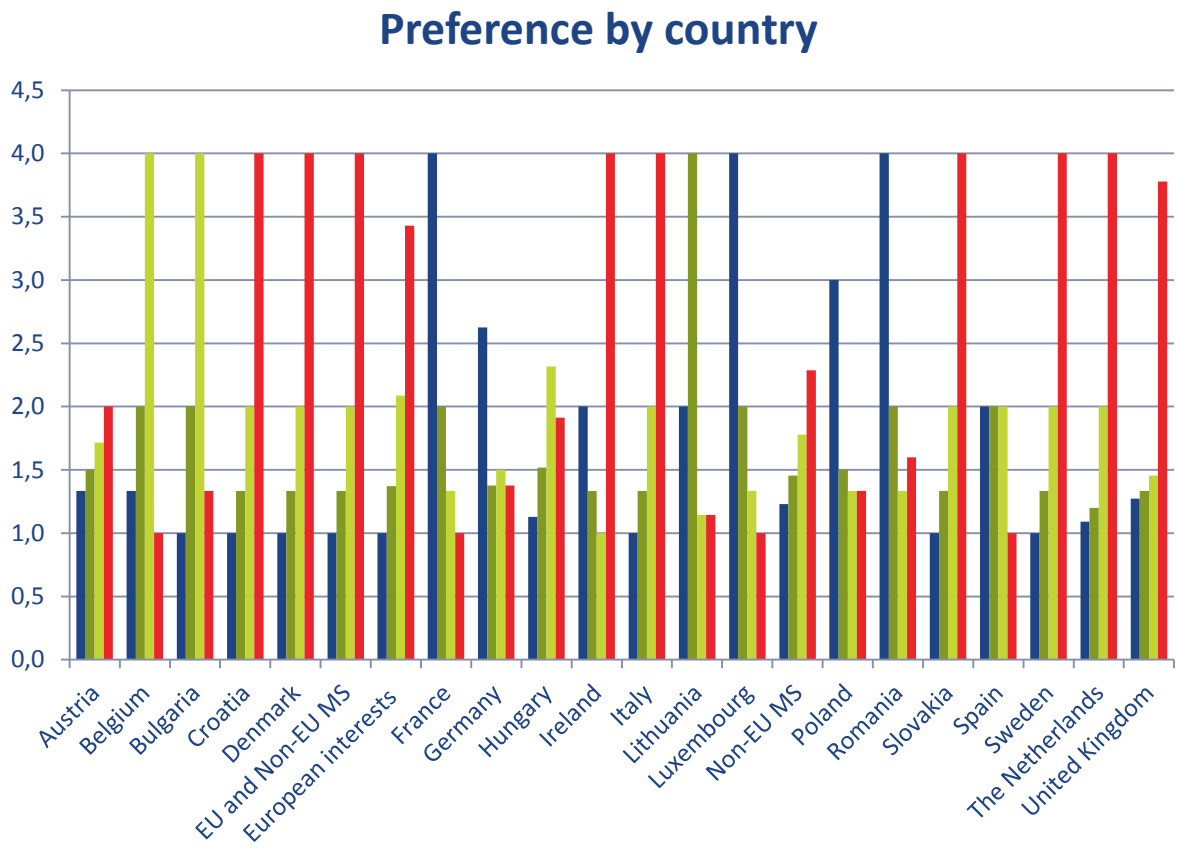
9. Rank the scenarios in order of preference

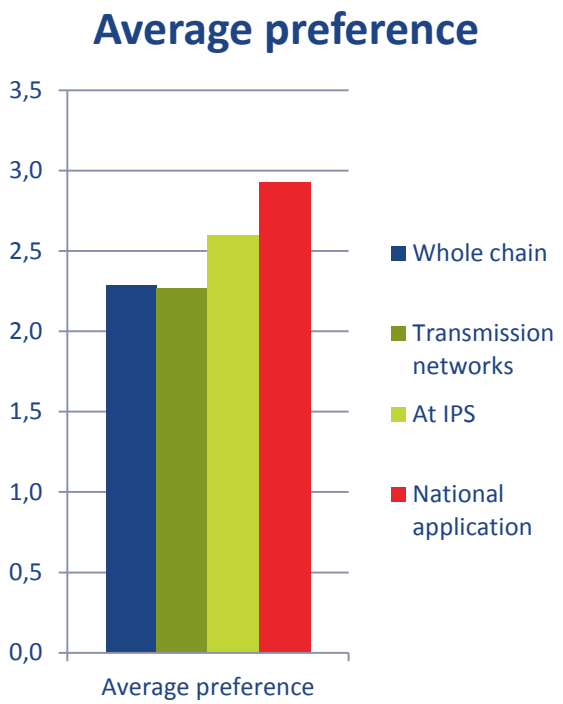




Section 2: Scenario definition

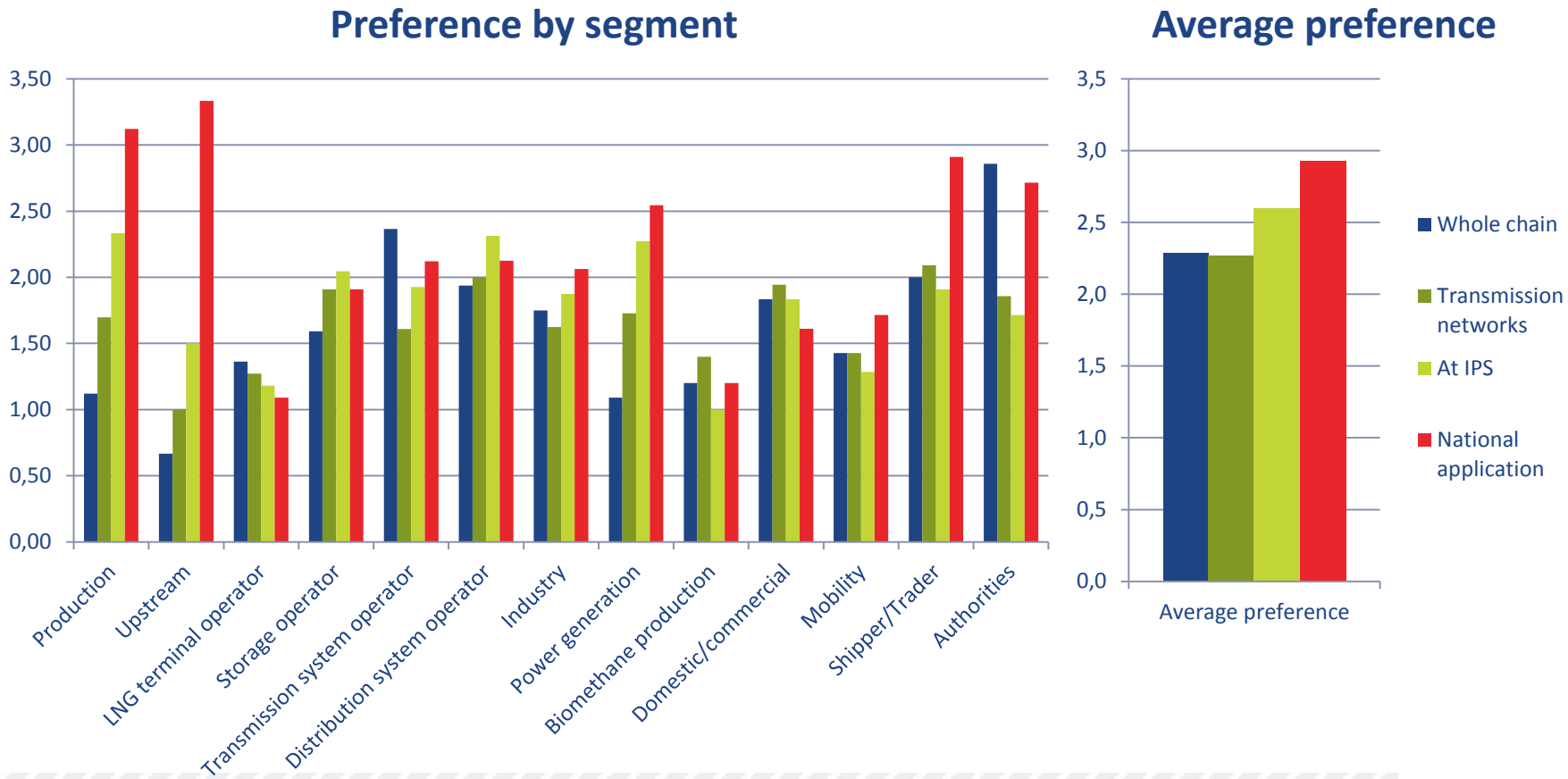
9. Rank the scenarios in order of preference





Section 2: Scenario definition

9. Rank the scenarios in order of preference



Section 2: Scenario definition

Policy issue 2. Implementation timing

> It means the time required for the concerned parties to comply with the amendment to the Interoperability Network Code.

> Options considered:

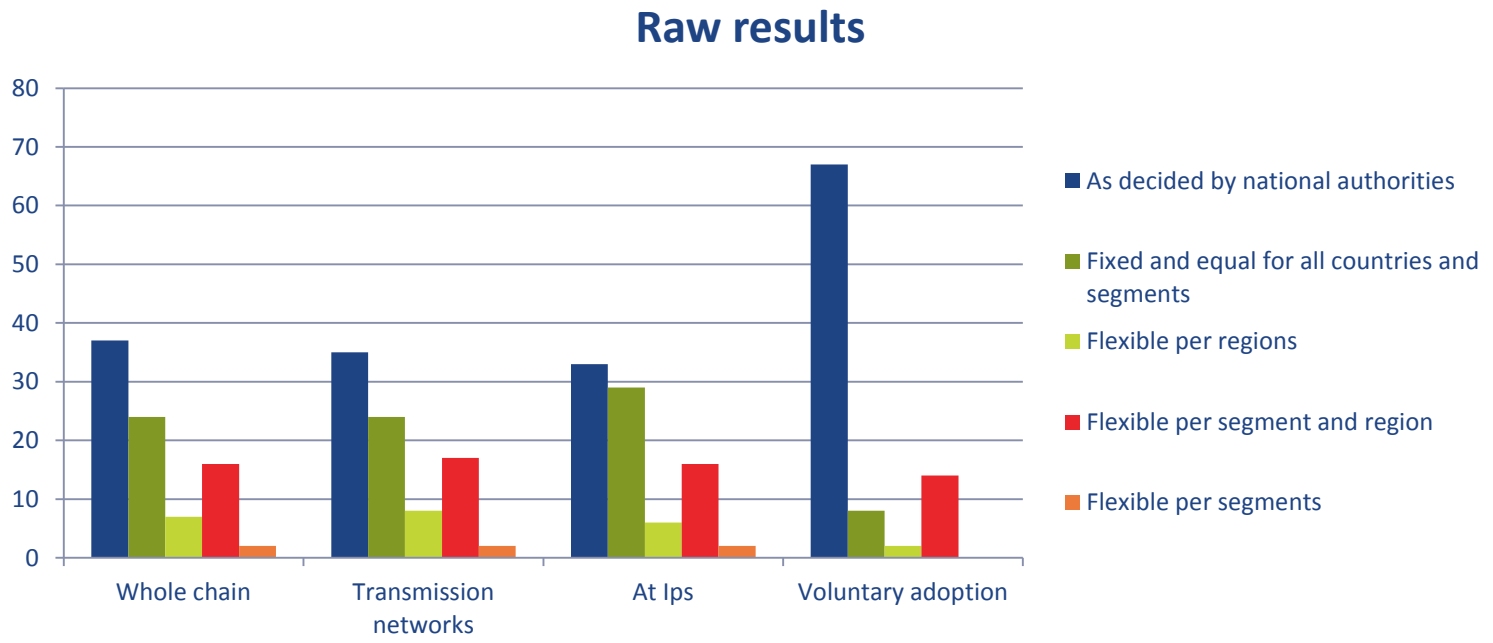
- **Fixed** and equal for all countries and segments
- **Flexible per segment[1] of the chain**
- **Flexible per regions[2]**
- **Flexible per segment and regions**
- As decided by **national authorities**

[1]Segment refers to different parts of the gas value chain: production, LNG terminals, transmission, distribution, storage, electricity generations, industrial consumption, domestic/commercial use, mobility, etc.

[2]A region could be any combination of European countries.

Section 2: Scenario definition

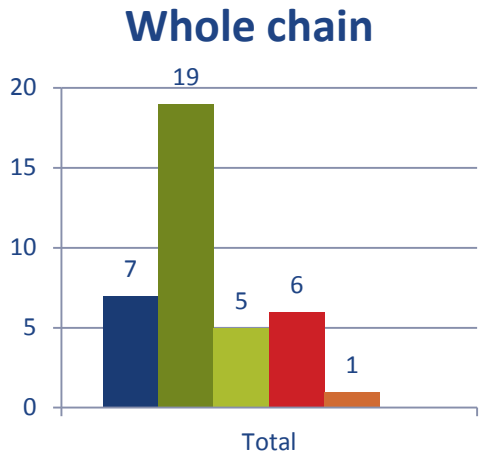
10. Regardless of your preference for a given scenario, what would be the most coherent choice in each case for policy issue 2 (implementation timing)?

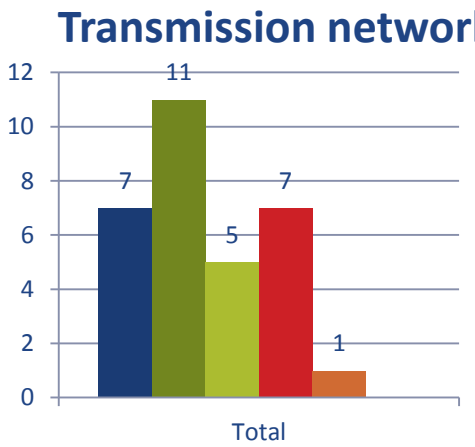


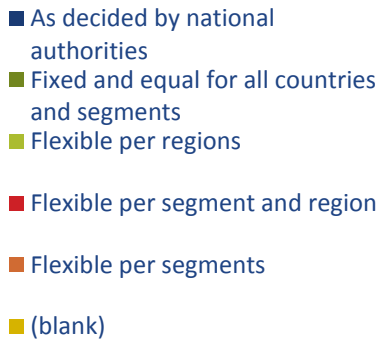
Results are largely influence by the respondent's preference for given scenarios. Next slides analyse the question by focus groups, which are formed by respondents selecting the respective scenario as option 1 or 2 in question 9

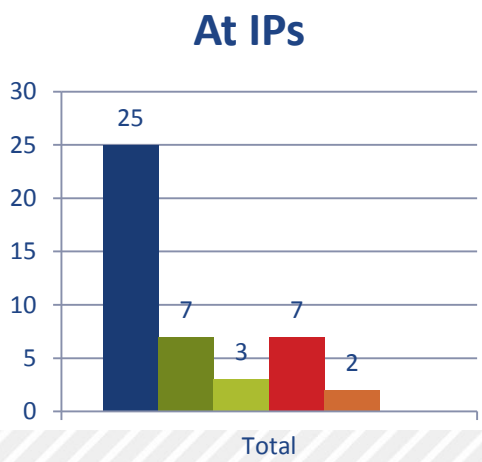
Section 2: Scenario definition

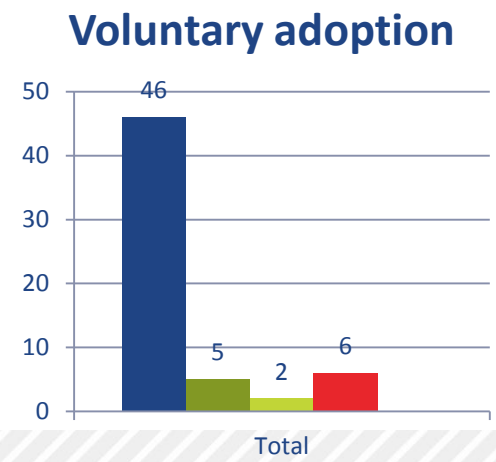
10. Regardless of your preference for a given scenario, what would be the most coherent choice in each case for policy issue 2 (implementation timing)?











Scenario	Suggested policy
Whole chain	Fixed and equal
Transmission networks	Flexible per regions?
At IPs	As decided by NAs
Voluntary adoption	As decided by NAs

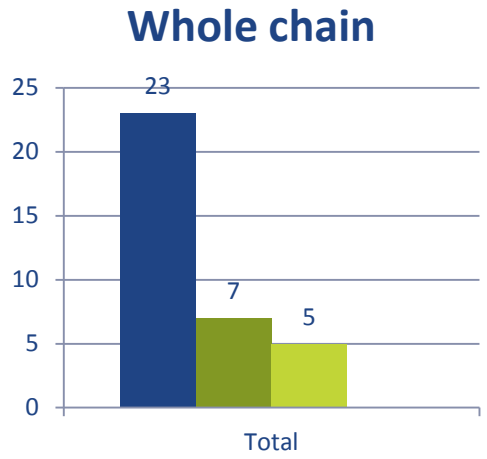
Section 2: Scenario definition

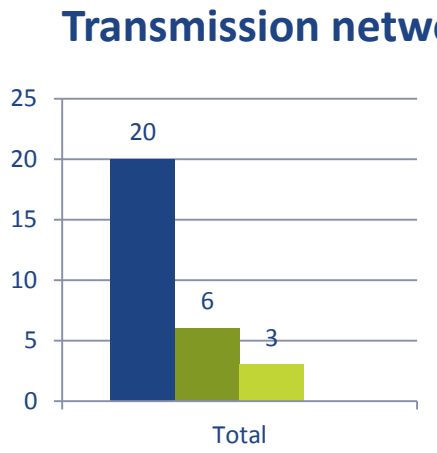
Policy issue 3. Interaction with INT NC

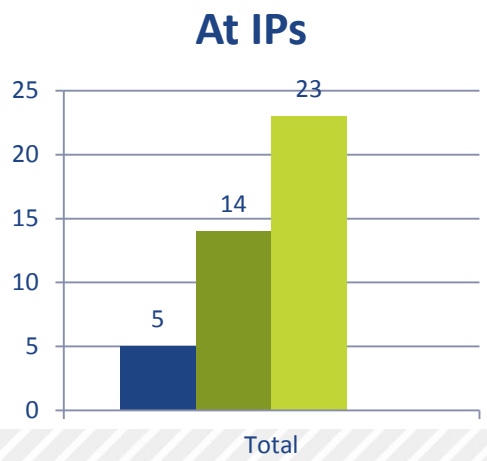
- The INT NC already provides mechanisms (Article 15) for the removal of gas quality related cross-border trade barriers that have been recognised by NRAs. In brief, the INT NC requires TSOs to carry out a joint cost benefit analysis and to submit a joint proposal to NRAs
- How should this process interact with the application of the CEN standard?
- Options considered:
  - INT NC mechanisms **don't apply** after transition period, except for parameters not covered in the standard
  - INT NC mechanisms are applied as **first option** when a barrier is found. If no agreement is reached, the CEN standard will be applied
  - INT NC mechanisms should be the **only solution** applied

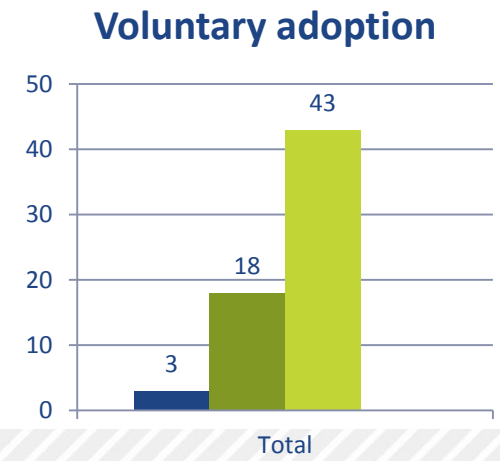
Section 2: Scenario definition

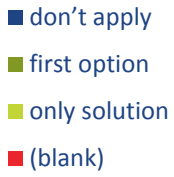
11. Regardless of your preference for a given scenario, what would be the most coherent choice in each case for policy issue 3 (Interaction with NC)?











Scenario	Suggested policy
Whole chain	Mechanisms in NC don't apply
Transmission networks	Mechanisms in NC don't apply
At IPs	Mechanisms in NC are only solution
Voluntary adoption	Mechanisms in NC are only solution

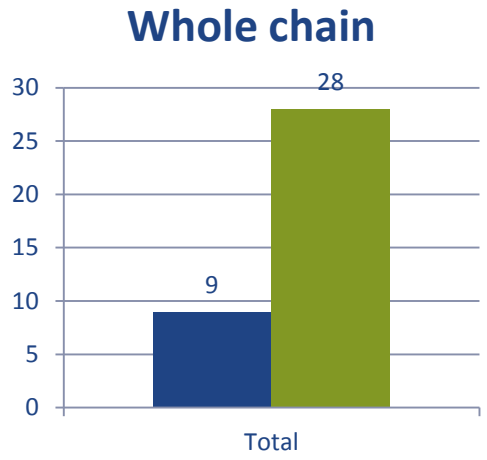
Section 2: Scenario definition

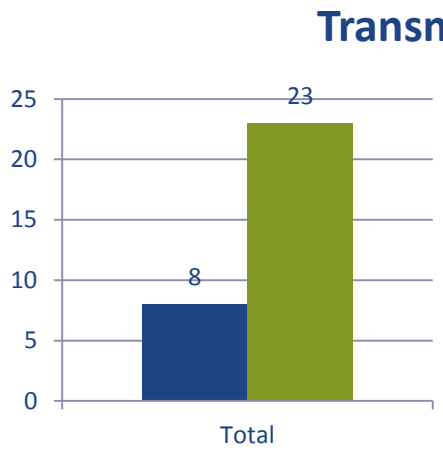
Policy issue 4. Allowance for off-spec gas

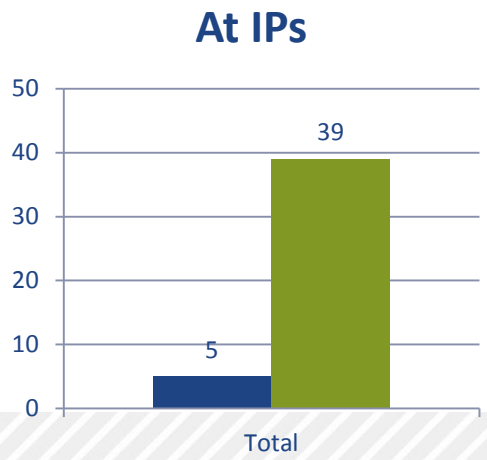
- Mandate M/400: *The Commission hereby requests CEN to draw up standards that define the minimum range to be accepted for gas quality parameters for H-gas*. […] *The goal is to define standards that are as wide as possible within reasonable costs"*
- A first aspect of this issue is whether TSOs (or DSOs for gas injected directly to distribution networks) can refuse to accept gas that is within the limits of the standard
- Options considered:
  - Gas meeting the standard **shall be accepted** by infrastructure operators
  - Gas meeting the standard **may be refused** by infrastructure operators if national legislation sets stricter limits for the parameters contained in the standard
- A second aspect is whether infrastructure operators can accept gas that is outside the standard
- Options considered:
  - Infrastructure operators **can't accept gas outside** the standard
  - Infrastructure operators **may agree less strict limits** than those of the standard

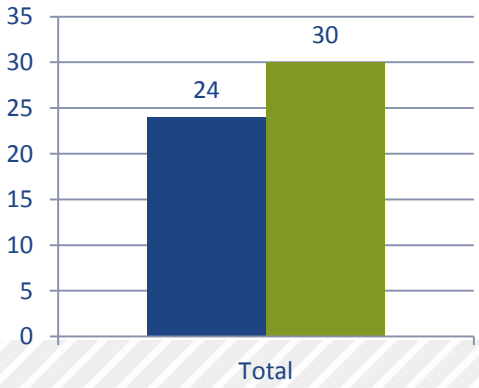
Section 2: Scenario definition

12. Regardless of your preference for a given scenario, what would be the most coherent choice in each case for policy issue 4a (Allowance for off-spec gas)?









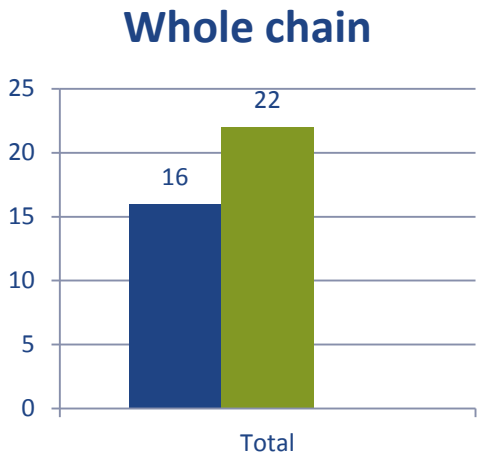
may be refused

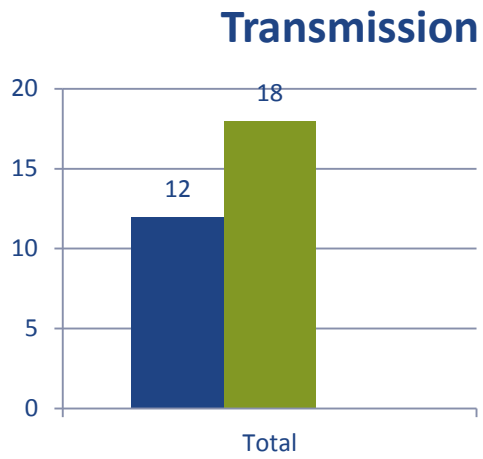
shall be accepted

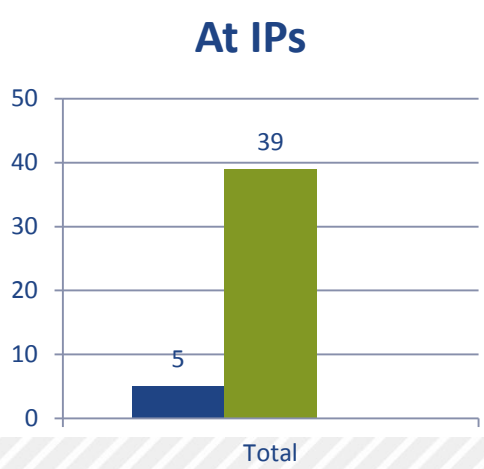
Scenario	Suggested policy
Whole chain	Gas meeting the standard shall be accepted
Transmission networks	Gas meeting the standard shall be accepted
At IPs	Gas meeting the standard shall be accepted
Voluntary adoption	?

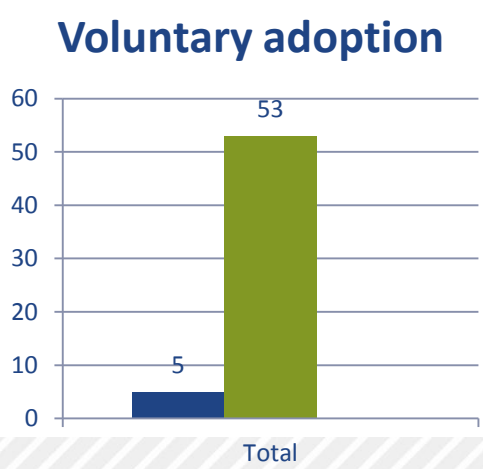
Section 2: Scenario definition

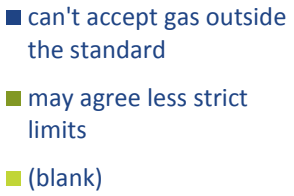
13. Regardless of your preference for a given scenario, what would be the most coherent choice in each case for policy issue 4b (Allowance for off-spec gas)?











Scenario	Suggested policy
Whole chain	Operators may agree less strict limits
Transmission networks	Operators may agree less strict limits
At IPs	Operators may agree less strict limits
Voluntary adoption	Operators may agree less strict limits

Section 2: Scenario definition

Policy issue 5. A-deviations (conflicts with national legislation)

- A-Deviations inform on conflicts between national legislation and European standards
- EN 16726 already includes A-deviations from several Member States. In addition, A-deviations can also be requested after publication
- Adoption of standards is voluntary. When there is an EU harmonisation legislation enforcing the standard, it is not clear whether national legislations should be amended to eliminate A-deviations
- Complementary questions:
  - Are there any national constraints caused by national legislation/ regulation?
  - Are there stricter legal/regulatory requirements than given in EN 16726:2015 (A-Deviation)? For which parameters?
  - Is an A-Deviation documented in EN 16726:2015?
  - Are there less strict legal/regulatory requirements than given in EN 16726:2015 (no A-Deviation)? For which parameters?
  - Are there any other legal/regulatory constraints? Please describe
- Options considered:
  - A-deviations should be **withdrawn** after transition phase (implementation timing)
  - A-deviations should be **retained** unless otherwise decided by competent authority

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **Austria**

- Stricter requirements for:
  - Carbon dioxide: Actual valid in Austria ÖVGW G31 2% CO2, at the EN 16726 2,5% CO2 -)
  - (Total sulfur?) Actual valid in Austria ÖVGW G31 - 10 mg/m3, at the EN 16726 - 20 mg/m3**.**
- No A-deviation documented in EN16726
- Less stricter limits in place for: H_2S, COS; hydrocarbon and water dew points; O_2.

> **Belgium**

- No A-deviation documented in EN16726
- Less strict requirements:
  - H2S (inclusive COS) : 6,5 mg/m³ (0 °C)
  - Total sulfur: 150 mg/m³ (0 °C)
- Other requirements:
  - GCVmin : 34,58 MJ/m³ (25 °C,0 °C) - GCV max : 46,06 MJ/m³ (25 °C,0 °C)
  - WImin : 49,13 MJ/m³ (25 °C,0 °C) - WImax : 56,82 MJ/m³ (25 °C,0 °C)

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **Croatia**
  - Stricter requirements for: Total sulfur without odorant; Nitrogen; Wobbe Index; Lower/Higher Heating value
  - An A-deviation is documented (requested?) in EN16726
  - Less strict requirements for: CO_2, O_2

> **Denmark**
  - Stricter requirements for: O2 in distribution grid are 0.5% where EN 16726:2015 has the limit 1%
  - An A-deviation has been approved by TC-234 after publication of the standard.
  - Less strict requirements for:
    - O2: 0.5 %-mole for biomethane injection. This value contradicts with the limit stated in the EN 16726 for grids with sensitive consumers (0.001%)
    - Methane Number: In the Danish gas legislation there is no limit of the methane number for the gas. Legislation requires cooperation between sensitive customer and supplier

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **France**

- No A-deviation is documented
- Less strict requirements for H2S, water dew point, total sulfur
- Other issues: for security of supply a wide range of GCV is applied and for public safety reasons the whole gas network is odourised

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **Germany**

- Stricter requirements in German legislation:
  - allowed total sulfur content of natural gas for automotive fuels : 6/8 mg/m³
  - By referring to the technical norm G260 shippers are required to meet a lower sulfur content when injecting gas in the national natural gas network
- The A-deviation of Germany is in the Annex G of EN 16726
- Less strict requirements for:
  - technical rules G260 and G262 referred to in German legislation allow oxygen content up to 3% for biogas injected to the natural gas network. They also allow higher sulfur content than the standard

> **Hungary**

- Less strict requirements for: H2S-content, CO2-content, O2-content, relative density, hydrocarbon dew point, water dew point as documented in the A-deviation for Hungary

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

- **Ireland**
  - No deviation documented
  - Other issues:
    - Specifications are in place with adjacent TSOs which would therefore include the British GSMR standard
    - The TSO is obliged to act as a Reasonable and Prudent Operator (RPO). This includes monitoring gas entering the system to ensure system integrity at all times. If there is a binding CEN standard in place then this could potentially act as a counteract to the TSOs requirements to act as an RPO at all times.
- **Italy**
  - Stricter requirements for water dew point
  - No A-deviation documented
  - Less strict requirements for Sulphur, Oxygen, CO2 and density

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **Lithuania**

- Stricter requirements:
  - Water dew point temperature (-10 °C).
  - Oxygen high limit (0,5%)
  - Carbon dioxide limit (2,5%)
- No A-deviation is documented
- Less strict requirements:
  - Total sulphur without odorant (30 mg/m^3),
  - Hydrogen sulphide (7 mg/m^3)
  - Mercaptan sulphur (16 mg/m^3)
  - Oxygen low limit (0,2 %)
- Lithuanian regulation sets requirements for:
  - Wobbe Index
  - Methane content (>= 90%)

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

- **Poland**
  - No A-deviation is documented
  - Regulation in Poland is less stringent for:
    - sulfur (40 mg/m3)
    - water dew point (3.7 to 5 °C at 5.5 Mpa)
    - H2S (7 mg/m3)
    - Mercaptan sulfur (16 mg/m3)
    - Oxygen
- **Romania**
  - National legislation refers only to gas components. No A-deviation is documented
  - Less stringent requirements for O2, CO2, H2S

Section 2: Scenario definition

14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **Spain**
  - No A-deviation is documented
  - Less strict requirements apply currently for dew points and sulfur
  - Other: methane number is not contemplated in the national regulation

> **The Netherlands**
  - All stricter legal/regulatory requirements for the Netherlands are specified in the documented A-Deviation and relate to the total sulfur, O2, CO2 and dew points
  - Furthermore the Dutch legal/regulatory requirements specify more parameters for H-gas: WI, gas temperature, CO, organochloric compounds, organofluoric compounds, H2, pathogenic microbes, dust, total sulfur content after odourisation and silica
  - There are no requirements on methane number or relative density

Section 2: Scenario definition

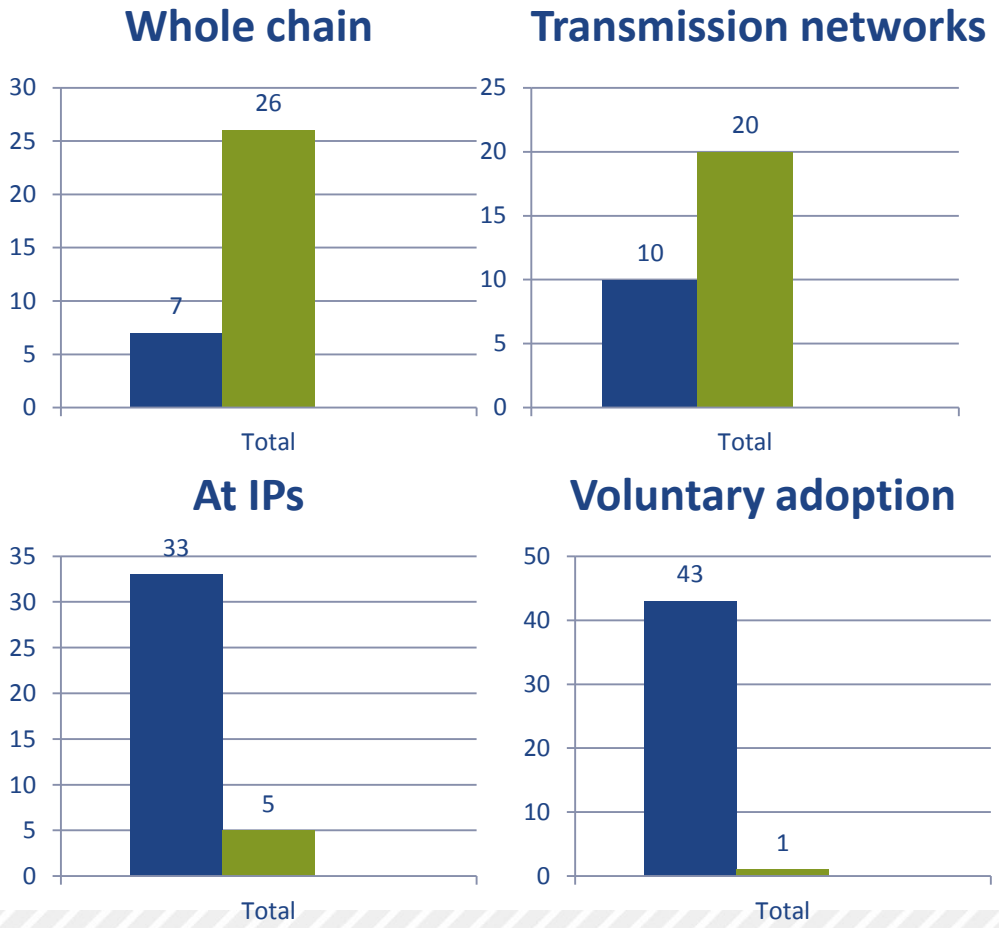
14-18 Questions on national constraints and A-deviations – *Summary comments by MS*

> **United Kingdom**

- Stricter requirements: national legislation for Wobbe Index would prevent the UK adopting a relative density range of 0.555 to 0.7.
- No A-deviation documented
- Less strict requirements for:
  - Total Sulphur: 50 mg/m3
  - Hydrocarbon and water dew points
  - Mercaptan
  - Oxygen: 0.2%, up to 1% for biomethane injection.
    - In practice, historically, NGGT has typically sought to agree with upstream parties to limit the O2 content in their gas deliveries to our system to 0.001%mol (or 10 ppm) due to the difficulties that may be experienced by some offtakes.
    - A change has been proposed to promote access to LNG. It would be incompatible with CEN requirement of 0.001% at entry points.
  - Limit for CO2 in GS(M)R is flexible.

Section 2: Scenario definition

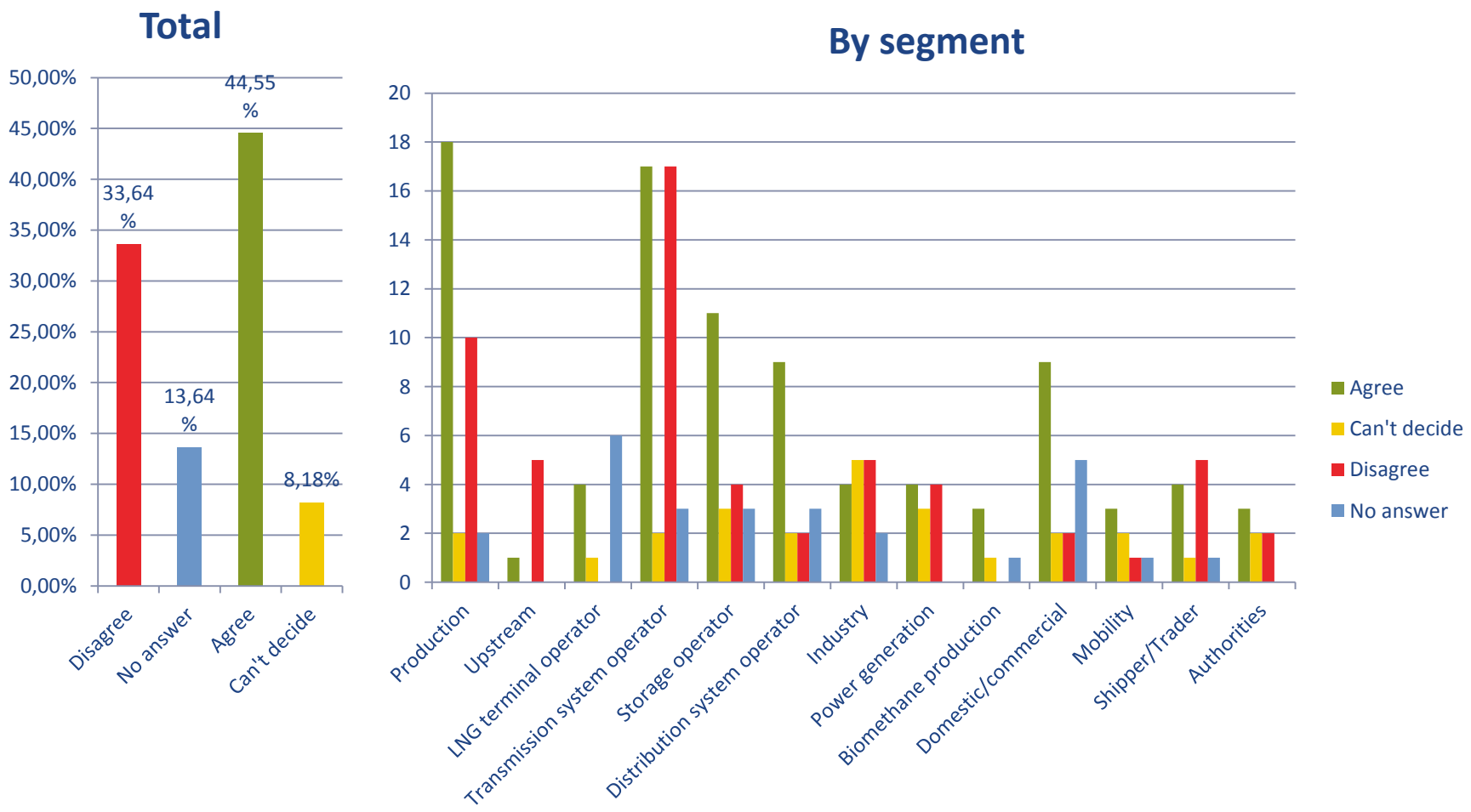
19. Regardless of your preference for a given scenario, what would be the most coherent choice in each case for policy issue 5 (A-deviations)?



Scenario	Suggested policy
Whole chain	Withdrawn
Transmission networks	Withdrawn
At IPs	Retained
Voluntary adoption	Retained

Section 2: Scenario definition

20. Policy issue 6: flexible limits. What is your opinion on the proposed option?



Section 2: Scenario definition

20. Policy issue 6: flexible limits. What is your opinion on the proposed option?

> **Comments of those agreeing**

- We support the proposal to apply the flexible limits on a case-by-case basis after conducting an impact assessment. However, the proposal should allow the application of higher limits than the standard on a case-by-case basis as well.
- The time period for decision must be set.
- Define who is concerned party, is it NRA involvement a prerequisite?
- Define sensitive, does it include technical and commercial reasons?
- However, we don't agree with the inclusion of the definition of a sensitive network within the standard
- Storage operators should be also involved.
- Workable if upstream production units are involved.
- Qualification of sensitive should be technically supported
- Implications on gas supplies should be assessed.
- Clarification needed on who the relevant national authorities are

Section 2: Scenario definition

20. Policy issue 6: flexible limits. What is your opinion on the proposed option?

> **Comments of those disagreeing (I)**

- Do TSOs have the obligation to determine whether sensitive sites would be affected?
- Impossible to guarantee flow patterns
- Should connection of sensitive customers be rejected where flexibility has been applied?
- Instability in EU regulation is detrimental to investor confidence
- It is not clear what the definition of a sensitive site is. CEN clarified that any network having an UGS is a sensitive network and hence the lower limits shall apply.
- Daily average of O2 is not appropriate. Actions to off-spec gas should be immediate.
- Adoption of standard should be voluntary
- Sensitive end-users should be not exposed or otherwise be compensated
- Impact assessments have already been done. It could affect existing agreements.
- This just adds complexity

Section 2: Scenario definition

20. Policy issue 6: flexible limits. What is your opinion on the proposed option?

> **Comments of those disagreeing (II)**

- The proposed option is not necessary as Article 17 Para 3 a) NC INT already requires the TSO to establish a list of sensitive network users.
- Reduction of CO2 specification to 2,5% at existing terminals will reduce flows to UK
- The current density range allows a CO2 concentration of 4% already.
- The proposal carries unacceptable risks of inadvertent contamination.
- No, the standard is not flexible.
- We understand the principle but it would be challenging to apply in practice
- Deep revision of the EN16726 is expected.

> **Comments of those not taking a position**

- What a sensitive installation is; who demonstrates the solution; and who is responsible needs to be defined.
- Measurement of such low limits is not possible with existing equipment

Section 2: Scenario definition

21. Policy issue 6: flexible limits. Do you suggest any other option?

- No, since ENTSOG does not allow to challenge the values,
- Adoption of the standard should be voluntary
- Make no changes to the INT NC
- The EN 16726 should be valid for all under consideration of regional necessities (e.g. via A-Deviations)
- TSOs should have the same responsibilities on gas quality as before the unbundling
- CEN standard needs to be more clearly defined
- It should be up to the competent national authorities to initiate a process, if necessary.
- Methodology should be fact based, including a CBA.
- An assessment of how changes in CEN standard will affect the NC shall be made.
- Let TSO make the assessment subject to regulation by authorities.
- Any assessment should be carried out in an open and inclusive manner, whilst recognising commercial confidentiality.
- The guiding principle should be accepting gas to the system.

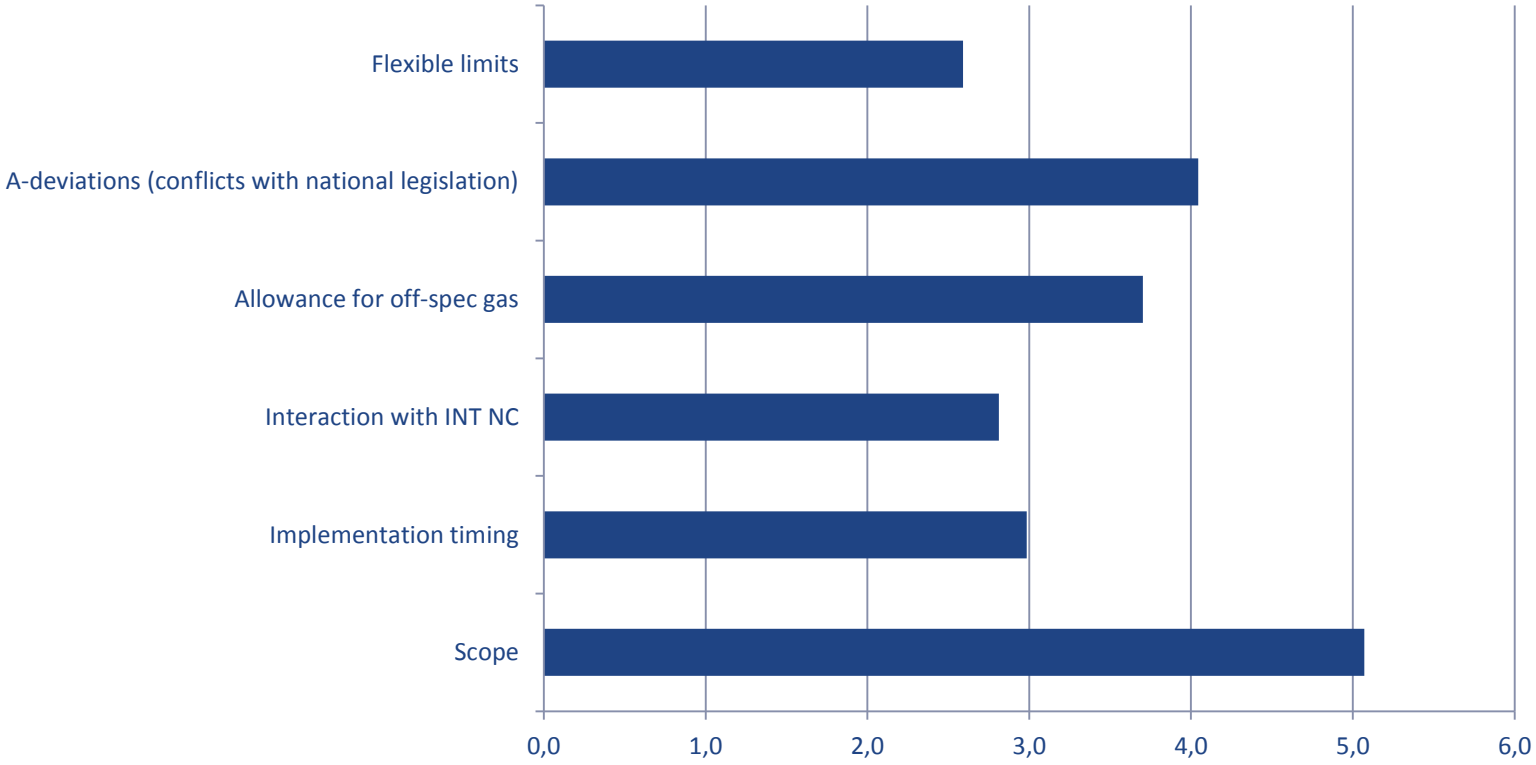
Section 2: Scenario definition

Resulting scenarios

Policy issue	Scenario 1: Whole chain implementation	Scenario 2: Transmission networks only	Scenario 3: IPs only	Scenario 4: Voluntary adoption
1 Scope	Whole chain	Transmission networks only	IPs only	Voluntary adoption
2 Implementation timing	Fixed and equal	?	As decided by national authorities	As decided by national authorities
3 Interaction with INT NC	Article 15 shall not apply after transition	Article 15 shall not apply after transition	Article 15 shall be the only solution	Article 15 shall be the only solution
4a Allowance for off-spec gas	Gas meeting the standard shall be accepted	Gas meeting the standard shall be accepted	Gas meeting the standard shall be accepted	?
4b Allowance for off-spec gas	Operators may agree less strict limits	Operators may agree less strict limits	Operators may agree less strict limits	Operators may agree less strict limits
5 National specifications (A-deviations)	A-deviations withdrawn	A-deviations withdrawn	A-deviations retained	A-deviations retained
6 Flexible limits (O2, CO2, etc.)	Case by case impact assessment	Case by case impact assessment	Case by case impact assessment	As decided by national authorities

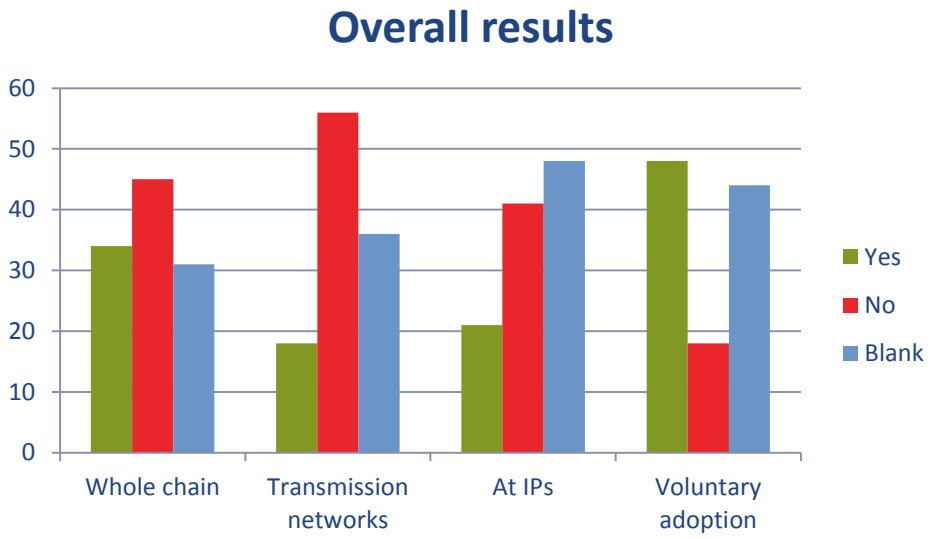
Section 2: Scenario definition

22. Please rank the policy issues in terms of difficulty



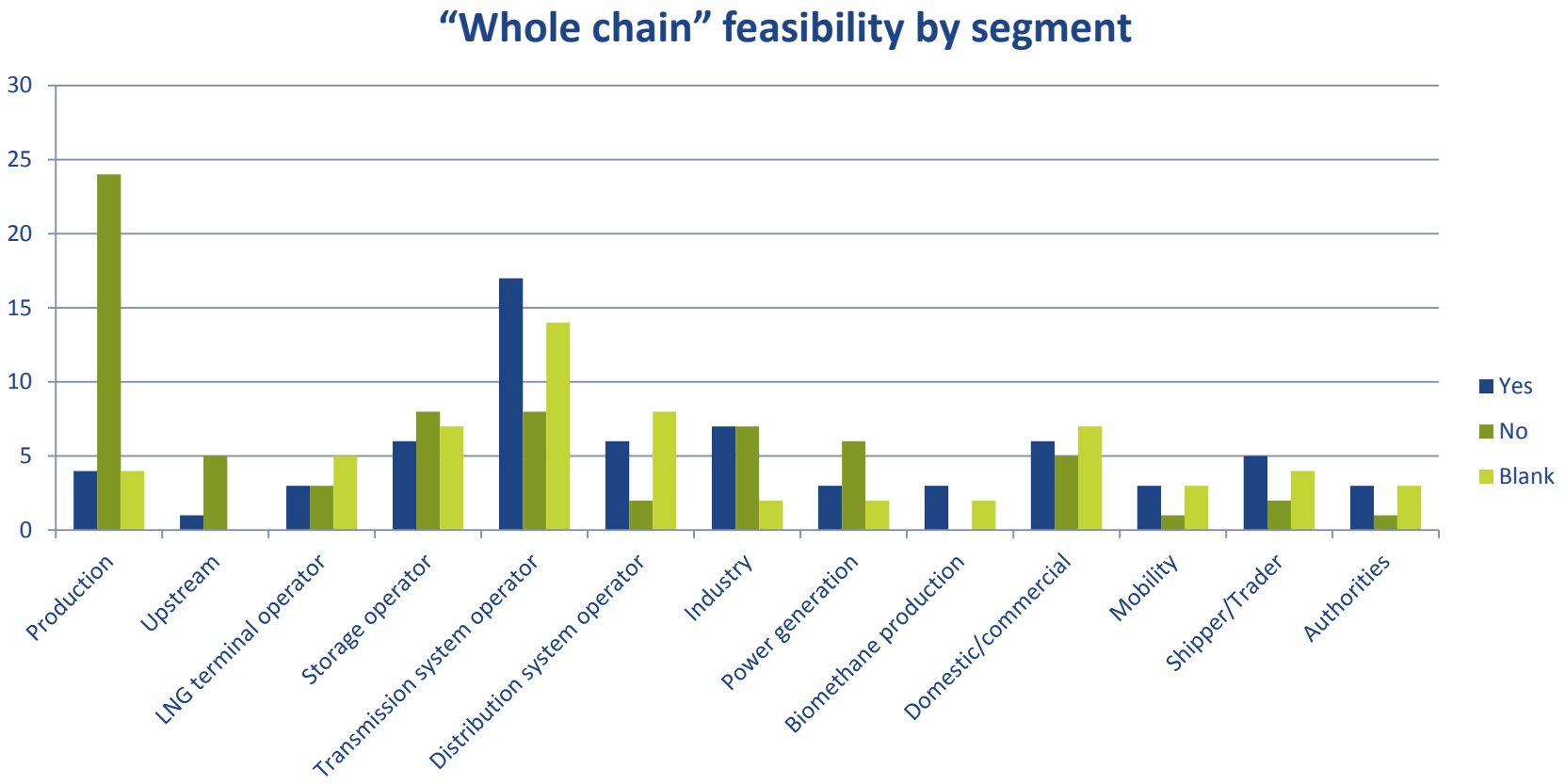
Section 3: Impact analysis of scenarios

30,39,48,57 Is this given scenario feasible for your segment/organisation/country?



Section 3: Impact analysis of scenarios

30 Is the whole chain scenario feasible for your segment/organisation/country?



Section 3: Impact analysis of scenarios

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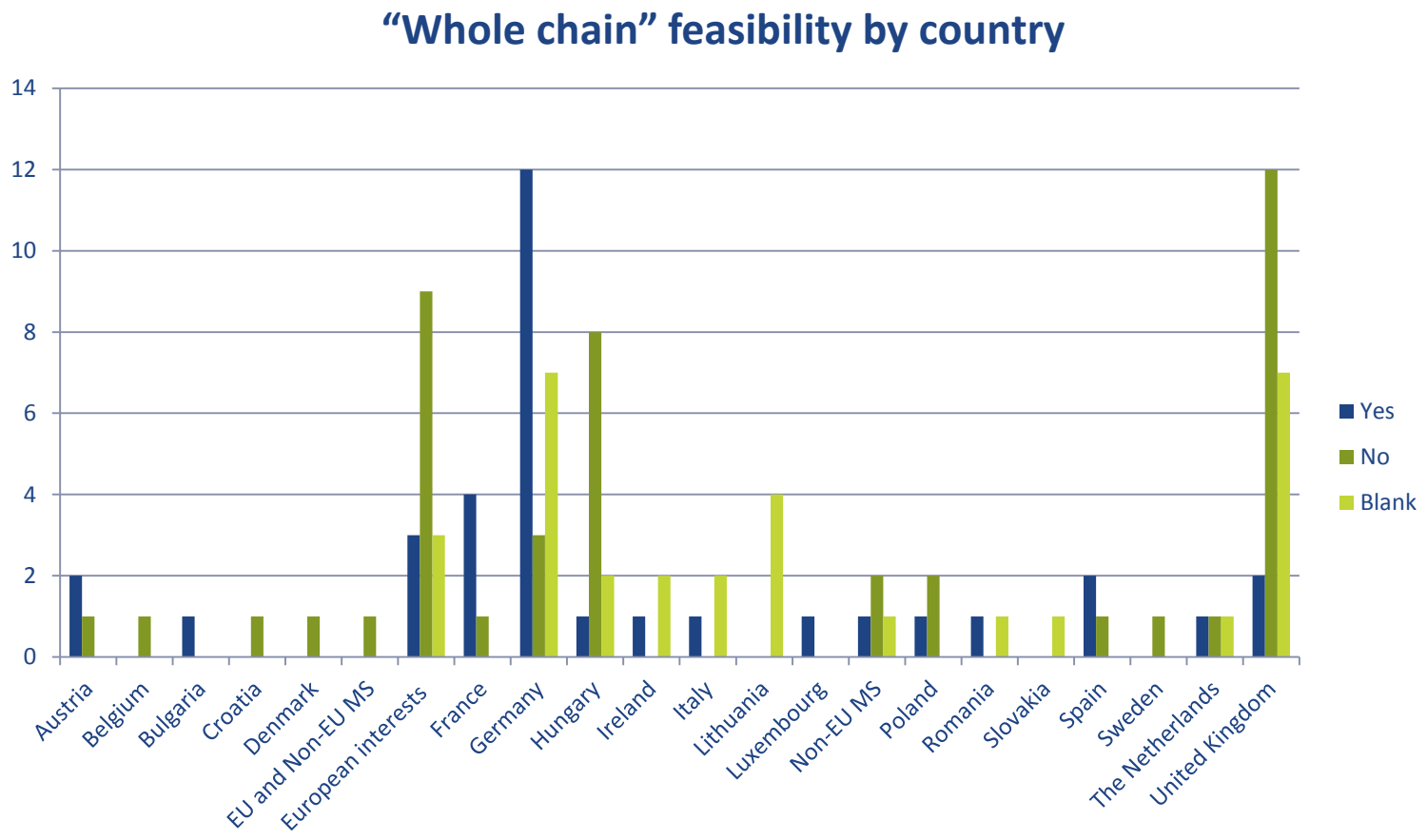
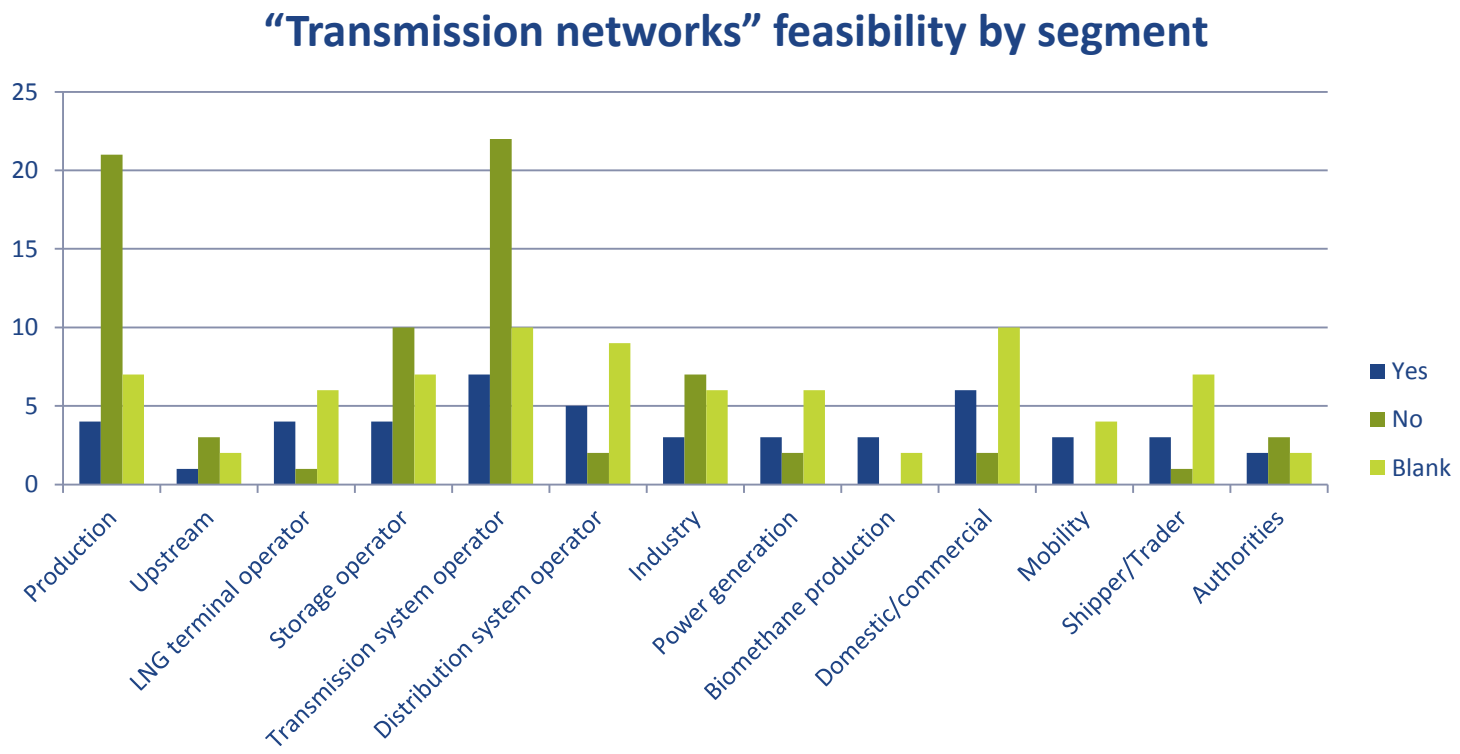


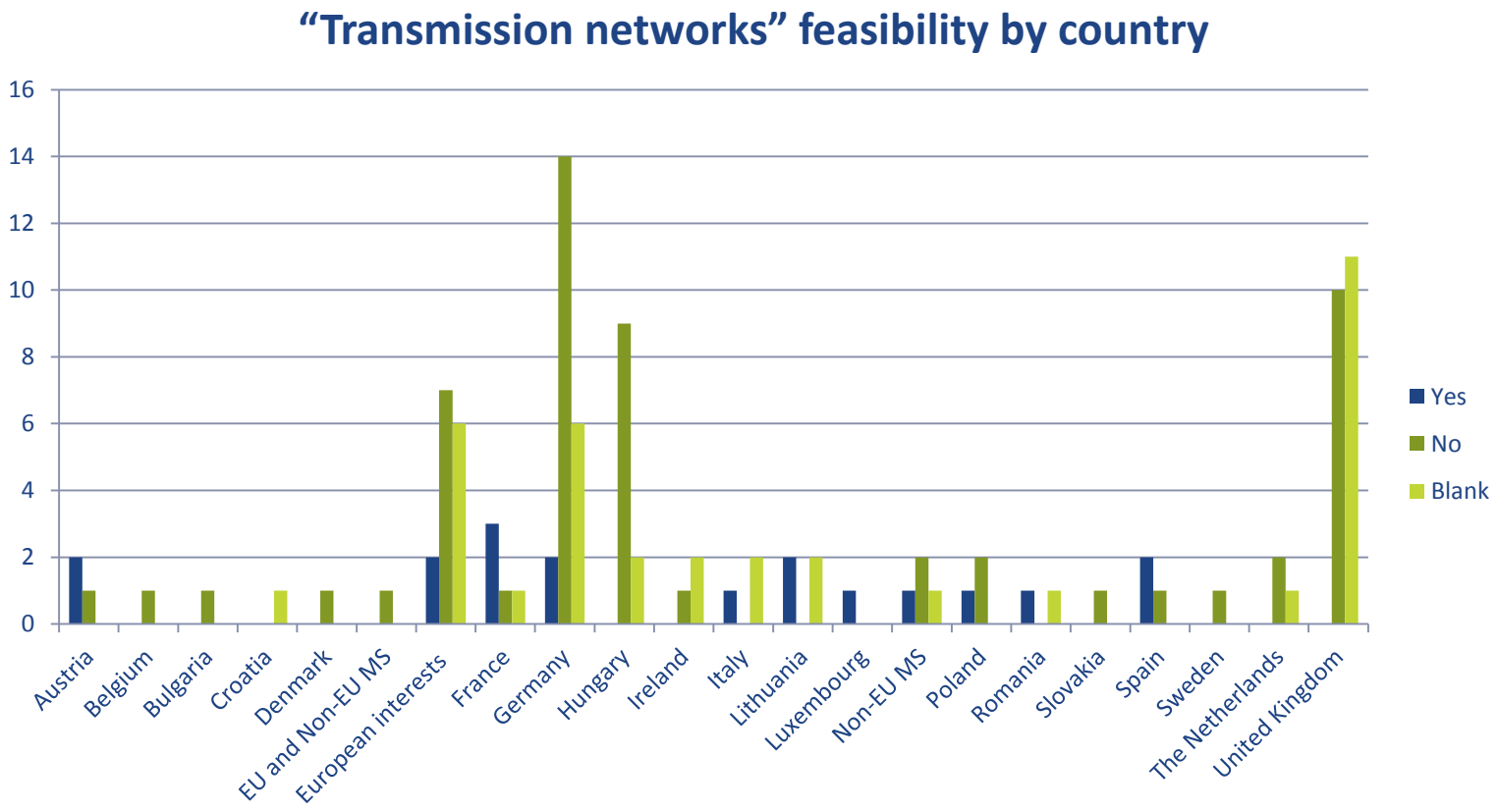
Section 3: Impact analysis of scenarios

39 Is the transmission networks scenario feasible for your segment/organisation/country?



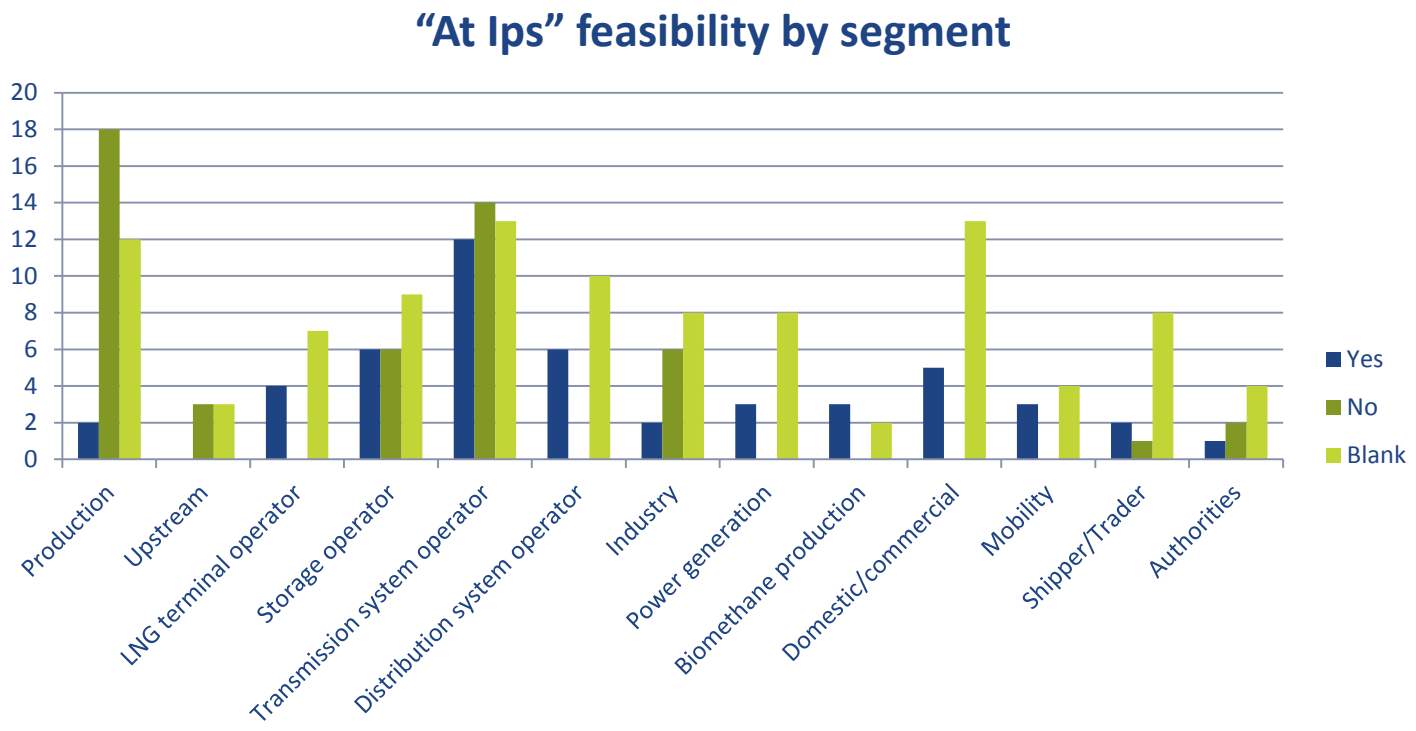
Section 3: Impact analysis of scenarios

39 Is the transmission networks scenario feasible for your segment/organisation/country?



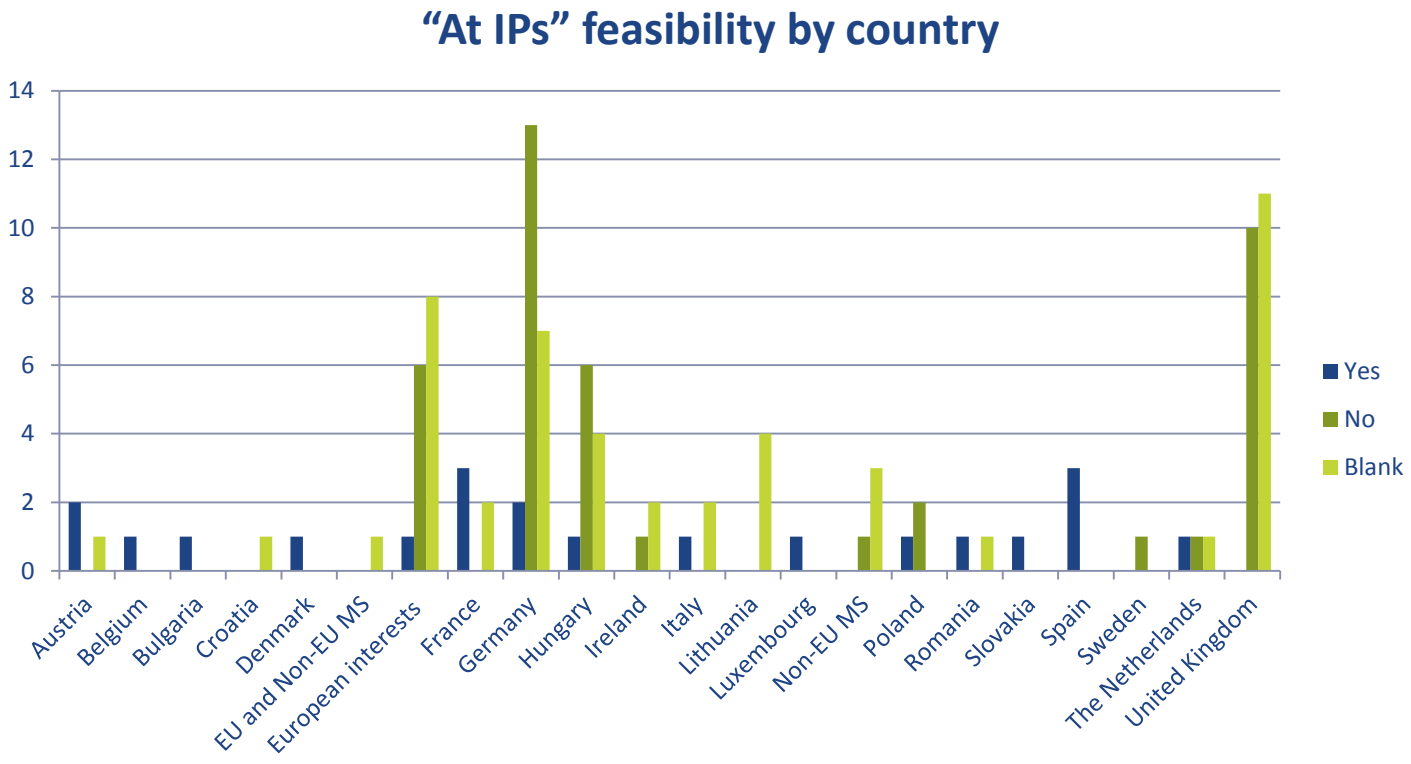
Section 3: Impact analysis of scenarios

48 Is the "At IPs" scenario feasible for your segment/organisation/country?



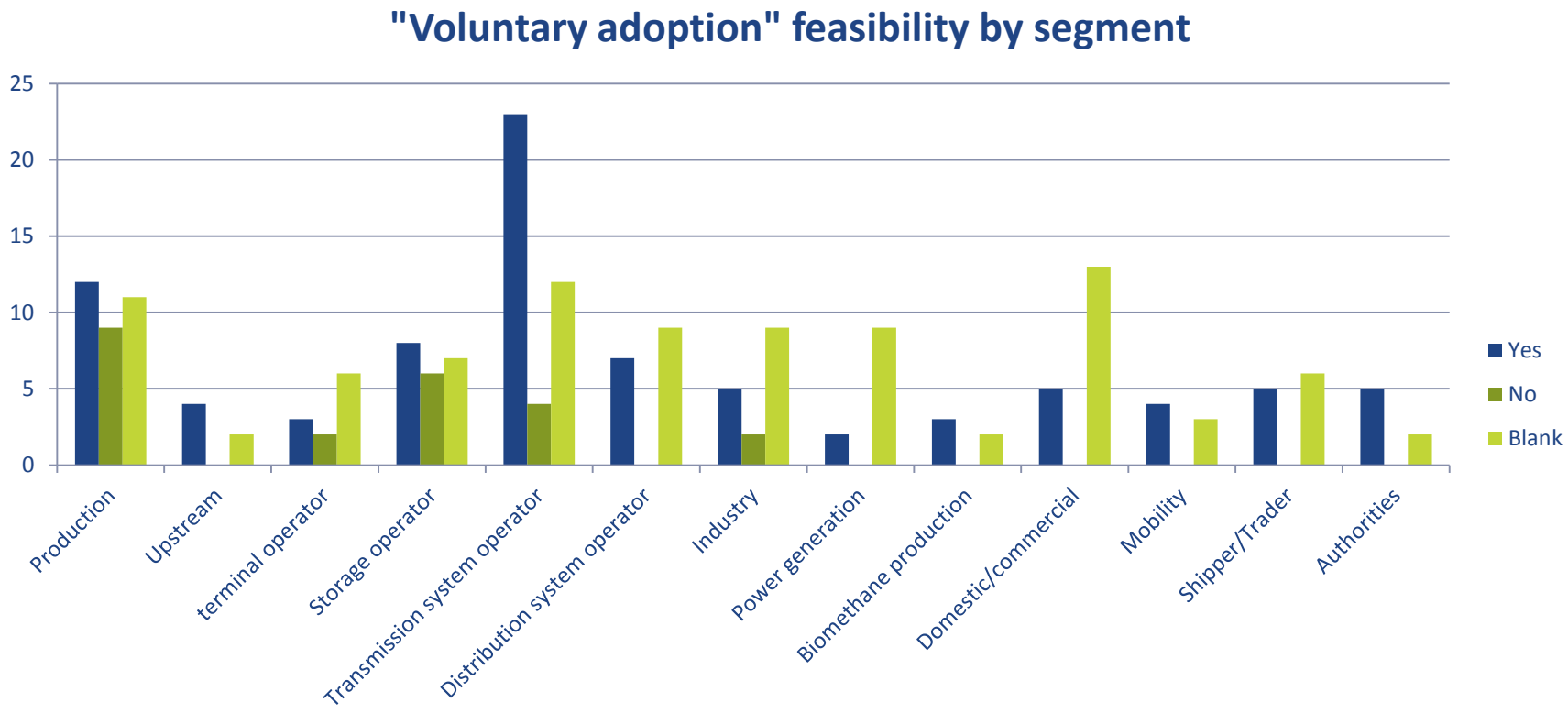
Section 3: Impact analysis of scenarios

48 Is the "At IPs" scenario feasible for your segment/organisation/country?



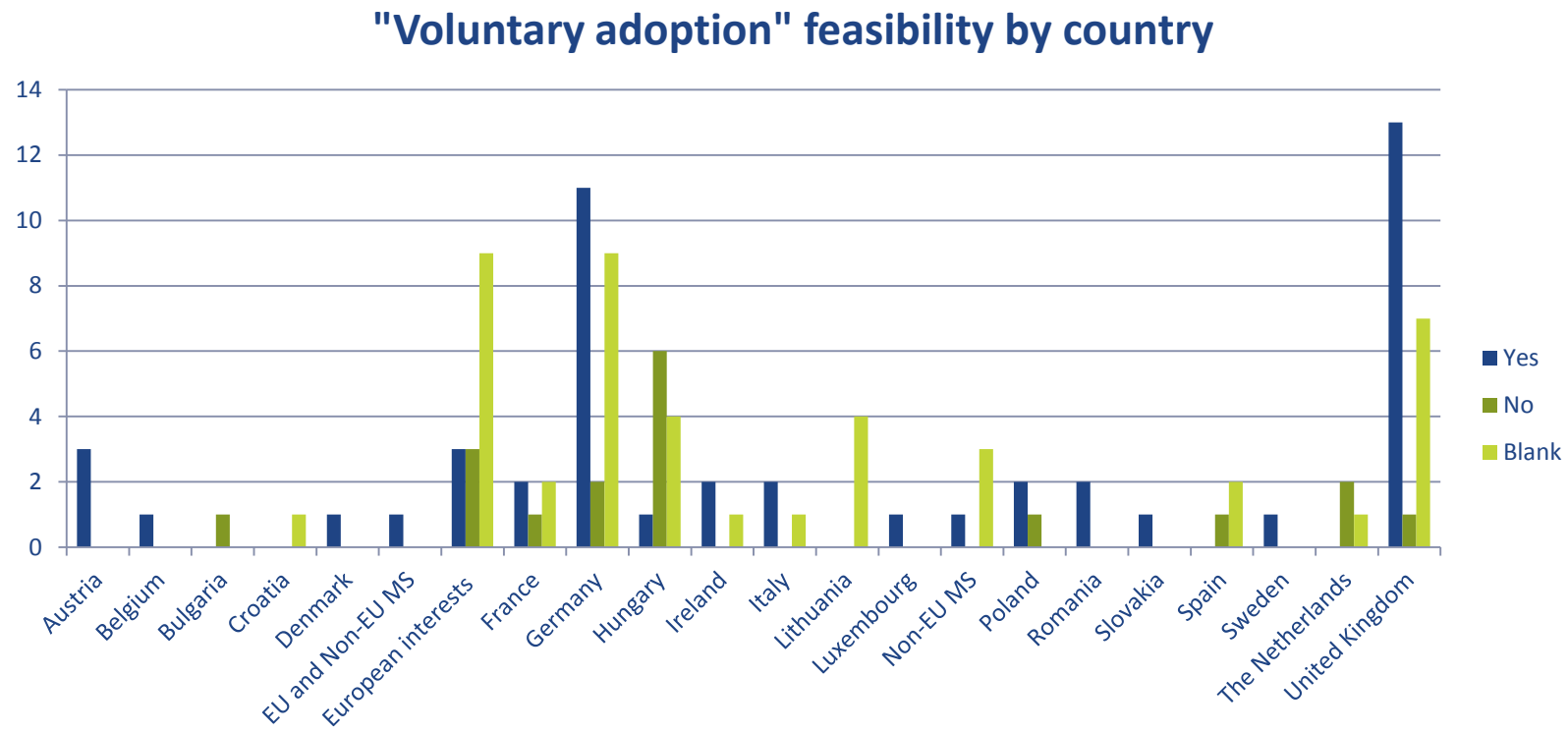
Section 3: Impact analysis of scenarios

57 Is the voluntary adoption scenario feasible for your segment/organisation/country?



Section 3: Impact analysis of scenarios

57 Is the voluntary adoption scenario feasible for your segment/organisation/country?



Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Austria**:

- Benefits:
  - Harmonized quality on each IP simplifies IP
  - NRA: Less cost for appliances manufacturers and consequently for users
- Impacts: extra investments to meet the unnecessary high quality standards
- Implementation barriers : existing contracts and existing design of facilities, Investment for modifications
- Costs (storage):
  - 15 M€ to meet requirements
  - As a result of corrosion due to higher CO2 and sulfur: unknown
- Time: 2-3 years
- Security of supply risks: if off-spec gas accepted can be rejected
- Impact in price: yes, investment costs need to be recovered
- Feasible: not for storages
- Remark: stricter values for dew point without added value
- Unintended consequences: increased corrosion

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Belgium**:

- Benefits: clarity for all segments regarding specifications, standard in full scope
- Impacts: if comingling off-spec gas not allowed, very expensive gas treatment
- Implementation barriers :
  - impossible to achieve if not applied at EU entry points,
  - lack of cheap reliable sensors for the standardised parameters
- Costs: huge investment in gas treatment and R&D for sensors
- Time: n/a
- Security of supply risks: if not applied at EU points and no comingling allowed
- Impact in price: tariffs (more interruptions, more GQ monitoring and gas treatment)
- Feasible: No
- Unintended consequences:
  - if gas treatment required, competitiveness of gas as a fuel
  - development of biomethane injection

Section 3: Impact analysis of scenarios

Scenario 1: whole chain

> **Bulgaria**:
  - Benefits: transparency, overcoming of barriers, diversification of supplies
  - Impacts: financial
  - Implementation barriers : difficulties may occur for TSOs next to non EU countries.
  - Costs: N/A
  - Time: N/A
  - Security of supply risks: restriction of national production and south-direction
  - Impact in price: N/A
  - Feasible: Yes
  - Remark:
  - Unintended consequences: cost and time to be assessed

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Croatia**:
  - Benefits: no benefits at all
  - Impacts: investment for gas treatment
  - Implementation barriers : economical and legal
  - Costs: N/A
  - Time: N/A
  - Security of supply risks: closure of domestic gas production
  - Impact in price: domestic gas price would increase
  - Feasible: No
  - Remark:
  - Unintended consequences:

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Denmark**:

- Benefits: no benefits since it gives little flexibility to use the system efficiently
- Impacts: cost of biomethane injection and national production
- Implementation barriers :
  - MS competence would have to be overruled
  - Renegotiation of contracts
- Costs: maybe, a negative decisive impact on biomethane
- Time: N/A
- Security of supply risks: restriction of national production (methane number)
- Impact in price: Price for bring biomethane in-spec
- Feasible: No
- Remark:
- Unintended consequences: a barrier to decarbonisation of gas

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **France** :

- Benefits:
  - Free flows of gas between all networks
  - Enhanced security of supply
  - End users would have a good knowledge of the gas quality delivered
  - Network day to day easier: less gas blending and treatment
- Impacts: adaptation of end user applications to greater variabilities
- Implementation barriers : some end-users systems designed for stricter ranges
- Costs: N/A
- Time: a few years.
- Security of supply risks: None, on the contrary.
- Impact in price: invest for LNG and UGS quality treatment
- Feasible: Yes (except LNG)
- Remark:
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Germany**: (I)

- Benefits:
  - TSOS and others:
    - Clear and precise rules for all/legal security
    - No Investments for gas treatment facilities at TSO level necessary
    - Problems regarding the conclusion of Interconnection Agreements (IA) between TSOs can be solved by referring to a common standard
    - Clear rules, when a gas flow may be interrupted if the gas does not meet the common standard (including rules about liability)
  - Industry, traders and SSOs: improvement of shipper situation by a harmonised barrier-free market
  - DSOs: Fewer requests to adapt qualities to a local standard
  - Technical assoc: Adjustment of gas quality limited to a number of entry points. A tool to interrupt off-spec gas
- Impacts:
  - Curtailment of fuel stations (sulfur). Solution needed (e.g. information provision from TSO)
  - Under an absolute approach, biogas production (02) and regional hydrogen injection

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Germany**: (II)

- Implementation barriers : legal barrier on sulfur
- Costs:
  - Curtailment agreements for CNG stations.
  - Or 44.1 M€ if CNG stations need desulphurisation (not affordable)
- Time: N/A
- Security of supply risks: TSO should be entitled to accept off-spec gas to avoid this.
- Impact in price: potentially for CNG
- Feasible: Yes (for a majority)
- Remark:
- Unintended consequences: potentially for DSOs, CNG and biomethane

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Hungary**:

- Benefits:
  - NRA: EU standard for every consumer, transparent and clear basis.
  - Producers: no benefit at all
- Impacts: investment for gas treatment (sweetening) for production and UGS,
- Implementation barriers : economical, legal (Hungarian gas shall be used in Hungarian market) and security of supply. Production at end of life cycle. Small fields. Heterogeneity of GQ
- Costs:
  - Storage: 95M€
  - Production: (e.g. at amine sweetening unit ca. 350 € /(m3/h) investment cost plus 0,031 €/m3 operational cost).
- Time: 3 to 5 years
- Security of supply risks: up to 70% national production shut-in and closure of UGS
- Impact in price: production shut-in could rise gas prices, tariffs could also increase
- Feasible: No
- Unintended consequences: deter investment in prospects due to high CO2 content

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Italy**:
  - Benefits: nothing
  - Impacts: the scenario gives responsibility to TSOs and DSOs who cannot intervene in case the quality is off-spec
  - Implementation barriers: N/A
  - Costs: N/A
  - Time: N/A
  - Security of supply risks: if gas from national production is outside the standard
  - Impact in price: if gas treatment is needed
  - Feasible: Yes
  - Remark: This scenario is feasible but difficult
  - Unintended consequences: price and security of supply

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **The Netherlands**:

- Benefits: since WI is out and there are no barriers, no benefit is expected
- Impacts: TSO looses the ability to adapt off-spec gas by co-mingling; early abandonment of gas fields
- Implementation barriers: legal framework in NL, renegotiation of existing contracts and lack of legal basis
- Costs: N/A
- Time: 5 or 6 years (e.g. as for WI legal change)
- Security of supply risks: abandonment of gas fields or explorations. Not considered large risk as differences in spec are minors.
- Impact in price: slight
- Feasible: divided views
- Remark: Even if t were feasible changing the legal framework would be a major operation
- Unintended consequences: producers of renewable energy faced with larger costs

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

- **Poland**:
  - Benefits:
    - Benefits only if the draft standard is modified
    - Proper gas quality in entries
    - Maybe from supply diversification. Hard to know without Wobbe Index
  - Impacts: investment for gas treatment (drying) will impact tariffs.
  - Implementation barriers : financial, operational (equipment needed) and legal (whole chain goes beyond INT NC).
  - Costs: N/A
  - Time: from 2 to 20 years (different views)
  - Security of supply risks: yes/on the contrary (different views)
  - Impact in price: yes
  - Feasible: No (different views)
  - Remark: the scope of parameters in the standard should be adjusted
  - Unintended consequences: decrease of power supply flexibility

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Slovakia**:
  - Benefits: no benefits
  - Impacts: investment for gas treatment
  - Implementation barriers: N/A.
  - Costs: N/A
  - Time: a few years due to complexity of the process
  - Security of supply risks: yes, some volumes will become off-spec gas
  - Impact in price: yes, investment should be reflected
  - Feasible: Yes
  - Remark: difficulties with water dew point
  - Unintended consequences:

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Sweden**:
  - Benefits: guarantee of gas quality
  - Impacts:; increased costs due to less utilization of transmission system
  - Implementation barriers: renegotiating existing agreements
  - Costs: N/A
  - Time: N/A
  - Security of supply risks: O_2 and MN requirements will limit biomethane injection
  - Impact in price: yes, to adapt injection facilities
  - Feasible: No, only if revised to fulfil market requirements
  - Unintended consequences: it could be a barrier for biogas in Europe

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Spain**:

- Benefits: Higher degree of gas quality control; No market benefits expected
- Impacts: CEN standard is more restrictive than Spanish regulation, barriers will be created, some gas entries would become off-spec
- Implementation barriers : N/A.
- Costs: 15 bcm in 2015 would become off-spec at IP with Morocco
- Time: 3 to 5 years, depending on permitting for new gas treatment facilities; long term contracts will also delay
- Security of supply risks: yes, some supplies will become off-spec gas
- Impact in price: yes, either because of investment in gas treatment or reduction of supply portfolio
- Feasible: Yes (divided views)
- Remark: feasible but with increases in gas price
- Unintended consequences: depending on how flexible limits are applied end users may receive gas out of CEN standard

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **United Kingdom (I)**:

- Benefits: As there are no barriers, no benefits are expected. If there were barriers INT NC is enough. The potential benefits of the standard to security of supply have never been assessed.
- Impacts:
  - 15.9 bcm of rejected gas in 2015 due to CO2 and O2 limits (2.5% and 10 ppm)
  - Security of supply seriously compromised, less diversity and flexibility.
  - Additional costs for gas processing and monitoring.
  - Cessation of production in gas fields
  - New field developments less likely to proceed
  - Increased CO2 emissions due to gas treatment
  - Reduced LNG deliveries due to sulfur limit
- Implementation barriers : financial, how to recover investment when there are no benefits.
- Costs:
  - £2 billion (value of rejected gas in 2015), higher costs if standard is implemented.

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **United Kingdom (II)**:
  - Time: No less than 5 years
  - Security of supply risks:
    - 20% of UK supplies in 2015 would be rejected if CO_2 and O_2 limits are applied (2.5% and 10 ppm)
    - New developments less likely to come on line
  - Impact in price: gas price increases due to shortfall of rejected gas
  - Feasible: No
  - Remark: technically possible but not desirable
  - Unintended consequences:
    - 20% drop in supplies and increase in gas prices is contrary to what EC was trying to achieve
    - It could also stifle innovation for new sources

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

- **Norway**:
  - Benefits: None, there are no issues that need resolving
  - Impacts: if TSO flexibility to deviate from standard is restricted:
    - Significant production loss or delay, less field developments;
    - More frequent curtailments; reduced gas flows to UK
  - Implementation barriers: blending may not be enough to meet 2.5% for some fields
  - Costs: prohibitive, e.g. costs of finding new routes (and abandoning old ones) to evacuate fields
  - Time: Up to mid-20s
  - Security of supply risks: Yes, especially for the UK
  - Impact in price: curtailments will increase transport costs, less competition will increase gas prices
  - Feasible: No, due to the negative effects
  - Unintended consequences: see impacts above
  - *See also production summary*

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Russia**:

- Benefits: None
- Impacts: worsen the current term of operations for gas transit
- Implementation barriers: different technological requirements on the equipment operation in different gas value chain segments
- Costs: significant investment to overcome the barriers
- Time: at least two years
- Security of supply risks: yes, gas flow interruption risk
- Impact in price: yes, compensation of production and transportation costs
- Feasible: N/A
- Unintended consequences: N/A

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Producers (I)**:

- Benefits: We expect no benefits at all. Moreover we have not seen any attempt to identify or substantiate possible benefits of amending the INT NC
- Impacts:
  - Eliminate flexibility for producers (less stringent limits) and end user (more stringent)
  - Production shut-in of gas currently accepted and co-mingled (e.g. 15.9 bcm of gas potentially rejected in 2015)
  - Limit LNG supplies and restrict flow across interconnectors
- Implementation barriers:
  - Economic: welfare loss (e.g. production shut-in), volume at stake are significant
  - Operational issues: installation of gas measurement equipment
  - Legal: whole chain goes beyond regulation 715/2009 and Directive 2009/73/EC

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Producers** (II)

- Costs: prohibitive (see Teesside Final Modification Report), rejected gas would amount to £2 billion only in 2015 (see UK summary)
- Time: considerable
- Security of supply risks: yes, due to production shut-in and limitation of LNG. But it's not the biggest concern
- Impact in price: yes, price will increase in the affected regions
- Feasible: No
- Remark:
- Unintended consequences: see impacts and barriers

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

- **LNG operators**: see summaries of BE, FR, ES and UK
  - Impact: sulfur limit may limit future LNG supplies from the US
- **Storage operators:** see summaries of AT, BE, BG, FR, DE, HU, IT, PL, SE, ES and UK
  - Benefits: no benefits vs. clear rules for participants
  - Impacts: investment to accept gas according to the new standard (CO2, and sulfur) and deliver it (0_2, dew points)
  - Implementation barriers: financial, contractual
  - Costs: only 3 operators reported detailed costs adding up to 110 M€
  - Time: responses vary from 2 to 5 years and N/A
  - Security of supply risks: one operator said it would face closure
  - Impact in price: yes, due to cost recovery and reduced availability
  - Feasible: No (divided views)
  - Unintended consequences: impacts on integrity management

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Transmission system operators (I):** see member state summaries

- Benefits: No benefits vs clear rules and free flows of gas
- Impacts:
  - Additional costs associated with more gas processing and monitoring equipment
  - Loss of flexibility if comingling is not accepted
- Implementation barriers:
  - Renegotiation of agreements;
  - Regulatory funding if benefits can't be demonstrated
  - Lack of cheap and reliable sensors
- Costs: N/A
- Time: responses varying from 2 to 6 years

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Transmission system operators (II):** see member state summaries

- Security of supply risks: relevant if there is no flexibility to accept off-spec gas
- Impact in price: Impact on transport fees as result of gas processing and/or quality monitoring
- Feasible: divided views, mostly seen as feasible or technically possible but with negative impacts
- Unintended consequences:
  - Security of supply
  - Barriers to decarbonisation
  - Uncertainty in application of flexible limits

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Distribution system operators:**
  - Benefits: No benefits vs certainty and reliability in gas quality
  - Impacts:
    - Compatibility of sulfur requirements with national end-use sulfur content and odourisation practices
    - Concerns on biomethane requirements if reinjected into transport
  - Implementation barriers: legal, little margin of maneuver for DSOs if quality is off-spec
  - Costs: N/A
  - Time: Unknown (one respondent: at least 3 years)
  - Security of supply risks: divided views
  - Impact in price: gas prices expected to rise
  - Feasible: mostly feasible
  - Unintended consequences:

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Shippers/Traders**:

- Benefits: We do not expect any concrete benefits
- Impacts:
  - Discouragement of gas use
  - Safety of appliances that are not replaced/tuned
  - Reduced economic activity due to investment in equipment
  - Higher spreads between hubs due to reduced competition
- Implementation barriers:
  - Time to replace/retune appliance and availability of technical resources for that
- Costs: gas treatment costs would be passed to infrastructure users
- Time: 2-3 years for treatment plants (e.g. CO2 removal); unknown for appliances
- Security of supply risks: yes, it will become more expensive
- Impact in price: yes, reduced liquidity will make financial products more expensive
- Feasible: Yes, but not preferred
- Unintended consequences: Higher unit costs, increased risks of stranding

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Power generation/mobility**:

- Benefits: no benefits expected from this (incomplete!) standard. Gas will not be cheaper
- Impacts in power generation an gas compressors drive. Quality variation will affect gas turbines performance, reliability (safety, emissions, increased corrosion, unexpected plug flows)
- Implementation barriers:
  - Different national environment protection levels
  - Existing contracts are based on a defined gas quality for which the turbines have been optimised
- Costs: adaptation costs if quality changes: 10 to 20% of a new engine. Installation of local density smoothing systems
- Time: long, changes in the entire existing installation are needed. Customers may decide to move business away.
- Security of supply risks: yes, shut-down of power plants and interruption of gas networks. Security of supply could be only improved with more LNG terminals along the EU coast.
- Impact in price: yes, it will most likely increase
- Feasible: No, the least feasible one
- Unintended consequences: emissions limits and integrity compromised

>

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Industrial users**:

- Benefits:
  - All users exposed to the same gas quality
  - Safe operations, mitigations of extra environmental emissions and to the lowest social costs of the whole value chain
  - Supply diversification but difficult to assess without Wobbe Index
- Impacts:
  - Increase of final cost of gas (and end products)
- Implementation barriers: TSOs' role and responsibility not clearly defined
- Costs: savings will be higher than costs. Costs should be analyzed by TFs.
- Time: 2 to 4 years
- Security of supply risks: no, on the contrary. Safety issues are as important as SoS.
- Impact in price: no impact foreseen
- Feasible: divided views, yes vs no (because there is no WI)
- Unintended consequences: see impacts

Section 3: Impact analysis of scenarios

Scenario 1: Whole chain

> **Domestic/commercial (heating sector)**:

- Benefits: No benefits from an incomplete standard
- Impacts:
  - Adverse effect on environmental protection levels
  - Uncertain impact on installed stock of heaters
  - Potential barriers for supplies
- Implementation barriers:
- Costs: N/A
- Time: N/A
- Security of supply risks: No.
- Impact in price: Not enough information to answer
- Feasible: No, without WI the process is redundant
- Unintended consequences: Not enough information to answer

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

- **Austria**: see Whole chain answers
- **Belgium**: see Whole chain answers +
  - Benefits: Monitoring of gas quality at Entry Points on Transmission System is sufficient to ensure that gas comply with the standard on the whole Transmission System
  - Impact: negative impact on new sources of gas developments
  - Remark: More flexibility on distribution level than on transmission level meaning that small scale production points will have an obvious preference for the first although it could be better for an economical/technical perspective to connect on transmission grids
- **Bulgaria:** see Whole chain answers
- **Denmark:** see Whole chain answers

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **France:**

- Benefits:
  - Free flows of gas between all networks, knowledge of the gas quality
  - Network day to day easier: less gas blending and treatment
- Impacts, Feasible, Time, Unintended consequences: see Whole chain answers
- Implementation barriers : see Whole chain answers + because of multiple sources it is impossible for the TSO to deliver the same gas quality in time and space
- Costs: N/A + Depending on the segment of end uses it is not feasible or it will cost a lot of money that will be passed onto the end customer
- Security of supply risks: It reduces the scope of natural gas that can enter Europe.
- Impact in price: rise of the gas price for end customer, invest for LNG and UGS quality treatment
- Remark: In reality the different stakeholders are following the EASEE-gas CBP on gas quality and implementing this scenario will not change a lot of what is happening right now

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **Germany**: (I)

- Benefits:
  - Only the transport of gas on TSO level without any barriers would be ensured
  - Enhanced free trade of natural gas without barriers could decrease transport prices
  - DSO: A reliable situation due to gas quality is expected. Fewer requests for distribution grid operators to adapt the gas to a local standard is expected
  - Industry: No benefit
- Impacts:
  - Many small treatment plants required, including gas quality Control, for "sensitive clients"
  - The TSO will not get gas with quality guarantee of EN 16726 but on the next grid connection point TSO has to fulfill EN 16726
  - When national injection in high-pressure grids had NOT to fulfill EN 16726 a storage risk will occur for the SSOs when this gas is transported to an storage
  - Curtailment of fuel stations (sulfur)
  - Problems especially for biogas injection concerning the O2 and CO_2- limits and with regional hydrogen injection

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **Germany**: (II)

- Implementation barriers : legal barrier on sulfur; huge amount of decentralised gas treatment installations needed
- Costs:
  - The installation of ONE gas treatment facility taking into account an average flow at IPs of 500.000 m3/h would require investments of a high tens of millions (approx.. 75 Mio EUR) per treatment facility. Germany has more than 40 physical IPs
- Time: N/A
- Security of supply risks: Yes, because of time for installation/ no, because there is no legal instruments to refuse gas flow
- Impact in price: increase of transportation fee
- Feasible: no (for a majority)
- Remark: At least filling stations have to be equipped with desulphurisation
- Unintended consequences: in case of an outage of such facilities negative consequences for the network consumers directly connected and storage facilities could occur

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **Hungary**:

- Benefits: no (major), easier handling of gas flows and better usage of the system
- Impacts: investment for gas treatment (sweetening) for production and UGS, close down any UGS, TSO is responsible, unsolvable task for TSO, TSO cants be responsible for the quality for injected gas
- Implementation barriers : economical, legal (Hungarian gas shall be used in Hungarian market) and security of supply. Production at end of life cycle. Small fields. Heterogeneity of GQ , TSO is not capable
- Costs:
  - Storage: 95M€
  - Extremely high cost for TSO
- Time: 2 to 4 years
- Security of supply risks: up to 70% national production shut-in and closure of UGS
- Impact in price: production shut-in could rise gas prices, capacity tariffs increase
- Feasible: No (majority)/ Yes (TSO)
- Unintended consequences: deter investment in prospects due to high CO2 content

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

- **Italy**: see Whole chain answers
  - Impacts: the scenario gives responsibility to TSOs who cannot intervene in case the quality is off-spec
- **The Netherlands**:
  - Benefits: no
  - Impacts: TSO looses the ability to adapt off-spec gas from producers by co-mingling
  - Implementation barriers: see Whole chain answers
  - Costs: N/A
  - Time: 10 years or more for construction of TSO treatment facilities
  - Security of supply risks: no
  - Impact in price: transport tariff increase
  - Feasible: no, specially if compare with IP scenario
  - Remark:
  - Unintended consequences: treatment facilities in urban area should be discussed with public

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **Poland**:

- Benefits: no
- Impacts: investment for gas treatment (drying) will impact tariffs.
- Implementation barriers : financial, operational (equipment needed) and legal (whole chain goes beyond INT NC).
- Costs: N/A
- Time: from 2 to 15 years (different views)
- Security of supply risks: yes/on the contrary (different views)
- Impact in price: yes
- Feasible: No (different views)
- Remark: the scope of parameters in the standard should be adjusted
- Unintended consequences: decrease of power supply flexibility

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **Slovakia**: see Whole chain answers

> **Sweden**: see Whole chain answers

> **Spain**: see Whole chain answers +

- Benefits: more flexibility for non-conventional sources (biomethane and potentially H2 in the future) in the distribution networks. This would reduce the harmonization benefits for the consumers in the distribution networks though
- Remark: all responsibility on TSO

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **United Kingdom (I)**:

see Whole chain answers +

- Feasible: No
- Remark: Given the large number (124) of offtakes from transmission network to the distribution networks, the scenario is considered neither feasible nor desirable for the UK to manage a different gas quality specification on the transmission system to the distribution networks
- Unintended consequences:
  - An unintended consequence could be to install gas processing equipment at the transmission / distribution interface, causing additional costs for no benefit
  - A restrictive standard could prevent future sources of supply coming online and therefore adversely impact security of supply. It could also stifle innovation especially with regards to new sources of gas coming on line

Section 3: Impact analysis of scenarios

Scenario 2: Transmission Networks

> **Norway**: see Whole chain answers

> **Russia**: see Whole chain answers

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Producers (I)**:

- Benefits: We expect no benefits at all. Moreover we have not seen any attempt to identify or substantiate possible benefits of amending the INT NC
- Impacts:
  - Eliminate flexibility for producers (less stringent limits) and end user (more stringent)
  - Production shut-in of gas currently accepted and co-mingled
  - This scenario is probably the most costly one and therefore the one carrying the most significant unintended consequences
- Implementation barriers:
  - Economic: welfare loss (e.g. production shut-in)
  - Operational issues: installation of gas measurement equipment
  - Legal: it goes beyond regulation 715/2009 and Directive 2009/73/EC

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Producers** (II)

- Costs: see “Whole chain” + Additional operating cost of approx. £4 million/year(one producer response)
- Time: considerable, at least 2 years period is required
- Security of supply risks: yes, due to production shut-in and limitation of LNG.
- Impact in price: yes, price will increase in the affected regions
- Feasible: No
- Remark:
- Unintended consequences: see impacts and barriers

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **LNG operators**: see summaries of BE, FR, ES and UK

> **Storage operators:** see summaries of AT, BE, BG, FR, DE, HU, IT, PL, SE, ES and UK

- **See Whole chain answers**
- Benefits: major no +
  - More flexibility on distribution level than on transmission level meaning that small scale production points will have an obvious preference for the first although it could be better for an economical/technical perspective to connect on transmission grids.
  - Since flow direction can be handled more easily due to having the same gas quality standard the system usage will be better,
  - Transparency, overcoming the barriers of the cross border natural gas trade, diversification of the supply sources.
- Barriers: renegotiation of agreement with adjacent operators

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Transmission system operators :** see member state summaries

see Whole chain answers +

- Benefits: Only the transport of gas on TSO level without any barriers would be ensured
- Impacts: Additional costs
- Implementation barriers:
  - renegotiation of agreements;
  - huge amount of decentralized gas treatment installations
  - Lack of cheap, reliable, accurate, integrated and safe sensors for measurements
  - some end-users have gas treatment units designed for different/stricter gas specifications
- Costs: The installation of ONE gas treatment facility taking into account an average flow at IPs of 500.000 m3/h would require investments of a high tens of millions (approx.. 75 Mio EUR) per treatment facility
- Time: responses varying up to 15 years
- Security of supply risks : Yes, in case the treatment installations could not be built in time
- Impact in price: yes
- Feasible: no

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Distribution system operators:**

See whole chain answer +

- Remark:
  - It should also be determined, that distribution grid operators should not have stronger limits that defined in the EN16726, i.e. all gases coming from transportation grids are acceptable by distribution grids. Distribution grids are allowed to accept less strong limit values for single values (i.e. O2 or CO2)
  - An unnecessary and unbeneficial layer of complexity would be introduced at the transmission and distribution interface

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Shippers/Traders**:

See whole chain answers +

- Impact: If several gas treatments are needed to lift the quality in the regional downstream sector to EN-standard and TSOs are obliged to do so, tariffs for the capacity market will massive raise up

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Power generation/mobility**:

See whole chain answers +

- Impacts: in this scenario, gas turbines used in power generation and in industrial applications would not be any longer directly impacted, the gas turbines used in the gas transmission network would continue having similar negative impacts as outlined in the “whole chain”

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Industrial users**:

see Whole chain +

- Benefits:
  - In case end-users at exit points are out of scope any benefits expected
  - More flexibility for non-conventional sources (biomethane and potentially H2 in the future) in the distribution networks
- Impacts:
  - Unwanted, expensive and risky situations at exit points of eligible end users
  - Reduce the harmonisation benefits for the consumers in the distribution networks
  - Application of the CEN standard to the transmission networks would allow for more stringent limits at end-user exit points, providing on-spec gas to end-users and it would eliminate the flexibility to apply less stringent limits at entry points
  - Standard could prevent future sources of supply coming online
  - Implementation on transmission networks only could create problems if a different standard applied on distribution networks

Section 3: Impact analysis of scenarios

Scenario 1: Transmission Networks

> **Domestic/commercial (heating sector)**:
  - See whole chain answers

Section 3: Impact analysis of scenarios

Scenario 3: IPs

- **Austria**: see Whole chain + transmission network answers
- **Bulgaria**: see whole chain + transmission network answers+
  - Feasible: yes

- **Croatia:** no answer

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Belgium**:

- Benefits:
  - Allows to co-mingle gas flows on the Transmission System in order to accept off spec gas
  - Facilitates discussions between TSO when they are looking for options to solve an off-spec gas event
  - Gives more flexibility to develop new sources of gas
- Impacts:
  - need to monitor Gas quality parameters at Entry Points, downstream as gas flows are co-mingled
  - End users connected to gas transmission and distribution system could receive off-spec gas
  - specifications at IP level are more restrictive than those at Domestic exit

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Belgium**:

- Implementation barriers : impossible to achieve if not applied at EU entry points
- Costs: huge investment in gas treatment and R&D for sensors
- Time: n/a
- Security of supply risks: TSO could be obliged to refuse off-spec gas
- Impact in price: expensive gas treatment should be installed - negative influence on tariffs
- Feasible: yes
- Remark: TSO having Entry Point not respecting the CEN standard cannot be requested to respect the CEN standard on its Transmission System and Exit Points

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Denmark**:

- Benefits: remove gas quality barriers between neighboring systems
- Impacts:
  - Suboptimal specification at a border station, e.g. at a border station between two countries where there currently are no issues on this parameter outside the requirements in the CEN standard
  - Barrier for introducing biomethane in the grid
- Implementation barriers:
  - MS competence would have to be overruled
  - Renegotiation of contracts
- Security of supply risks: lower security of supply for adjacent markets
- Impact in price: Price for bring biomethane in-spec
- Feasible: yes
- Remark: the NC INT can handle any barriers between adjacent systems. The requirement for oxygen in grids with sensitive installations is not technically justified and should be re-evaluated
- Unintended consequences: a barrier to decarbonisation of gas

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **France** :

- Benefits:
  - Contract simplification between TSOs
  - Possibility to accept other gas qualities locally
- Impacts: Don’t give a unique view of the gas quality for end users
- Implementation barriers : No
- Costs: N/A
- Time: a few months.
- Security of supply risks: No
- Impact in price: no, but investment in quality treatment should be done
- Feasible: Yes
- Remark:
  - In reality the different stakeholders are following the EASEE-gas CBP on gas quality and implementing this scenario will not change a lot
- Unintended consequences: N/A

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Germany**: (I)

- Benefits:
  - It could help to agree Interconnection agreements, but without secured Entry and Exit specification on national level
  - A reliable situation due to gas quality is expected
- Impacts:
  - Gas treatment installations for huge flows would be necessary.
  - Enormous raise of transmission and storage risks and no defined downstream gas quality

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Germany**: (II)

- Implementation barriers :
  - Legal barrier on sulfur
  - Unmatched legal framework between IPs and national/other injection
- Costs: The installation of ONE gas treatment facility taking into account an average flow at IPs of 500.000 m3/h would require investments of a high tens of millions (approx. 75 Mio EUR) per treatment facility. Germany has more than 40 physical IPs
- Time: several years / more then 10
- Security of supply risks: yes, legal obligations on IPs without harmonized definition for national downstream sector could lead to physical shut-in
- Impact in price: The transport fees will increase
- Feasible: no (for a majority)
- Remark: N/A
- Unintended consequences: potentially for DSOs, CNG and biomethane

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Hungary**:

- Benefits: no
- Impacts: Producers and SSOs will not invest at all to meet the standards
- Implementation barriers : economical, legal and security of supply, TSO's systems need to be modified
- Costs:
  - Covers solely by TSO
  - Storage: 60M€
- Time: 3 to 5 years
- Security of supply risks:
  - The domestic production and storages may need to be restricted
  - closure of UGS
- Impact in price: it could restrict the flow of gas with an impact on the gas price in the affected region, undefined by TSO
- Feasible: No
- Unintended consequences: N/A

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Italy**:

- Benefits: Clearness of rules.
- Impacts: Less flexibility than in voluntary adoption
- Implementation barriers: N/A
- Costs: N/A
- Time: N/A
- Security of supply risks: no
- Impact in price: no
- Feasible: Yes
- Remark:
- Unintended consequences: N/A

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **The Netherlands**:

- Benefits: No benefits. mechanisms to treat gas quality barriers between TSOs exist in the current version of the Network Code Interoperability and Data Exchange
- Impacts: unnecessary gas treatment costs for the TSO
- Implementation barriers: construction of treatment facility due to requirements
- Costs: construction and operation of the TSO treatment facilities
- Time: 6-8 years
- Security of supply risks:
  - not large risk that some depleted gas fields will be abandoned
  - It could restrict the flow of gas
- Impact in price: yes
- Feasible: yes (different views)
- Remark: TSO has more possibilities to adapt the gas quality at the IP by comingling of gas streams, the role of the TSO in this “gas quality conversion” process needs to be defined
- Unintended consequences: scenario could result in an early abandonment of largely depleted gas fields

Section 3: Impact analysis of scenarios

Scenario 1: IPs

> **Poland**:

- Benefits: no
- Impacts:
  - Potential hazard of cutting off some of national production sources.
- Implementation barriers : financial, operational (equipment needed) and legal
- Costs: N/A
- Time: from 2 to 20 years (different views)
- Security of supply risks: yes
- Impact in price: yes
- Feasible: no (one view - yes)
- Remark:
- Unintended consequences: Cut off some supply sources. Higher prices of gas

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Slovakia**: see Whole chain + Transmission network

> **Sweden**: see Whole chain + Transmission network

Impact: The price for bringing biogas to the transmission grid will increase.

> **Spain**:

- Benefits: If the INT NC mechanisms do not prevail, the scenario 3 would be exactly the same as scenario 2. With the same benefits
- Impacts: re-negotiation of interconnection agreements
- Implementation barriers : If CEN standard prevailed over the INT NC mechanisms, the barriers would be the same as in Scenarios 1 and 2
- Costs: 15 bcm in 2015 would become off-spec at IP with Morocco
- Time: n/a
- Security of supply risks: yes, specially for countries downstream.
- Impact in price: yes
- Feasible: yes
- Remark: if it is well done it would neither be costly nor risky
- Unintended consequences: depending on how flexible limits are applied end users may receive gas out of CEN standard

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **United Kingdom (I)**:

- Benefits: barriers at IPs due to different specifications would be removed
- Impacts:
  - It would require TSOs or upstream parties to blend / process gas,
  - Implementation IPs only could create problems if a different standards at other entry points to the transmission network
  - Additional costs for gas processing and monitoring
  - It would treat different sources of flexibility (i.e. interconnectors vs storage and LNG) differently and thereby make them less interchangeable
- Implementation barriers : The nature of the UK pipeline transmission network is not conducive to managing different specifications for gas quality at IPs compared to non-IPs
- Costs: rejected gas would amount to £2 billion only in 2015

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **United Kingdom (II)**:

- Time: somewhere, 5 years
- Security of supply risks:
  - If the standard were applied at IPs only then the gas received at the St Fergus terminals which has CO2 content greater than 2.5% could no longer be accepted because of TSO's obligation to make gas available for offtake at Moffat at this level. This could adversely affect not only the security of supply of GB but also of Northern Ireland and the Republic of Ireland, given that the vast majority of their gas is sourced from the Moffat offtake
- Impact in price: yes, costs would be potentially incurred by the network companies and ultimately passed onto consumers
- Feasible: No
- Unintended consequences: whole chain + transmission network

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Norway**:

- Benefits: Flexibility for TSOs to maintain specifications which are suited to the operational needs
- Implementation barriers:
  - blending may not be enough to meet 2.5% for some fields
  - Economic barriers - possible restrictions to flow gas across interconnection points
  - Operational - gas quality measuring and treatment equipment needed
- Costs: prohibitive
- Time: Up to mid-20s
- Security of supply risks: Yes, negative
- Impact in price: increase of transport costs, increase of gas prices
- Feasible: No
- Remark: The mechanism already provided in the Network Code to solve gas quality issues at interconnection points is fit for purpose
- Unintended consequences: Increased flaring of gas will also be a consequence, with its undesirable environmental effects
- *See also production summary*

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Russia**: see whole chain and transportation network answers

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Producers (I)**:

- Benefits: no
- Impacts:
  - Eliminate flexibility for producers (less stringent limits) and end user (more stringent)
  - Limit LNG supplies and restrict flow across interconnectors
- Implementation barriers:
  - Economic: welfare loss (e.g. production shut-in), volume at stake are significant
  - Operational issues: installation of gas measurement equipment
  - Legal: whole chain goes beyond regulation 715/2009 and Directive 2009/73/EC
  - Installation of CO2 removal unit needed

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Producers** (II)

- Costs: n/a + prohibitive (see Teesside Final Modification Report), rejected gas would amount to £2 billion only in 2015 (see UK summary)
- Time: n/a
- Security of supply risks: yes, negative impact on security of supply
- Impact in price: yes, price will increase
- Feasible: No (majority)
- Remark:
- Unintended consequences: application to interconnection points could spill over to entry points that are co-located with interconnection points

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **LNG operators**: see summaries of BE, FR, ES and UK

> **Storage operators:** see summaries of AT, BE, BG, FR, DE, HU, IT, PL, SE, ES and UK

- Benefits: no
- Impacts: reduce TSOs' flexibility to apply less stringent limits, Don't give a unique view of the gas quality for end users
- Implementation barriers:
  - unmatched legal framework between IPs/Storage connection points and national/other injection eventually impacts the gas flow.
  - Difficulties may occur for TSOs neighbouring non EU countries
- Costs: only 1 operators reported detailed costs adding up to 60 M€
- Time: responses vary from 2 to 5 years and N/A, faster than Scenario 1 and 2
- Security of supply risks: one operator said it would face closure
- Impact in price: yes, due to cost recovery and reduced availability
- Feasible: yes and no (divided views)
- Unintended consequences: scenario should also cover IP at the Entry to Europe

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Transmission system operators (I):** see member state summaries

- Benefits:
  - Contract simplification between TSOs, and possibility to accept other gas qualities locally
  - Allows to co-mingle gas flows on the Transmission System
  - Contract simplification between TSOs
- Impacts:
  - Additional costs associated with more gas processing and monitoring equipment;
  - enormous raise of transmission risks and no defined downstream gas quality;
  - Domestic gas shall not transmitted through IP
- Implementation barriers:
  - renegotiation of agreements
  - regulatory funding if benefits can't be demonstrated
  - lack of cheap and reliable sensors
- Costs: The installation of ONE gas treatment facility taking into account an average flow at IPs of 500.000 m3/h would require investments of a high tens of millions (approx. 75 Mio EUR) per treatment facility
- Time: responses varying from 2 to 6 years, faster than Scenario 1 and 2

>

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Transmission system operators (II):** see member state summaries

- Security of supply risks: negative
  - Legal obligations on IPs without harmonised definition in the same legal framework of the gas quality for national sector could immediately lead to physical shut downs if there is no possibility for commingling
  - Problem regarding security of supply for countries downstream
- Impact in price: Impact on transport fees as result of gas processing/quality monitoring
- Feasible: divided views
- Remark: In reality the different stakeholders are following the EASEE-gas CBP on gas quality and implementing this scenario will not change a lot of what is happening right now
- Unintended consequences:

increased costs for consumers for gas creating an additional comparative disadvantage for the gas business compared to other fuels like coal and lignite

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Distribution system operators (I):**

- Benefits:
  - Less constrains caused by the implementation of the CEN Standard
  - Clearness of rules
  - Cross border trade is not hampered by quality differences
- Impacts:
  - Compatibility of sulfur requirements with national end-use sulfur content and odourisation practices
  - Concerns on biomethane requirements if reinjected into transport
  - Negative influence on safety of the end-user because of less constrains

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Distribution system operators (II):**

- Implementation barriers: Concerning sulphur there is a legal barrier, Less flexibility than voluntary adoption
- Costs: N/A, filling stations have to be equipped with desulphurisation
- Time: Unknown (faster than Scenario 1 and 2)
- Security of supply risks: no/ yes for companies using gas as feedstock
- Impact in price: Yes, gas prices can be slightly higher
- Feasible: yes
- Remark: no need for stipulating this model across the EU, as national technical and/or regulatory/legislative requirements might justify another scope option

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Shippers/Traders**: see scenario 1 and 2

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Power generation/mobility**:

- Benefits: clarity around cross-border flows
- Implementation barriers
- Costs: n/a
- Time: n/a
- Security of supply risks: n/a
- Feasible: n/a
- Unintended consequences: there will be unintended consequences if the end user experiences the wide d range & consequently the very wide WI range

Section 3: Impact analysis of scenarios

Scenario 3: IPs

> **Industrial users**:

- Benefits: no
- Impacts:
  - expensive and risky situations at exit points of eligible end users
  - no defined downstream gas quality
- Implementation barriers: unmatched legal framework between IPs/Storage connection points and national/other injection
- Costs: n/a
- Time: n/a
- Security of supply risks: yes/no.
- Impact in price: Eligible end users will be exposed to higher costs
- Feasible: no, From the perspective of eligible end users this option is unfeasible.
- Unintended consequences: This option has major risks of unintended consequences

Section 3: Impact analysis of scenarios

Scenario 3: IPs

- **Domestic/commercial (heating sector)**:
  - Benefits: No
  - Impacts: negative effects onto client operations if gas quality undergoes frequent changes
  - Implementation barriers: n/a
  - Costs: N/A
  - Time: N/A
  - Security of supply risks: Yes, the risk of supplying gas appliances and chemical companies using gas as a feedstock
  - Impact in price: Not enough information to answer
  - Feasible: Not enough information to answer
  - Unintended consequences: Not enough information to answer

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Austria**:

- Benefits: No investments
- Remark: The present gas quality standard as well as the EN16726:2015 are mandatory on both TSOs and DSOs network. This will not change anything at Austria level compared to the whole chain solution. The application of the standard on voluntary basis in the European member states will not make things change from the present situation where each country has its own standard. From this point of view, all the work performed till now would be unnecessary.
- Feasible: yes

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

- **Belgium**:
  - Benefits:
    - Gives more flexibility to develop new sources of gas
  - Impacts:
    - Risks in terms of SOS which are linked to the mismatch of gas quality specifications. One gas which complies with the national specification in one country could be refused in another country
  - Implementation barriers, Costs, Time, Impact in price: n/a
  - Security of supply risks: yes, see impact
  - Feasible: yes
- **Bulgaria**:
  - Impact:
    - Financial difficulties can appear for smaller TSOs
    - Difficulties may occur for TSOs neighboring non EU countries
  - Security of supply risks: no
  - Feasible: no

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Denmark**:

- Benefits: n/a
- Impacts: n/a
- Implementation barriers:
- Security of supply risks: no
- Impact in price: n/a
- Feasible: yes
- Remark: The existing well functional system of bilateral agreements supported by the NC INT in the non-amended version is preserved. This will ensure that actual problems are solved in the most efficient manner
- Unintended consequences: - n/a

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **France** :

- Benefits: no
- Impacts: any party could reduce gas quality specifications as it wants, no harmonisation
- Implementation barriers : No
- Costs: Time: Security of supply risks: Impact in price: no
- Feasible: Yes
- Remark:
  - Stakeholders agree on the EASEE-gas CBPs. This equilibrium might be broken with a voluntary adoption scenario. It creates barriers when there are none at the moment.
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Germany**: (I)

- Benefits: no
- Impacts:
  - Interruptions may occur
  - Not be possible in IAs to agree on a common standard
  - Unwanted, expensive and risky situations at exit points of eligible end users
  - No free market will be established
- Implementation barriers : Discrimination of different gas sources may arise.
- Costs: -
- Time: current situation
- Security of supply risks: the risk of an interruption (present today)
- Impact in price: no
- Feasible: yes
- Remark: It is feasible but the problem of legal uncertainty is not solved
- Unintended consequences: The problem of legal uncertainty is not solved

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Hungary**:

- Benefits:
  - Gas quality requirements could be handled at national level with common agreements
- Impacts: Exemptions are not favourable on the system, as TSOs need to solve extreme transmission tasks to meet the standards
- Costs: 60 M euro
- Time: it is already, some respondents: 1-3 years
- Security of supply risks: From exempted points gas can not be injected and withdrawn, that can cause SoS problems
- Impact in price: no, but production shut-in could increase the price
- Feasible: no (regulator – yes)
- Remark:
- Unintended consequences: voluntary adoption on a national basis to the whole chain would lead to the same negative impacts as a possible whole chain implementation

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Italy**:

- Benefits: Maximum flexibility pursuance
- Impacts: n/a
- Implementation barriers: no
- Costs: n/a
- Time: n/a
- Security of supply risks: no
- Impact in price: no
- Feasible: Yes
- Remark:
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **The Netherlands**:

- Benefits: possibility to the Netherlands to harmonise the values of the national gas quality specification in accordance to the EN 16726 without having to change the legal framework
- Impacts: no
- Implementation barriers: no
- Costs: no
- Time: n/a
- Security of supply risks: no
- Impact in price: no
- Feasible: yes
- Remark: most easy one to implement of all presented scenarios
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Poland**:

- Benefits: no
- Impacts:
  - Impacts on safety of end-user appliances.
  - Different quality at each entry
- Implementation barriers : need to apply for A-deviation in case of those parameters: H2O DP, HC DP, O2, Total S
- Costs: N/A
- Time: up to 2 years
- Security of supply risks: TSO – no/ industry - yes
- Impact in price: TSO - no impact / Industry - yes
- Feasible: TSO – yes / industry - no
- Remark:
- Unintended consequences: Quality risk for users

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

- **Romania:** scenario would enable an implementation process without any negative impact on the transmission activity in general and on tariffs and security of supply in particular
- **Slovakia**:
  - Benefits: no
  - Impacts:
    - Endangered safety of supply, high costs of implementation (building of new technology for treatment of the gas)
  - Implementation barriers :
  - Costs: N/A
  - Time: n/a
  - Security of supply risks: the certain volumes of gas can become the off-spec gas and might be not allowed to enter the system
  - Impact in price: yes
  - Feasible: yes
  - Remark: difficulties with water dew point

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Sweden**:

- Benefits: The existing well functional system of bilateral agreements supported by the NC INT in the non-amended version could be changed over time in order to serve the market and comply with the standard
- Impacts: no
- Implementation barriers: no
- Costs: n/a
- Time: n/a
- Security of supply risks: no
- Impact in price: no
- Feasible: yes
- Remark:
- Unintended consequences: The market evolution could in worst case be stopped. There could be endless discussion and different rules in regions that will be difficult to handle

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Spain**:

- Benefits: it has more benefits than other
- Impacts:
  - It would necessarily need a negotiation between neighboring countries, in a way that globally it has coherence
  - Depending on how it was implemented
- Implementation barriers : n/a
- Costs: n/a
- Time: n/a
- Security of supply risks: n/a
- Impact in price: n/a
- Feasible: no
- Remark: No, it is too open, we cannot evaluate if it would work before knowing which countries would implement it and how
- Unintended consequences

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **United Kingdom (I)**:

- Benefits:
  - Alows Member States to take account of local conditions
  - Freedom to make changes with partner Member States, building relationships to resolve issues on a bilateral basis
  - Adverse impacts on security of supply would be avoided
- Impacts:
  - Negative if adjacent TSOs adopt different specifications
  - It may limit the UK ability to export
- Feasible: yes
- Remark: It would be useful to understand from the upstream community whether the lack of a harmonised gas quality specification at EU transmission system entry points would be likely to lead to the EU bloc becoming a less attractive option for them to land gas that could go elsewhere (such as LNG) or whether other factors such as regulatory stability and market liquidity are more important when making these decision
- Implementation barriers, Costs, Time, Security of supply risks, Impact in price: no

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

- **Norway**:
  - Benefits: Possibility for TSOs to maintain specifications which are suited to the operational needs
  - Implementation barriers:
    - Negative impact on IP
  - Costs: Time: Security of supply risks: Impact in price:
  - Feasible: yes / No
  - Unintended consequences: voluntary adoption on a national basis to the whole chain would lead to the same negative impacts as a possible whole chain implementation
  - *See also production summary*
- **Russia**: see other scenarios + scenario Voluntary adoption is absolutely unreasonable and unacceptable since it allows for application of terms and requirements that are different from the ones set in the CEN Standard

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Producers**:

- Benefits:
  - Right balance of the interests of producers, transporters and consumer
  - Less cost
  - More flexibility
- Impacts: May be an impact on IP
- Implementation barriers: major “no” + investments into equipment
- Costs: -
- Time: 2-3 years
- Security of supply risks: yes, it could cause negative impact on some IPs
- Impact in price: yes, price could increase
- Feasible: yes/no (divided views)
- Remark: voluntary adoption on a national basis to the whole chain would lead to the same negative impacts as a possible whole chain implementation
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **LNG operators**: see summaries of BE, FR, ES and UK

> **Storage operators:** see summaries of AT, BE, BG, FR, DE, HU, IT, PL, SE, ES and UK

- Benefits: No investments and modification at UGS necessary
- Impacts: no harmonisation
- Implementation barriers: no
- Costs: only 1 operators reported detailed costs adding up to 60 M€
- Time: -
- Security of supply risks: no
- Impact in price: yes, due to cost recovery and reduced availability
- Feasible: yes and no (divided views).
- Remark:
  - mismatch of gas quality specifications between two countries
  - Some answers refer to whole chain
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary Adoption

> **Transmission system operators (I):** see member state summaries

- Benefits: no (majority), less cost, Gives more flexibility to develop new sources of gas
- Impacts:
  - Interruptions may occur
  - Difficulty in interconnection agreements signing
  - No free market will be established. Discrimination of different gas sources may arise
  - No technical security for cross-border transmission/supply
- Implementation barriers: no
- Costs: it is current situation
- Time: it is current situation
- Security of supply risks: see impacts
- Impact in price: no
- Feasible: divided views, mostly seen as feasible

>

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Transmission system operators (II):** see member state summaries

- Remark:
  - The existing well functional system of bilateral agreements supported by the NC INT in the non-amended version is preserved. This will ensure that actual problems are solved in the most efficient manner
  - There is a need to apply for A-deviation in case of those parameters: H2O DP, HC DP, O2, Total S
- Unintended consequences:
  - endless discussion and different rules in regions
  - The problem of legal uncertainty is not solved
  - Quality risk for users

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Distribution system operators:**

- Benefits: No benefits vs flexibility
- Impacts:
  - No progress will be done in comparison to current business. No market development
  - multiple regulations over Europe confuse the market
- Implementation barriers: no
- Costs: no
- Time: n/a
- Security of supply risks: no
- Impact in price: no
- Feasible: yes
- Unintended consequences: The markets will stay diversified and national regulations and individual contracts will determine the market

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Industrial users**:

- Benefits: no
- Impacts:
  - Unwanted, expensive and risky situations at exit points of eligible end users)
  - Loss of flexibility to accept off spec gas
- Implementation barriers: not defined
- Costs: n/a
- Time: n/a
- Security of supply risks: no, on the contrary. Safety issues are as important as SoS
- Impact in price: divided views
- Feasible: divided views, yes (majority)
- Unintended consequences: With voluntary acceptance, the gas using equipment has to comply with the local rules which complicates the sales process

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Shippers/Traders**:

- Benefits: no vs the least cost option + the maximum flexibility pursuance
- Impacts:
  - no clear obligation on parties to resolve issues that may come up

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Power generation/mobility**:

- Benefits:
  - The existing installed infrastructure would not be impacted.
  - It would allow addressing specific challenges/barriers in specific segments on an ad-hoc basis
- Impacts : n/a
- Implementation barriers: n\a
- Costs: n/a
- Time: n/a
- Security of supply risks: n/a
- Impact in price: n/a
- Feasible: yes (and some respondents didn't provide no answers)
- Remark: From the gas turbines manufacturers' point of view, this is the best scenario. Existing installations should be able to continue operating with the gas quality they were designed and optimized for. Currently, defined gas compositions differ in different regions of Europe. Hence, regional differences should continue to be possible in the future
- Unintended consequences:

Section 3: Impact analysis of scenarios

Scenario 4: Voluntary adoption

> **Domestic/commercial (heating sector)**:

- Benefits: independent decision making by Member States
- Impacts: No clear obligation on parties to resolve issues that may come up
- Implementation barriers:
- Costs: N/A
- Time: N/A
- Security of supply risks: can hamper cross-border gas flows in case of emergency
- Impact in price: Not enough information to answer
- Feasible: yes
- Unintended consequences: the gas using equipment has to comply with the local rules which complicates the sales process

Section 3: Open questions

- Interoperability Network Code is enough to eliminate cross-border barriers in gas quality.
- In practice Member States already have gas quality standards in place, many of which include the Wobbe Index
- The current CEN-standard does not include all relevant parameters.
- More knowledge about the needs of the end consumers should be studied
- Due to safety requirement, we support the standard only under the condition that end users at the exit points will not be exposed to a Wobbe Index range exceeding 3-4MJ/m3. Wider ranges and high speed quality changes jeopardize end-users operation
- There is not sufficient evidence that there is a real problem and a potential amendment of the network code could introduce serious restrictions
- The potential benefits of the CEN standard to security of supply have never been assessed
- It should be infrastructure operators and NRA task and/or responsibility to provide a well-based impact analysis.
- As long as there is no completed standard available (including Wobbe; Wobbe Variation; etc), the standard should not be taken over into the network code. The standard became considerably weaker than expected and needs to be revised.
- TSO could be obliged to refuse gas that respects the specifications of a specific Entry Point in Europe but not the specifications set in the CEN standard which applies on Exit Points.
- Unclear situation with gas flow from non-EU countries that are not obliged to implement CEN Standard
- 20% of UK supplies in 2015 would be rejected if CO_2 and O_2 limits are applied (2.5% and 10 ppm) with implementation the Standard

Thank You for Your Attention

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