05

GAS – TECHNICAL OPERATIONAL QUALITY

5.1. INTRODUCTION

For the first time, this CEER Benchmarking Report also covers the gas sector. Although in general the quality of supply regulation of gas networks does not differ from the approaches used in electricity networks, the underlying objective is entirely different. Since gas is a natural resource its quality and composition is of particular importance, especially in an international context (see the natural gas quality indicators in Chapter 6).

Moreover, technical safety is of much higher importance than in the electricity since an interruption of gas delivery may give rise to physical danger and in the worst case with fatalities. This is why an extensive set of gas technical standards and rules have been established for gas internationally. In addition, the ability of gas to be stored leads to a very high quality of supply concerning gas continuity.

In this part, the dimensions "Technical operational quality", "Natural gas quality", and "Commercial quality" will be covered respectively in the following chapters. Each of these chapters contains a brief description of relevant quality factors, initial benchmarking of current quality levels, and standards introduced by NRAs.

The following countries have generously answered questions for gas quality: Austria, Belgium, Croatia, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Slovenia, Spain and Sweden.

5.2. STRUCTURE OF THE CHAPTER ON TECHNICAL OPERATIONAL QUALITY

This chapter gives a brief overview on Continuity of Supply indicators used and regulation that is applied in CEER countries. Firstly, this chapter gives an overview of the structure of the gas networks. Secondly, continuity of supply indicators provided by these countries are presented. Finally, this will be followed by an overview of the regulation in force dealing with Continuity of Supply and safety.

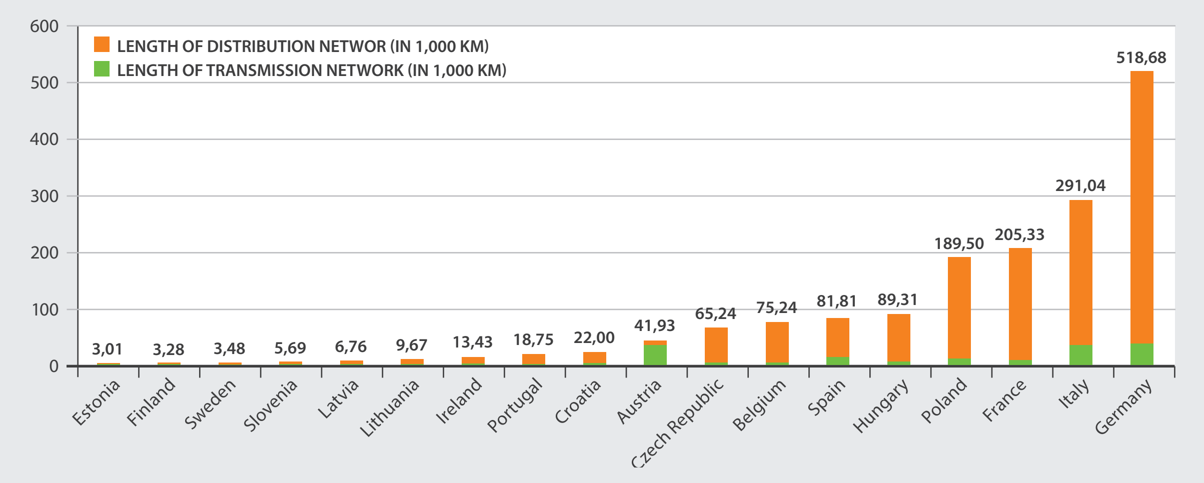
In general, this chapter is based on input from 19 CEER countries: Austria, Belgium, Croatia, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Slovenia, Spain, and Sweden. However, the overall availability of data and information differs noticeably from question to question and hence it is not always possible to compare the answers of all participating countries.

5.3. STRUCTURE OF GAS NETWORKS

At first, it might be helpful to get an overview of the technical structure of gas networks across the Member States. Therefore the definition of pressure levels and the length of the gas networks are shown and compared.

5.3.1 Network length

FIGURE 5.1 LENGTH OF THE GAS NETWORK (IN 1,000 KM) IN 2014



5.3.2 Measurement Points

TABLE 5.1 NUMBER OF MEASUREMENT POINTS

Country	Year	- with remote control	- without remote control	- with compliant measurements to technical standards
Belgium	2010	1,05	30,984	10,361
	2011	1,05	31,95	10,876
	2012	1,05	32,119	10,862
	2013	1,05	29,917	10,271
	2014	1,05	28,858	9,877
Czech Republic	2010	0	4,318	4,318
	2011	0	4,318	4,318
	2012	0	4,328	4,328
	2013	0	4,471	4,471
	2014	0	4,347	4,347
Estonia	2010	3		
	2011	3		
	2012	3		
	2013	3		
	2014	3		
France	2010			
	2011			
	2012			
	2013			
	2014	174,874		
Hungary	2010	620		620
	2011	620		620
	2012	625		625
	2013	630		630
	2014	636		636
Ireland	2010	153	3,1	400
	2011	153	3,2	300
	2012	153	3,2	290
	2013	153	3,3	290
	2014	153	3,477	275
Italy	2010	32,063	98,064	
	2011	33,438	96,73	
	2012	36,438	98,528	
	2013	38,701	97,111	
	2014	42,582	93,465	
Latvia	2010			
	2011			
	2012			
	2013			
	2014	456	8,381	4,624
Portugal	2010	12		12
	20 11	12		12
	2012	12		12
	2013	12		12
	2014	12		12
Slovenia	2010			
	2011			419
	2012			444
	2013			452
	2014			451

5.3.3 Pressure regulated and metering gas stations

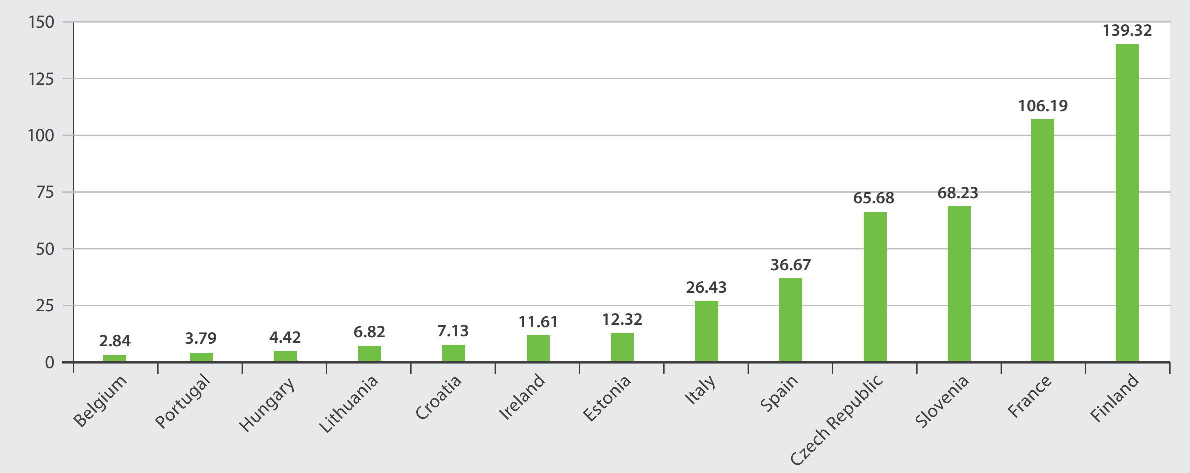
Grid structure and complexity can be shown by the number of pressure regulated and metering gas stations.

Since absolute numbers are not very powerful, the ratio of transformer stations and net length is shown in the next figure. It can be seen that the ratio varies noticeably across countries from a ratio of 2.84 up to a ratio of 139.32.

TABLE 5.2 NUMBER OF PRESSURE REGULATED AND METERING GAS STATIONS

Country	2010	2011	2012	2013	2014
Belgium	213	213	214	214	214
Croatia	159	158	156	157	157
Czech Republic			4,313	4,299	4,285
Estonia		37	37	37	37
Finland	439	454	463	477	456
France	22,626	22,466	22,26	22,045	21,803
Hungary	393	394	395	395	395
Ireland	150	151	151	152	156
Italy	7,563	7,593	7,565	7,596	7,692
Latvia					20,236
Lithuania	65	65	65	66	66
The Netherlands	683	688	685	687	686
Portugal	68	69	71	71	71
Slovenia		350	359	378	388
Spain					3
Sweden	49	49	50	50	

FIGURE 5.2 NUMBER OF PRESSURE REGULATED AND METERING GAS STATIONS PER LENGTH OF THE GAS NETWORK (IN 1,000 KM) IN 2014



5.3.4 Pressure levels

The definition of pressure levels in use varies widely throughout the reporting countries. In some countries more definitions are in use, for example in Ireland, where higher pressure levels are used for onshore and subsea transmission systems.

More interestingly, not only the pressure levels are defined in these countries but also the accepted variations in pressure are regulated in 10 countries that have reported an answer to that question.

TABLE 5.3 PRESSURE LEVELS IN USE

Country	High pressure	Definition	Medium pressure	Definition	Low pressure	Definition	Other
Austria	✓	All transmission pipeline systems are listed in ANNEX 2 of Natural Gas Act 2011	✓	Higher than 6 bar	✓	Lower than 6 bar	
Croatia	✓	In distribution system > 5 bar, whole transmission system	✓	In distribution system > 0.1 bar ≤ 5 bar	✓	In distribution system ≤ 0.1 bar	Transmission system consist of 75 bar and 50 bar working pressure pipelines
Czech Republic	✓	1.6 MPa – 3.9 MPa (16 bar – 39 bar) [1]	✓	5 kPa – 0.4 MPa (0.05 bar – 4 bar)	✓	up to 5 kPa (0.05 bar)	
Estonia	✓	exceeds 16 bar	✓	lower than 16 bar	✓	lower than 16 bar	
France	✓	pressure between 40 and 70 bar	✓	3 types: MPC: pressure between 4 and 25 bar MPB: pressure between 0.4 and 4 bar MPA: pressure between 0.05 and 0.4 bar	✓	pressure <= 50 mbar	
Germany	✓	> 1 bar	✓	> 0.1 bar – ≤ 1 bar	✓	≤ 0.1 bar	
Hungary	✓	MOP > 25 bar	✓	100 mbar < MOP ≤ 4 bar	✓	MOP ≤ 100 mbar	High-medium: 4 bar < MOP ≤ 25 bar
Ireland	✓	Max operating pressure 70 bar	✓	Max. operating pressure 40 bar	✓	Max. operating pressure 19 bar	Distribution system (MOP 16 barg-millibar) Subsea Transmission System MOP =148 barg [2] South West Scotland Onshore System MOP = 85 barg
Italy	✓	It is the gauge pressure of the gas exceeding 5 bar	✓	It is the gauge pressure of the gas exceeding 0.04 bar and not exceeding 5 bar	✓	It is the gauge pressure of the gas not exceeding 0.04 bar	
Latvia	✓	Above 0.4 MPa up to 1.6 MPa (including) (4 bar – 16 bar)	✓	Above 0.005 MPa up to 0.4 MPa (including (0.05 bar – 4 bar)	✓	Up to 0.005 MPa (including) (0.05 bar)	
Lithuania	✓	All gas transmission network pipelines operate at pressure from 16 bar. As regards to gas distribution network, such pipelines are regarded to operate at high pressure if they operate at pressure from 5 to 16 bar.	✓	Distribution network pipelines are considered medium pressure if they operate at pressure from 0.1 to 5 bar. Moreover, medium pressure is divided into 2 sub-categories in the medium level: Category I : from 2 to 5 bar; Category II: from 0.1 to 2 bar.	✓	Distribution network pipelines are considered low pressure if they operate at pressure below 0.1 bar.	
The Netherlands	✓	The pressure of the high pressure network varies from 40 bar to 80 bar. This network is maintained by the TSO. Levels: 40 bar 67 bar	✓	The medium pressure network is maintained by the DSO. P > 200 mbar (high pressure DSO) Levels: 1 bar 2 bar 4 bar 8 bar	✓	The pressure of the low pressure network is smaller than or equal to 200 mbar. The low pressure network is maintained by the DSO. P ≤ 200 mbar (low pressure DSO) Levels: 100 mbar 30 mbar	

Country	High pressure	Definition	Medium pressure	Definition	Low pressure	Definition	Other
Poland	✓	Exceeding 1.6 MPa (16 bar)	✓	Between 10.0 kPa and 0.5 MPa inclusive (0.1 bar – 5 bar)	✓	Up to and including 10.0 kPa (0.1 bar)	Increased medium pressure gas pipelines: between 0.5 MPa and 1.6 MPa inclusive (5 bar and 16 bar)
Portugal	✓	> 20 bar	✓	between 4 and 20 bar	✓	< 4 bar	
Slovenia	✓	For the purpose of answering the questionnaire we will divide the network in this way: > 1 bar	✓	For the purpose of answering the questionnaire we will divide the network in this way: between 100 mbar and 1 bar	✓	For the purpose of answering the questionnaire we will divide the network in this way: < 100 mbar	At the moment there is not a clear definition which divide gas network in different pressure levels. For building the network there are rules which divide network on the network for pressure higher than 16 bars and the network for pressure lower than 16 bars.
Spain	✓	Up to 4 bar (rel) of maximum operation pressure	✓	From 0,05 up to 4 bar of maximum operation pressure	✓	Bellow 0,05 bar (rel) of max operation pressure	

[1] 1 Pa = 1 x 10-5 bar
[2] Bar(a)" and "bara" are sometimes used to indicate absolute pressures and "bar(g)" and "barg" for gauge pressures.

TABLE 5.4 ALLOWED VARIATIONS IN PRESSURE GAS NETWORKS

Country	What variations in pressure are allowed in gas networks?
Austria	1.022 bar to 91 bar (also depending on the pipeline)
Croatia	In transmission system allowed pressure variation are 70 – 75 bar and 45 – 50 bar, with respect to working pressure
Czech Republic	Within the category
France	If it is the MIP ≥ 10 % on the network: see EN 12186 § 9 and guide Gesip [1] § 6: The pressure control system shall maintain the pressure in the downstream system within the required limits and shall ensure that this pressure does not exceed the permitted level.
Hungary	In case of high pressure pipeline system the allowed variations is between 25 bar and 75 bar.
Ireland	8 bar off the 19 bar system 19 bar off the 70 bar system 50 bar of the SUB/SEA offtake
Latvia	Distribution system: low pressure 0.002 MPa; medium pressure 0.01 MPa, 0.4 MPa; high pressure 0.6 MPa, 1.2 MPa, 1.6 MPa
Lithuania	For system of 0.1 – 2 bar pressure variations can be up to 12.5 percent. For system of 2 – 5 bar pressure variations can be up to 7.5 percent. For system of 5 – 16 bar pressure variations can be up to 5 percent.
The Netherlands	This is not regulated
Poland	Transmission system: The pressures at which gaseous fuel is delivered for transmission at physical entry points or off-taken at physical exit points shall be posted on the TSO's website. The change of the value of gaseous fuel pressure published on the TSO's website shall be done in agreement with the proper Interoperating System Operator (ISO) or Customer connected at the physical exit point. In order to assure security of operation of the transmission system and security of supply of gaseous fuel to Customers, the Network User shall be obliged to deliver gaseous fuel for transmission at physical entry points to the transmission system while conforming to the quality parameters required under in the Transmission Network Code (TNC), and maintaining the pressure within the ranges specified in accordance with above mentioned provision. Upon a request from a Customer connected directly to the transmission system, as submitted directly to the TSO, the TSO shall adjust, twice a year, the pressure at the physical exit point where such final Customer off-takes gaseous fuel, to the extent that technical capabilities for pressure adjustment exist at such point. The procedure of pressure adjustment at the physical exit points shall be specified in the technical annexes to the relevant contracts or agreements executed with the ISOs or Customers. In the event of failing to maintain the minimum delivery pressure at a physical entry point to the transmission system, the TSO is entitled to a charge from the Network User on this account.
Portugal	There are no limits.
Spain	Type Maximum Operation Pressure (Minimum granted pressure) High pressure B (APA) P > 16 bar (16 bar) High pressure A (APA) 4 bar < P ≤ 16 bar (3 bar) Medium pressure B (MPB) 0.4 bar < P ≤ 4 bar (0.4 bar) Medium pressure A (MPA) 0.05 bar < P ≤ 0.4 bar (50 mbar) Low pressure (BP) P ≤ 0.05 bar (18 mbar)

5.4. CONTINUITY OF SUPPLY OF GAS NETWORKS

Continuity of supply concerns interruptions in gas supply. In other words, it focusses on the events during which there is no gas at the supply terminals of a network user or the pressure drops below a specific level. Continuity of supply can be described by various quality dimensions. The most commonly used ones are the number of interruptions per year or the unavailability measured by interrupted minutes per year.

In general, it can be assumed that network users expect a high continuity of supply level at an affordable price. The fewer the interruptions and the shorter these interruptions are, the better the continuity is from the viewpoint of the network user. Therefore, one of the roles of network operators is to optimise the continuity performance of their distribution and/or transmission network in a cost effective manner.

Continuity of supply indicators are traditionally important tools for making decisions on the management of distribution and transmission networks. However, in the case of gas networks, safety is of much greater importance than in the electricity branch since unavailability or interruption of supply in many cases may correspond to some danger.

Indicators covering continuity of supply are mainly transferred from the electricity sector, although they cannot be applied and interpreted like in that sector. Since there is the possibility of storage in the grid and because of the very high technical requirements, continuity of supply is not one main scope for decisions for the network operator. Nevertheless, the usually used interruption-indicators are good candidates if one wants to describe and compare continuity of supply internationally.

Many countries who participated to this survey stated that continuity of supply is monitored within their networks country-wide. This monitoring is done in different ways across countries. Differences vary from the kind of interruptions monitored and the level of detail being reported to the interpretation and highlighting of various indicators.

In comparison with electricity, it can be seen that not only interruptions are monitored in the participating countries, but also the causes of interruptions. Moreover, as it can be seen from the following tables, these interruption indicators are also calculated separately for those causes, although not in every country.

5.4.1 Systematic between incidents, leaks, interruptions and emergency

When describing indicators on continuity of supply it is worth mentioning that within the gas sector the quality of supply is not only expressed by continuity indicators but also through incidents that precede an interruption, like incidents or leaks.

As mentioned before, technical safety of gas networks plays an important role when analysing continuity of supply. In contrast to the electricity sector, in gas there exist different types of events that have different consequences for network users and network operators and which therefore need to be handled differently when analysing technical and operational gas quality.

An **incident** can and does happen in every running system. But the existance of incidents is not necessarily an indicator for an interruption since that is dependant on other factors. Incidents may lead to **interruptions** but in many cases, an incident can be fixed without any effect on the supply of customers at all. In some cases there might be interruptions without any incident at all, for example due to maintanance of the grid.

Leaks are a direct indicator for the technical quality of the infrastructure. It means that gas unwantedly leaves the closed system due to corrosion, a pipe burst or some security leaks. The consequences with respect to continuity of supply can differ, since not every leak inevitably entails an interruption for the customer. Leaks may be repaired in due time when observed close to buildings but there is some room for action for the network operator if the leak is observed far away from buildings or populated area.

An **accident** (damage) is the worst of all incidents, where gas is inflamed and physical damage appears.

It is worth mentioning that incidents might rise the risk of leaks, interruptions or damages, but that it is not a necessarily consequence. Moreover, there is some room for action for the network operators especially with respect to failure management.

When monitoring these data it is necessary to have clear definitions of these events that are sufficient to separate between these situations.

In the following tables the different definitions of incidents, leaks, interruptions and damages are presented to give an overview of the varying definitions across countries.

TABLE 5.5 IS THERE A DEFINITION OF GAS INCIDENT?

Country	Is there a definition of gas incident?	If yes, please describe	Answer relates to: Transmission	Answer relates to: Distribution
Austria	Yes	"Failure" means an incident related to a gas pipeline system which can jeopardise the life and health of persons or damage property or another unintended interference with the proper functioning of a natural gas pipeline system; "Interruption" means an interruption of a consumer's supply with natural gas or a restriction of injection capacity due to insufficient pipeline capacity or other technical reasons relating to the transmission or distribution system.		✓
Croatia	No			
Czech Republic	Yes	Random accident is caused by damage to gas facilities, which has resulted in the immediate loss of life, injury or loss of life or gas leaks associated with the subsequent explosion and fire.	✓	✓
Estonia	No		✓	✓
Finland	No		✓	✓
France	Yes	Accidental release of gas, 3 different leak sizes puncture (diameter ≤ 12 mm), hole (12 mm < diameter ≤ 70 mm) and rupture (diameter > 70 mm).	✓	
Germany	Yes	E.g. unwanted gas release.	✓	✓
Hungary	No		✓	✓
Italy	Yes	It is defined as incident from a gas event involving the gas distributed through networks, which interests any part of the distribution and / or installations of end customers, including such apparatus for use, and that results in the death or injury serious people or damage to property with a value not less than € 5,000.00 and is caused by one of the following causes: a) a dispersion of gas (voluntary or not); b) an uncontrolled combustion in an apparatus of use of the gas; c) poor combustion in an apparatus of use of the gas, including that due to insufficient aeration; and d) an inadequate evacuation of the combustion products in an apparatus of use of the gas.		✓
Latvia	Yes	The incident is defined as the damage to the natural gas system, explosion, ignition etc. caused by a technical defect, incorrect exploitation or other unforeseen factors, which endanger health and life of human beings, and environment or causes material losses.		✓
Lithuania	Yes	Regulation of Energy equipment accidents and incidents investigating and accounting, adopted by Ministry of Energy of the Republic of Lithuania (13.03.2010 administrative order No. 1-80) containing precise list.	✓	✓
The Netherlands	Yes	See Table 5.6.		
Slovenia	Yes	Crises (incident) are every unplanned event because of which the operation of gas system is interrupt.	✓	✓
Spain	No			

TABLE 5.6 UNDER WHAT CRITERIA ARE INCIDENTS CLASSIFIED?

Country	DSO respon-sibility	Exceptional event	Force majeure	Third parties	Other	Answer relates to: Transmission	Answer relates to: Distribution
Austria	✓				Planned, unplanned		✓
Czech Republic	✓	✓	✓	✓	a) an imminent danger to life and health, injury or loss of life; b) gas leaks associated with the subsequent explosion and fire; c) damage to gas facilities PDS sudden external intervention when the damage exceeds 500,000,- CZK; d) limitation or interruption of gas distribution to more than 500 supply points; e) the emergence of a situation that could have or has the effect of declaring a state of emergency; and f) Unplanned interruption of gas distribution customers VO with the contracted annual gas consumption over 15 miles per m³ per supply point. This will ord. at his request, 2 x a year provided by the respective customer lists VO leader contractual sales capacity.	✓	✓
Estonia	✓		✓	✓		✓	✓
France	✓	✓	✓	✓		✓	
Germany	✓		✓	✓	Atmospheric influence, feedback effects caused in other networks, others (planned), exchange of meter.	✓	✓
Hungary						✓	
Italy	✓	✓	✓	✓			✓
Latvia	✓	✓	✓	✓			✓
Lithuania	✓		✓	✓	Also according to the termination type: planned and unplanned.	✓	✓
The Netherlands					Category 1: Deadly victims, more than one seriously injured person; loss of more than € 0.5 million to property; major damage to the environment (e. g. buildings or environment); need for coordinated mobilization of emergency services; public concern in the area. Category 2: Potential effects on or off the site (outflow of liquids and gas). For example, more than 0.1 % of the applied outflow quantities in the security calculations); Serious risks to soil pollution, groundwater pollution, air pollution or contamination; surface water as a consequence of an outflow; Risks to humans and animals; The need to switch on emergency services; Need to implement procedural, organisational or technical changes; Repair costs exceed € 0.25 million.		
Slovenia		✓	✓			✓	✓
Spain					Incidents in gas are not classified.		

TABLE 5.7 IS THERE A DEFINITION OF GAS LEAK?

Country	Is there a definition of gas leak?	If yes, please provide the definition	Answer relates to: Transmission	Answer relates to: Distribution
Austria	No			
Belgium	No		✓	
Croatia	No			
Czech Republic	Yes	Gas leaks or is uncontrolled. Unmetered loss of gas from the gas facility, technical rules for gas TPG 905 01.	✓	✓
Estonia	No		✓	✓
Finland	No			
France	Yes	Any unintentional release of gas.	✓	
Germany	Yes	Unwanted gas release.	✓	✓
Hungary	No		✓	
Italy	Yes	Gas leak calculation is detailed and defined for gas transmission system in Gas Network Code and for balancing equation. Gas leak or "dispersion" is the uncontrolled release of gas from the distribution system.	✓	✓
Latvia	Yes	Uncontrolled gas outflow from the gas network into environment, when it is required to perform specific activities in order to ensure safe operation of the facility.		✓
Lithuania	No			
The Netherlands	Yes	Unintended outflow of gas, caused by a failure of a component of the gas distribution network (NEN 7244-9).		✓
Slovenia	No			

TABLE 5.8 WHAT KIND OF CLASSIFICATION IS AVAILABLE FOR GAS LEAKS?

Country	Technical classification based on a degree of dangerousness	Localised after planned inspections	Reported by third parties (1)	Gas leaks per km of network	Gas leaks per number of final customers	Other	Answer relates to: Transmission	Answer relates to: Distribution
Czech Republic	✓	✓	✓				✓	✓
France	✓	✓	✓	✓	✓		✓	✓
Germany	✓	✓	✓	✓			✓	✓
Hungary		✓	✓				✓	
Italy	✓	✓	✓	✓				✓
Latvia	✓	✓	✓	✓	✓			✓
The Netherlands	✓			✓	✓	The DSOs also have data about the other 2 classifications (Localised after planned inspections, Reported by third parties). This data is not available at the NRA.		✓
Slovenia	✓	✓	✓				✓	✓

(1) E.g. via prompt intervention telephone number.

TABLE 5.9 IS THERE A DEFINITION OF EMERGENCY?

Country	Is there a definition of emergency?	If yes, please provide the definition
Austria	No	
Belgium	Yes	See AR16/02/2006 "plans d'urgence et d'intervention", art. 6 § 2
Czech Republic	Yes	A state of emergency is a situation that arose on the gas system or its part as a result of natural disasters, actions of state bodies under a state of emergency, state of emergency or a state of war, accidents on facilities for production, transport, distribution and storage of gas, outstanding balance of the gas system, or in part, terrorist act, or an uncontrolled drop in operating pressure in the high-pressure part of the distribution system (even locally) under 0.8 MPa, which causes a significant shortage of gas or compromising the integrity of the gas system, its safety and reliability throughout the national territory, a defined territory or a portion there of.
Estonia	Yes	An emergency is an event or a chain of events which endangers the life or health of many people or causes major proprietary damage or major environmental damage or severe and extensive disruptions in the continuous operation of vital services and resolving of which requires the prompt coordinated activities of several authorities or persons involved by them.
Finland	No	
France	Yes	
Germany	Yes	
Hungary	Yes	Council Directive 96/82/EC, European Parliament and Council Directive 2012/18/EU.
Italy	Yes	DSO: Emergency is defined as an event that can produce serious effects and / or large-scale safety and continuity of service distribution and causing one or more of the following conditions: a) Unplanned unavailability of delivery points or interconnection points; b) Unplanned unavailability of networks AP or MP or BP that results in the interruption without notice the gas flow to one or more end-users; c) Gas dispersion with interruption without notice of the gas distribution to one or more end customers; and d) Disruption caused by excess or lack of pressure in the network compared to the values required by applicable technical standards. It also defines any emergency event that results in the termination without notice of the gas to at least 250 end-users and for which the gas supply is not activated at all end-users involved present within 24 hours of the start of interruption, with the exception of end-users who are not reactivated when the first attempt to reactivate. TSO: a) Unplanned unavailability of pipelines, total or partial; b) Unplanned unavailability of line installations, total or partial; and c) Unplanned unavailability of compressor stations, total or partial.
Latvia	Yes	National emergency, regional emergency, local emergency.
Lithuania	Yes	The emergency is defined in Low on Civil Security of Republic of Lithuania. It defines 2 aspects of emergency: - emergency event: natural, technological, ecological or social event which corresponds, achieves or exceeds set criteria and also which puts lives, health, social conditions, assets or environment of the citizens in danger; and - emergency situation: situation formed due to emergency event which can cause sudden and great danger for the lives, health, assets, environment of citizens or citizens' death, injury, or other harm.
The Netherlands	No	
Slovenia	Yes	A crisis (incident) is an every unplanned event because of which the operation of gas system is interrupt. Emergency is also defined regarding EU Regulation 994/2010.

TABLE 5.10 UNDER WHAT CRITERIA ARE EMERGENCIES CLASSIFIED?

Country	DSO responsibility	Exceptional event	Force majeure	Third parties	Other	Answer relates to: Transmission	Answer relates to: Distribution
Belgium						✓	
Czech Republic					According to the Public Notice 344/2012	✓	✓
Estonia	✓		✓	✓	TSO responsibility	✓	✓
France		✓	✓	✓	Classification of the accident (leak/rupture) Urbanisation Emergency Plan	✓	
Germany	✓		✓	✓		✓	✓
Italy	✓	✓	✓	✓		✓	✓
Latvia							✓
Lithuania					Extreme situations are classified into 2 levels: - national, - municipal.		
Poland	✓	✓	✓	✓		✓	✓
Slovenia	✓	✓	✓	✓		✓	✓

TABLE 5.11 ARE CAUSES OF INTERRUPTIONS RECORDED?

Country	Are causes of interruptions recorded?	If yes, according to what classification? [1]	Answer relates to: Transmission	Answer relates to: Distribution
Austria	Yes	Network operator, third parties.		✓
Belgium	Yes			
Croatia	Yes	Network operator.	✓	✓
Czech Republic	Yes		✓	✓
Estonia	Yes	Planned and unplanned interruption.	✓	✓
Finland	No		✓	✓
France	Yes	For TSO: Network operator or force majeure. For DSO: DSO (GrDF) operate a data system to classify causes of interruptions recorded.	✓	✓
Germany	Yes	1. Atmospherically influence 2. Caused by third party 3. Responsibility of the network operator 4. Others (planned) 5. Feedback effects caused in other networks 6. Exchange of meter 7. Force majeure	✓	✓

Country	Are causes of interruptions recorded?	If yes, according to what classification? [1]	Answer relates to: Transmission	Answer relates to: Distribution
Hungary	Yes	Force majeure, third parties.	✓	
Italy	Yes	The causes of the interruptions are recorded with reference to: 1. Force majeure, understood as acts of public authorities, unusual natural events for which was declared a state of emergency by the competent authority, strikes, failure to obtain the authorisations; 2. External causes, defined as damage caused by third parties, emergencies and accidents from gas for reasons not attributable to the DSO and TSO; and 3. Other causes, studied come all other causes not included under the previous, including the causes not ascertained.	✓	✓
Latvia	Yes	Planned and unplanned gas supply interruptions, network operator or third party.		✓
Lithuania	Yes	Unplanned interruptions are classified into 3 main categories: Force majeure, third parties and network operator.	✓	✓
The Netherlands	Yes	Vandalism / theft; construction error (in the past); installation error; product error; soil; congealment; customer; pollution; wearing/aging; operation error; internal defect; unknown; other causes.		✓
Portugal	Yes	Force majeure Third parties Network operator Public interest reasons Security reasons		✓
Slovenia	Yes	Planned maintenance, inspections, reconstructions, tests, control measurements, enlargement of network, force majeure, third parties.	✓	✓
Spain	Yes	Situation of transport grid Normal grid operation conditions SOE 0 Situation of exceptional operative condition level 0 SOE 1 Situation of exceptional operative condition level 1 SOE 2 Situation of exceptional operative condition level 2 Situation of Emergency Can only be declared by the Government	✓	
Sweden	No			

5.4.2 Continuity of Supply Indicators

A total of 10 countries use indicators to monitor continuity of supply indicators, both frequency and duration and for both planned and unplanned interruptions.

From the tables shown, it becomes clear that in most countries, where continuity of supply is monitored, the indicators SAIDI, ASIDI, SAIFI, and CAIDI are in use. The use of more than just one indicator to quantify continuity of supply, results in more information being available and more possibilities to compare the results among different countries.

SAIDI and SAIFI are the basic indicators, reported in almost all participating countries, albeit under different names and with different methods for weighting the interruptions. The method of weighting impacts the results and leads to different biases towards different types of network users.

When weighting is based on the number of network users, each user is treated equally, independent of its size and independent of their consumption levels. Whereas when weighting is based on interrupted or contracted power, an interruption gets a higher weighting when the total interrupted power is higher.

Again, it should be noticed, that one single interruption in gas can lead to a high risk of safety and therefore the efforts of network operators to almost completely avoid such an interruption might be greater than in electricity. In general, this might be one reason for having considerably fewer interruptions than in electricity. Another reason for fewer interruptions is that most of the pipelines are below ground level and therefore are less vulnerable than overhead power lines. However, most interruptions last much longer than in electricity.

TABLE 5.12 WHAT RELIABLE INDEXES ARE AVAILABLE AS FAR AS GAS NETWORKS ARE CONCERNED?

Country	SAIDI	ASIDI	SAIFI	CAIDI	Other	Answer relates to: Transmission	Answer relates to: Distribution
Austria	✓ SAIDI = (sum of all customer interruption durations) / (total number of customers served)		✓ SAIFI = (total number of customer interruptions) / (total number of customers served)	CAIDI = (sum of all customer interruption durations) / (total number of customer interruptions) = SAIDI / SAIFI			✓
Croatia					✓ Duration of all interruptions of gas supplies in relation to the number of all end customers which gas supply has been interrupted.		✓
Czech Republic						✓	✓
France		✓	✓	✓			
Germany	✓ SAIDI = Σ(Ni * ri) / Nt N_i - number of customers interrupted by each incident, N_t - total Number of customers in the system for which the index is calculated, r_i - restoration time for each incident (< 100 mbar)	✓ ASIDI = Σ(Li * ri) / Lt N_i - contracted power interrupted by each incident, N_t - total contracted power in the system for which the index is calculated, r_i - restoration time for each incident (< 100 mbar)	✓ SAIFI = Σ(Ni) / Nt (< 100mbar) SAIFI = $\Sigma(L_i) / L_t$ (≥ 100 mbar)	CAIDI = Σ(Ni * ri) / Ni (< 100 mbar) CAIDI = Σ(Li * ri) / Li (≥ 100 mbar)	No	✓	✓
Italy	✓ The number of interruptions for the end customer is defined by means of the following formula: Number of interruptions for customer = $\Sigma C_i / C_{tot}$ where the sum is extended to all n interruptions occurred in the calendar year, and where: • C_i is the number of end-users involved in the i-th interruption considered; • C_{tot} is the total number of end customers served by the distribution company at the end of the calendar year.		✓ The overall duration of interruption for the end customer is defined by means of the following formula: Total duration of interruption for customer = $\Sigma C_i \times t_i$ / Ctot where the sum includes all n outages occurred in the calendar year, and where: • C_i is the number of end-users involved in the i-th interruption considered; • t_i it is the corresponding duration of the interruption for customers Ci; • C_{tot} is the total number of end customers served by the distribution company at the end of the calendar year.				✓

Country	SAIDI	ASIDI	SAIFI	CAIDI	Other	Answer relates to: Transmission	Answer relates to: Distribution
Lithuania	✓ It is average disruption duration for one customer, calculated as: Sum of all customers who encountered planned or not planned disruption times the length of duration (minutes) in the numerator and total number of customers in the denominator.		✓ It is average number of disruption for one customer, calculated as: sum of all customers for who encountered gas distribution disruption in the numerator and total number of customers in the denominator.				✓
The Netherlands	✓ Sum of all customer interruption durations / Total amount of consumers served		✓ Total number of customer interruptions / Total amount of customers served	✓ Sum of all customer interruption durations / Total number of customer interruptions			✓
Poland	✓	✓	✓	✓		✓	✓
Portugal	✓ Average duration of interruptions per exit point (min/exit point): the quotient of the overall duration of interruptions at the exit points over a specific period and the total number of exit points at the end of the period considered.		✓ Average number of interruptions per exit point: quotient of the total number of interruptions at the exit points over a specific period and the total number of exit points at the end of the period considered.		✓ AIT: Average duration of the interruption (min/interruption): Quotient of the overall duration of interruptions at the exit points and the total number of interruptions at the exit points over the period considered.	✓	

TABLE 5.13 AVAILABILITY OF SUB-INDICATORS

Country	Planned/unplanned interruptions	For causes of interruptions	For origins of interruptions	Answer relates to: Transmission	Answer relates to: Distribution
Austria	✓		✓		✓
Croatia	✓				
Czech Republic	✓	✓	✓		✓
France	✓	✓	✓		✓
Germany	✓	✓	✓	✓	✓
Italy	✓	✓			✓
Lithuania	✓	✓			✓
The Netherlands	✓				✓
Poland	✓	✓	✓	✓	✓
Portugal	✓	✓		✓	

TABLE 5.14 CONTINUITY OF SUPPLY INDICATORS IN 2013

Editor	SAIDI	ASIDI	SAIFI	CAIDI	Other	Answer relates to: Transmission	Answer relates to: Distribution
Austria (1)	1.83		0.0057	323.00			✓
Czech Republic						✓	✓
Germany	0.573	0.072				✓	✓
Lithuania	26.9702 (planned) 1.5283 (unplanned)		0.2643 (planned) 0.0045 (unplanned)				✓
The Netherlands	5.10 (planned) 1.01 (unplanned)		0.027 (planned) 0.0067 (unplanned)	195.64 (planned) 122.5 (unplanned)			✓
Poland						✓	✓
Portugal	0.00		0		AIT: 0	✓	
Slovenia	NAP						

(1) Values in 2014: SAIDI: 1.68, SAIFI: 0.0050, CAIDI: 335.

5.5. REGULATION OF CONTINUITY OF SUPPLY AND SAFETY ISSUES

Technical quality of gas networks is mainly a result of operating and maintaining the gas networks by the network operator. In this area, network operators have to follow technical rules and standards with the aim to guarantee a mostly uninterrupted distribution of gas in sufficient quantity and quality and the required pressure.

This section provides an overview of the different regulation frameworks for technical gas quality and safety issues which exist in CEER countries. Since the topic of regulation of technical gas quality is manifold, it is subject to many different indicators. To mention just a few, this section covers the handling of planned interruptions, rules and incentives for safety, whether or not there are rules in force for the restoration of networks in case of an unplanned interruption and if there are any obligations for odorising gas.

5.5.1 Standards in technical gas quality regulation

Continuity of supply refers to the availability of gas to all network users. All reporting countries stated that continuity of supply is monitored within their gas networks country-wide. This monitoring is done in differently ways across different countries. Differences vary from the kind of interruptions monitored and the level of detail being reported to the interpretation and highlighting of various indicators. The methods used for monitoring in the different countries are presented in this section.

Since technical safety is much more important in the gas sector than in the electricity sector, it is covered by accepted technical rules and standards, which are in many cases not subject to direct regulation but it is assumed that network operators follow those rules.

5.5.2 Case Study: The role of technical rules and standardisation for the gas sector in Germany

The general concept of the German energy policy is shaped by market principles. Energy is in principle a matter for the private sector and energy companies act on their own authority. Nonetheless, due to the importance of energy availability to public welfare and to the economy, it is subject to state supervision within a clear legal framework. Putting it briefly, the safety and operation of the German gas supply system is based on a self-administration principle with a minimum of state supervision.

The energy authority within the Federal Ministry of Economic Affairs and Energy, and additional offices in the federal states are responsible for technical safety in gas. According to the principle of self-administration, the Energy Authority normally observes the gas sector and intervenes only if deficits or critical incidents show up. Nonetheless, there is a continuous communication and information exchange between the authorities and the gas sector.

Energy Industry Act ensures safety by self-administration of the gas sector

In Germany, the Energy Industry Act (EnWG: 2005) builds the legal framework for the gas sector, which also implements the European Directives in the field of energy, e.g. the directive for the common gas market 2003/55/EC, replaced now by the new edition 2009/73/EC, and the related EC Regulation No 715 on the gas transmission network access. Regarding the technical functioning of gas infrastructure, the Energy Industry Act is limited to the stipulation of general aims: provision of gas has to be managed in a safe, economic and environment friendly way.

As a specialty, the Energy Industry Act requires in section 49 that energy companies (that means facilities that produce, transmit, distribute, and deliver gas) have to operate their system according to the generally recognised technical rules. Especially according to this section, it is assumed that the generally recognised technical rules have been observed when the technical rules of the German Technical and Scientific Association for Gas and Water (DVGW e. V.)[12] have been adhered to. This means that the German law does not define the features which constitute for example technical safety, but it assumes that, with respect to technical safety, it should be sufficient if an energy company builds and operates according to the generally accepted technical rules.

In addition to the Energy Industry Act, only few additional ordinances refer to technical aspects of the gas infrastructure such as:

- Ordinance for general requirements for connection to and the use of a low pressure network, which directs the contract between the gas network operator and the gas consumer;
- Ordinance for access to gas network, which governs the conditions for which network operators have to admit non-discriminatory access to the network, including biogas injection and capacity allocation; and
- Ordinance for high pressure pipelines, which applies for construction and operation of pipelines with operating pressure over 16 bar as a part of gas transmission systems designated for provision of public with gas or designated for provision of industrial enterprises but outside of the site of this enterprise.

All of these ordinances are referring to the Energy Industry Act section 49, to the quoted DVGW codes of practices as well as to DVGW certification and quality marks.

As a consequence, technical rules serve as additional elements to state regulation. Precondition is the democratic legitimation of these rules provided by comprehensive involvement of all relevant parties – sector, science, administration, politics and society. This precondition leads to the approach of self-administration of the gas techniques:

- The sector builds a representative technical and scientific association and provides expertise (for the gas sector, the DVGW e. V);
- The association obliges itself in statutes and in organisation to guarantee transparency, openness, participation of all interested parties and consensus in the procedures of setting codes of practices. Certainly, the resulting set of technical rules has to be coherent and without conflicts in itself or with view to legislation and national and European standards; and
- Easy availability of the resulting technical rules has to be granted.

The documents developed according to this approach shall give the liberty to choose different solutions and shall be open to the available and innovative technologies in order not to create innovation barriers.

The principles of self-administration are well-proven and advantageous for all parties involved in the gas sector, including the responsible state authorities. Respecting all changes on European and national level, it is also the approach of the future.

The role of the German Technical and Scientific Association for Gas and Water in the German gas sector

As a non-profit organisation German Technical and Scientific Association for Gas and Water (DVGW e. V.) promotes the technological developments of the gas and water sectors and contributes to the effective implementation of new technologies and legislation in practice. In this regard, the DVGW bases its activities on the current requirements of gas and water sector and on the objectives declared in the statutes, i.e. safety, environmental and consumer protection, precautionary principles, hygiene and quality aspects, while taking efficiency and cost-effectiveness into consideration.

As shown previously, German legislation mandates the DVGW to set technical requirements on which the practical work in the gas and water branch is therefore based. These are stipulated in different kinds of DVGW deliverables in descending order of importance: codes of practice, technical guidelines and recommendations. Together these documents build the "DVGW Set of Technical Rules" for gas. This set applies to the design, construction, operation and maintenance as well as to the use of installations, systems and products intended for the public provision of gas, including quality of gas and the qualification requirements for companies and persons involved in the gas sector. In general, it defines primarily the technical safety, environmental and organisational requirements for the provision and use of gas.

Through this, the DVGW essentially provides the yardstick for achieving compliance with safety requirements. Compliance is the final responsibility of the applying companies. All activities of the non-profit association aim at supporting companies in this duty. In this regard, the DVGW follows the described principles of self-administration and acts as an autonomous body, free of the influence of special interests. In addition, the continuous and interactive co-operation between the DVGW, energy authorities and other related authorities contributes significantly to the proper completion of the task. In this context, the DVGW also has a constructive dialogue with BNetzA, focussed on the technical safety

12. http://www.dvgw.de/english-pages/dvgw/

as an important aspect in regulation. For example the well-proven Technical Safety Management System of DVGW's supporting companies qualification, organisation and procedures, could build a good basis for a common approach with the German NRA.

The application of DVGW codes of practice is voluntary in a formal respect but de facto, they are stipulating the obligatory level of safety and technology to be respected by all parties involved in the German gas industry and they are recognised as such by legislation. If other rules and procedures are followed, in the case of incidents and/or accidents, users have to prove that the applied rules and procedures are offering the same safety level as the DVGW codes of practice do.

Procedure of setting DVGW codes of practices

The work of drafting codes of practices, technical guidelines and recommendations follows the same principles and similar procedures as formal standardisation (e.g. DIN, CEN and others), including involvement of all interested parties, enquiries and public hearings. It is carried out by DVGW technical committees which are composed of experts delegated voluntarily for this purpose by gas network operators, utilities, product manufacturers, pipe-construction companies, etc. Approximately 400 gas experts are contributing expertise and experience to the DVGW committees. Thus, the committee elaborates the rules for the sector and ensures hereby a high level of quality, technical safety and reliability.

The procedure of setting codes of practices, technical guidelines and recommendations is laid down in the terms and conditions for DVGW technical bodies and for the elaboration of the "DVGW Set of Technical Rules" (GW 100:2015).[13]

One example demonstrating the interaction of DVGW activities is the introduction of the Technical Safety Management Gas (DVGW TSM). This branch specific system aims at supporting gas network operators to verify, optimise and monitor the internal operational, organisational structure and qualification of the company in line with the gas technical and legal framework. By introducing the DVGW TSM, companies demonstrate conformity in general and in case of incidences with gas.

Based on the DVGW code of practice G 1000 "Requirements related to the qualification and organisation of companies operating facilities for the pipe-bounded supply of the public with gas"[14], a questionnaire has been elaborated covering all relevant gas technical, organisational and legal issues for appropriate organisation and qualification of a gas network operator. For the company, the internal introduction of TSM is a continuous process, starting with the internal self-verification during which the company checks itself whether all requested requirements are fulfilled. Following to this, DVGW experts verify the compliance with the questionnaire and the related requirements in detailed dialogues and give approval by certificate or relaunch the self-verification process. Assuming no major changes, verification and approval is repeated every 5 years.

DVGW TSM is highly appreciated by the energy authorities. In some federal states of Germany, e.g. Bavaria, the proof of DVGW TSM system provides basis for the permission to transport and distribute natural gas according to the Energy Industry Act section 3 requiring the appropriate staff, technical and economic capacities to guarantee the permanent provision of consumers with gas. Additionally, BNetzA as the NRA accepts the value of DVGW TSM for the technical safety and has agreed to take it into account for a future configuration of the quality regulation.

5.5.3 Planned interruptions

A total of 15 of the reporting countries have obligations for giving advance notice of planned interruptions. The time for that advance notice varies clearly between 36 hours in Portugal and almost a year in Hungary, where all planned interruptions for the following year have to be published by the 15 January of each year.

13. A comprehensive overview of new technical standards issued by the DVGW is available on the Internet at www.dvgw-regelwerk.de. Furthermore, an electronic newsletter informs regularly about the publication of new DVGW deliverables and related events. (www.dvgw.de/english-pages/services/standardisation/newsletter).

14. The DVGW codes of practice are accessible via the webpage of DVGW.

TABLE 5.15 IS THERE AN OBLIGATION FOR OPERATORS TO GIVE AN ADVANCE NOTICE FOR PLANNED INTERRUPTIONS?

Country	Obligations for advance notice for planned interruptions	If yes, how long in advance	Answer relates to: Transmission	Answer relates to: Distribution
Austria	Yes	"Planned interruptions and restrictions of injection capacity shall be announced to system users and their suppliers in a suitable manner at least 5 days in advance, and such announcement shall include information about the planned duration of the interruption or restriction. Shorter lead times are permitted subject to the agreement of system users in each individual case."		✓
Belgium	Yes			
Croatia	Yes	Minimum 30 days		✓
Czech Republic	Yes	42 days in advance	✓	✓
Estonia	No	No direct obligation		
Finland	Yes	Not regulated	✓	✓
France	Yes	5 days		✓
Germany	Yes		✓	✓
Hungary	Yes	Until 15 January of every year the planned interruptions have to be published for the calendar year.	✓	
Italy	Yes	As regards the gas distribution the minimum time of notice in cases of scheduled interruption is equal to 3 working days.	✓	(i)
Latvia	Yes	5 working days before planned interruption.		✓
Lithuania	Yes	42 calendar days.	✓	✓
The Netherlands	Yes	At least 3 days in advance.		✓
Poland	**Yes**	Network operators are obliged to give an advice notice to all gas system users about the dates and duration of planned interruptions in delivery of gaseous fuels by press, Internet, radio or television announcements or by any other means customarily adopted in the given location, at least: a) 7 days before the day of planned interruption for customers classified as Connection Group B, subgroup I (i.e. customers who declare off-takes of gaseous fuel in an amount no more than 10 m^3/h of high-methane gas or no more than 25 m^3/h of low-methane gas). b) 14 days before the day of planned interruption for other customers.	✓	✓
Portugal	**Yes**	36 hours	✓	
Slovenia	**Yes**	1 month in advance	✓	✓
Spain	**Yes**	Except for emergency situations, the DSO will proceed to inform in due time for the affected users on the intention to supply disruption, trying in all cases to minimize the impact that the interruption would cause users affected. The DSO will include in such information, the cause that originates the interruption and expected date to resume the supply.		✓

(i) As regards the transport gas the minimum time of notice in cases of scheduled interruption it is equal to 7 working days of delivery points or interconnection and 3 working days on points of redelivery.

5.5.4 Rules and incentives for safety

Since safety issues are much more important in gas networks, different types of regulations or rules are in force. Some countries have introduced a sort of "risk index" and it is the network operator's task to provide these indicators to the public. Although monitored and published, it is not subject to regulation.

TABLE 5.16 IS ANY TYPE OF "RISK INDEX" OF DISTRIBUTION NETWORKS INTRODUCED TO REVEAL NETWORKS' SAFETY STATUS, TO MAKE NETWORKS MORE SECURE OR TO IDENTIFY PIPES REPLACEMENT PRIORITIES?

Country	Is any type of a "risk index" of distribution networks introduced to reveal networks' safety status, to make networks more secure or to identify pipes replacement priorities?	Description	Is this monitored?	Answer relates to: Transmission	Answer relates to: Distribution
Austria	No		No		
Croatia	No		No		
Czech Republic	Yes	In the Czech Republic there is a methodology for evaluating the condition of gas equipment for the purpose of ensuring their operation (TPG 905 01) as well as the methodology for ensuring recovery facility (TPG 700 02, TPG 700 04). These methodologies incorporate both technical insight and depending riskiness of the operation of the device. The purpose of these regulations is to define the optimal approach to the operation and recovery of gas facilities in terms of ensuring their safe, reliable and economic operation.	Yes		✓
Estonia	No		No		
Finland	No		No		
France	No		No		✓
Germany	No		No	✓	✓
Italy	Yes	The distribution company annually prepares the "Annual Report on the risks of gas emission" for each distribution system, considering the number of gas leaks reported by third parties during the reference year and the year prior to reference, specifying for each distribution system material type and the class of the pipeline pressure and road, as required by Technical Specification UNI / TS 11297 Evaluation procedures against gas leakages risks.	Yes		✓
Latvia	No		No	✓	✓
Lithuania	Yes	Regulated companies' competence.	No		
The Netherlands	Yes	The DSO's introduced a kind of risk index (veiligheids indicator). However this is not regulated by the NRA.			
Slovenia	No		No		
Spain	No		No		

Moreover, from all reporting countries, only Italy has adopted a specific financial incentive scheme aimed at improving safety of gas networks which is described as follows:

"The adjustment of the quality of service of the gas distribution provides, inter alia, a mechanism of incentives and penalties based on indicators measured at the level of gas distribution plant which make reference to 2 components (odorisation and gas dispersion). The incentive regulation of odorant is asymmetrical and only reward. The incentive regulation of the reduction of conventional localised disturbances reported by third parties includes both awards that penalty, through a mechanism trend levels (defined ex-ante) and comparing the trend levels and the actual levels (ex-post); it is asymmetrical in caps."

When it comes to financial compensation in situations where technical supply standards are not met, 4 of the reporting countries (the Czech Republic, the Netherlands, Slovenia and Spain) impose network operators to pay such compensations.

5.5.5 Restoration of networks

A total of 8 countries report that the time for restoration after an unplanned interruption is regulated by the NRA. In some countries this rule is set by law (Estonia), some countries use individual rules (France, Italy), and in other countries there is only the obligation to restore gas supply as soon as possible (Austria, Hungary, Latvia). Please see the following table for more information.

TABLE 5.17 IS THE TIME FOR THE RESTORATION OF SUPPLY IN CASE OF UNPLANNED INTERRUPTIONS SUBJECT TO ANY PARTICULAR REGULATION?

Country	Is the time for the restoration of supply for unplanned interruptions subject to any particular regulation (1)	If yes, please describe	Answer relates to: Transmission	Answer relates to: Distribution
Austria	Yes	Ordinance on Gas System Service Quality: "In cases of failures that interfere with supply or injection, system operators shall immediately start repair works, conclude the absolutely necessary repair works as quickly as possible and inform the affected system users of the planned or actual duration of the failure in a suitable manner."		✓
Croatia	Yes	Network codes of gas distribution system.		✓
Czech Republic	No			✓
Estonia	Yes	Natural Gas Act – The consecutive duration of an interruption of gas supply caused by failures may not exceed 72 hours and the total duration of interruptions per year may not exceed 130 hours.	✓	✓
Finland	No			
France	Yes	For GrDF: unless longer period agreed with the customer, the first trip comes within 4 hours when the call is received before 9 pm and the next morning before noon when the call is received during the night between 9 pm and 8 am.		✓
Germany	No		✓	✓
Hungary	Yes	As soon as possible.	✓	
Italy	Yes	1. Specific standard on the maximum number of days of reduction / interruption of capacity at redelivery points due to maintenance operations: it is expected that the TSO, exceeded the maximum number of 3 days, on an annual basis, of interruptions / reductions in capacity (days equivalent to entire capacity) as a result of maintenance activities that impact on the capacity available to a delivery point (net of those provided by the contractual conditions of interruptible and those arising from emergency service), matches an automatic compensation related to the allocated capacity not made available over on the 3rd day equivalent, until the 6th. For compensation, a maximum factor of risk containment for TSO is expected. 2. Specific standard on the maximum number of supply disruptions in the delivery points: with the same purposes of the preceding paragraph, it is provided that the TSO, exceeded the maximum number of interruptions, 0 (excluding emergencies derived from interruptions of service for reasons not attributable to the transport undertaking interruptions with notice and those set by contract terms interruptible) in which, in the reporting year, a delivery point has been involved, an automatic compensation corresponds to the number of interruptions in excess the specific level (up to a maximum of 3). There will also be a maximum value and a minimum compensation for each compensable interruption.	✓	
Latvia	No	Gas supply is restored as soon as possible.		✓
Lithuania	Yes	SAIDI index.		✓
The Netherlands	No			
Portugal	No		✓	
Slovenia	No			
Spain	Yes	Discount on access charges (the discount does not affect the energy component). 1 interruption of less than 5 hours: No discount. 2 interruptions of less than 5 hours in a month: 10 % discount. 1 Interruption from 5 to 24 hours: 10 % discount. For every additional 2 days of interruption: Additional 10 % discount.	✓	✓

(1) E.g. Standard, automatic compensations.

5.5.6 Obligations for odorising natural gas

TABLE 5.18 IS THERE AN OBLIGATION TO ODORISE NATURAL GAS?

Country	Is there an obligation to odorise natural gas?	Odori-sation at trans-portation level:	Odori-sation at distri-bution level:	Are there types of consumers for whom odorisation is not mandatory?	Do DSOs have obligations as far as gas odorisation is concerned?	Please, describe.	Is this monitored	Answer relates to: Trans-mission	Answer relates to: Distri-bution
Austria	Yes		✓	Yes			No		
Croatia	Yes		✓	No	Yes	DSO is obliged to odorise gas and to monitor the effectiveness of odorisation in accordance with the provisions of special laws, regulations, standards, codes of practice and internal technical acts of the DSO regulating the technical conditions of the odorisation.	Yes		
Czech Republic	Yes		✓	Yes	Yes	RWE GasNet used on its grid system combined central and local odorising so that odorisation secured safely and efficiently. It is used as an odorant substance Spot leak 1424 (a mixture of substances TBM and DMS). On a limited scale network is used based on customer requirements (technological consumption VO) sulphur-free odorant S GASODOR free.	Yes		✓
Estonia	Yes		✓						
Finland	Yes		✓	Yes	No	Gas safety is responsibility of Finnish Safety and Chemicals Agency (Tukes). http://www.tukes.fi/en/	No		
France	Yes	✓	✓	No	Yes	In France, gas is odorised by the TSO.	No	✓	✓
Germany	Yes		✓	No	Yes		No	✓	✓
Hungary	Yes	✓		Yes	No	Odorisation is the obligation of TSO. In specific cases the producer, who injects natural gas to the distribution system or the supplier of an island distribution system is responsible for the odorisation.	Yes	✓	
Italy	Yes	✓	✓	Yes	Yes	Odorisation at transportation level is required when the gas delivered is used for domestic or similar use. The distribution company is required to make an annual minimum number of measurements of the level of odorisation of gas per thousand end customers served. Such measures must be carried out in a distributed fashion throughout the year at the critical points of the network in accordance with the provisions of the applicable technical standards (UNI-CIG 7133-2 edition 2014 Gas odorisation for domestic and uses. Part 2: Requirements, check and management).	Yes		✓

Country	Is there an obligation to odorise natural gas?	Odori-sation at trans-portation level:	Odori-sation at distri-bution level:	Are there types of consumers for whom odorisation is not mandatory?	Do DSOs have obligations as far as gas odorisation is concerned?	Please, describe.	Is this monitored	Answer relates to: Trans-mission	Answer relates to: Distri-bution
Latvia	Yes		✓	No	Yes	In particular points according the standards.	Yes	✓	✓
Lithuania	Yes	✓		No			Yes		
The Netherlands	Yes	✓			Yes	DSOs monitor whether the gas is odorised properly. If not, the TSO is warned.			
Poland	Yes		✓	No	Yes	Gas odorisation parameters and the intensity of the odorisation for the low-pressure and the medium-pressure pipelines are contained in secondary law.	Yes		
Slovenia	Yes		✓	Yes	Yes	He is obliged to do the odorisation of gas in distribution system at the entry point of distribution system.	No		
Spain	Yes	✓	✓	No	Yes	DSO is also responsible for the gas odorisation.			
Sweden	Yes	✓		No					

5.5.7 Network losses

In general, losses are defined as the absolute difference between the volume of gas entering the system (metered or estimated at the point of entry) and the customer related amount of gas exiting the system (metered or estimated at the point of exit). The specific definition of network losses varies across countries.

To be able to compare losses across countries in the future, the adoption of a common standard for the expression of losses might be worth considering. Although losses are defined as listed below, additional inaccuracies in their measurement might occur, for example because of the time-lag between measuring input and output.

Moreover, some countries have implemented regulatory rules aimed in reducing losses.

TABLE 5.19 IS THERE A METHODOLOGY TO COMPUTE NETWORK LOSSES IN GAS NETWORKS?

Country	Answer	Is there any methodology to compute network losses in gas networks?
Austria	No	
Belgium	No	
Croatia	Yes	Annual gas losses are determined as difference of the total amount of gas that is taken into the distribution system and the total amount of gas that is delivered from the distribution system to end customers. The total amount of gas that is delivered to the distribution system is calculated as the total measured amount of gas entering the distribution system for a period of 6 hours of June 30 last year to 6 pm on June 30 of the year in which annual gas losses are determined.
Czech Republic	Yes	According to the Public Notice 195/2014.
Estonia	No	
Finland	No	
France	Yes	The Gas Losses and Diverse Discrepancies (LDD) of GrDF equals to the difference between: • Quantity of energy injected by the TSOs at the entrance of the DSO (Removals from the TSOs); and • Quantity of energy metered by GrDF to its customers (metered energy to the customers). Real GrDF LDD = ∑ (Removals from the TSOs – metered energy to the customers) To estimate this, we use: • The daily allocations = energy breakdown among customers supplied by GrDF of "Removals from the TSOs – LDD bought by GrDF" in which "LDD bought by GrDF" is the quantity of energy bought every day by GrDF to compensate its average LDD (2.4 TWh per year); and • Distribution spread account (DSA): calculated after each reading, they equal for each customer to the difference between its quantity of metered energy and the quantity of energy which was allocated to him/her during the same period. DSA = metered quantities – allocated quantities Then we have: ∑ DSA = ∑ (metered quantities – allocated quantities) = ∑ metered quantities – ∑ (Removals from the TSOs – LDD bought by GrDF) = ∑ (metered quantities – Removals from the TSOs) + ∑ LDD bought by GrDF = ∑ LDD bought by GrDF – Real GrDF LDD and Real GrDF LDD = ∑ LDD bought by GrDF – ∑ DSA Example: in 2013, the LDD bought by GrDF equaled 2,414 GWh and S DSA -656 GWh. It then came Real GrDF LDD =3,070 GWh.
Germany	No	
Hungary	Yes	High pressure system: the TSO measures continuously the entry and exit volumes. The metering differences and the transmission losses are defined in a balance sheet form on a daily basis, taking into account the transmission system operator's own consumption and change in its line pack, as well as the input to and off-take from the system. Medium and low pressure system: the losses are computed with the help of an expert model which defines several subcategories of loss.
Ireland	Yes	GNI calculates gas shrinkage losses on a monthly basis across the network. Shrinkage gas includes both fuel gas usage in compressor stations and water bath heaters on the transmission network as well as UAG.
Italy	Yes	High pressure system: gas transmission network codes define losses (measured, calculated and estimated). Balancing equation takes into consideration losses. Tariff regulations recognise average losses.
Latvia	Yes	JSC "Latvijas Gaze" uses 5 methodologies: methodology for technological losses calculation in distribution system, methodology for technological losses in transmission system, methodology for technological losses calculation for Incukalns UGS, methodology of technological losses calculation in user's gas supply system, methodology for calculation of non-balance of technological losses.
The Netherlands	No	
Portugal	No	
Slovenia	No	
Spain	Yes	Yearly balancing among entries and exits to the transport and distribution grids.
Sweden	Yes	Annual gas losses are determined as difference of the total amount of gas that is taken into the distribution system and the total amount of gas that is delivered from the distribution system to end customers.

TABLE 5.20 IS THERE ANY REGULATION IN FORCE AIMED AT REDUCING LOSSES?

Country	Answer	Is there any regulation in force aimed at reducing losses?
Austria	No	
Belgium	No	
Croatia	Yes	The methodology of determining the amount of tariff items for gas distribution prescribing that gas losses are within OPEX which includes the cost of purchasing gas for covering allowed losses of gas amounting to a maximum of 3 % of the total amount of gas entering the distribution system.
Czech Republic	No	
Estonia	No	
Finland	No	
France	Yes	Ministerial order on multi-fluids of 05/03/2014 (article 6) aims at reducing the vented gas in planned works on the transmission network. Use of reduction venting technics is mandatory if the estimation of losses reaches 40 t CH4. If the utilisation of such mitigation measure is not possible, the transporter has to justify it.
Germany	No	
Hungary	Yes	The accepted loss level is determined by the NRA and its level is under the actual loss level to incentivise the system operators to cut their losses.
Ireland	Yes	Incentive to reduce this.
Latvia	Yes	Every year JSC "Latvijas Gaze" elaborates and submits to the Public Utility Commission the plan of decrease of natural gas losses for the next year and the report on performance in the previous year in reference to the plan.
Lithuania	Yes	NCC confirmed the methodology for price calculation which indicates that technical losses projected for the regulatory period (5 years) must be proved by operators when setting the prices-cap. They should also prove any changes in technical losses each year when adjusting price-cap.
The Netherlands	No	
Portugal	No	
Slovenia	Yes	There is a regulative limit of 2%.
Spain	Yes	TSO and DSO have an economic incentive to reduce losses, as they can keep half of the value of the gas if the losses are less than the standard losses recognised by the regulation: Standard losses Distribution grids (≤ 4 bar) 1 % Distribution grids (4 to 16 bar) real losses up to a maximum of 0.39 % Transport grids (> 16 bar) 0.2%
Sweden	No	

5.6. FINDINGS AND RECOMMENDATIONS ON GAS TECHNICAL OPERATIONAL QUALITY

Finding 1

The availability of continuity of supply indicators and safety indicators for gas varies noticeably across all reporting countries.

Although one can observe a general availability of information on continuity of supply indicators, the level of detail varies markedly across the reporting countries.

RECOMMENDATION 1

EXPAND THE COVERAGE OF MONITORING OF CONTINUITY OF SUPPLY INDICATORS AND SAFETY INDICATORS.

It is recommended to extend the reported indicators across the reporting countries so that comparisons are possible across more countries in the future. Consequently, the definition of a basic set of indicators might be useful.

06

NATURAL GAS QUALITY

6.1. INTRODUCTION

Depending on its origin, the composition of natural gas can differ. Gas can be supplied to a country from different sources such as indigenous production, imports from neighbouring countries at interconnection points, or Liquefied Natural Gas (LNG) imports through LNG terminals. As a result of the varying supply mixes and appliance populations, each country has developed its own gas quality standards. This chapter proposes to compare the different standards across the European countries.

This benchmarking analysis is also relevant since European regulations such as the Interoperability Network Code [27] are to be implemented from May 2016 with the aim to facilitate efficient gas trading and transmission across gas systems within the European Union, and thereby moving towards greater internal market integration. Furthermore, work is being carried out by CEN, ENTSOG and other stakeholders to examine the impact of harmonising gas quality across Europe.

6.2. STRUCTURE OF THE CHAPTER ON NATURAL GAS QUALITY

In this chapter, the results allow comparisons of the standards relating to technical parameters applicable in each country and their monitoring frequency. The second part presents the actors who assume the responsibilities and financial risks resulting in gas quality. Finally, CEER provides its findings and observations on natural gas quality.

In total 17 countries responded to this questionnaire. Among these countries, Austria and Germany did not provide technical data given that parameters are defined by technical associations for gas (OVGW for Austria and DVGW for Germany) which set binding guidelines and technical rules according to their national legislation. This means that in Austria and Germany quality requirements for injecting and transporting gas that are set in the General Terms and Conditions for the distribution network, shall comply with OVGW or DVGW regulation, respectively. Therefore, the requested parameters are not monitored by the NRA.

6.3. ANALYSIS OF TECHNICAL PARAMETERS MONITORED BY COUNTRIES

6.3.1 Overview of technical parameters

In the benchmarking questionnaire, NRAs were asked to provide data on several parameters. Some of these parameters represent the chemical composition of natural gas (methane, sulphur, carbon dioxide, etc.). Other parameters such as Wobbe index, Relative Density or Water/Hydrocarbon Dew Point, etc. are considered as important quality parameters, sometimes stipulated in contractual specifications and enforced throughout the natural gas supply chain, from producers through processing, transmission and distribution companies to final end-users.

Table 6.1 presents an overview of the technical parameters monitored by each country. The definitions and characteristics of the main parameters are given in Section 6.3.2.

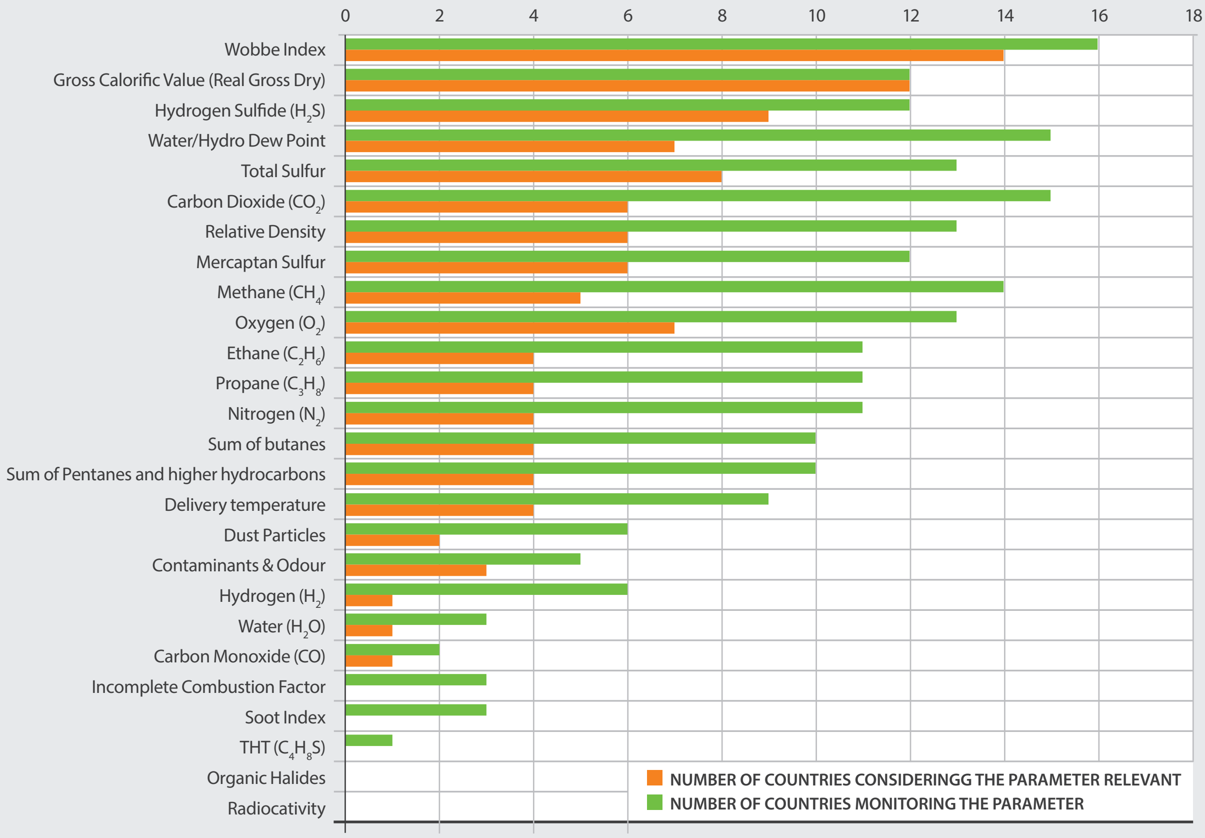
TABLE 6.1 OVERVIEW OF THE PARAMETERS MONITORED BY EACH COUNTRY

Parameters	BE	CZ	EE	ES	FR	GB	HR	HU	IE	IT	LT	LV	NL	PL	PT	SI
Wobbe Index	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Gross Calorific Value	x	x		x	x		x	x		x	x	x		x	x	x
Hydrogen Sulfide (H_2S)	x	x			x	x	x	x	x	x	x	x		x	x	
Water/Hydrocarbon Dew Point	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x
Total Sulphur	x	x	x	x	x	x	x	x	x	x	x			x	x	
Carbon Dioxide (CO_2)	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x
Relative density		x	x	x	x		x	x	x	x	x	x		x	x	x
Mercaptan Sulphur	x	x	x	x	x		x	x		x	x	x		x	x	
Methane		x	x	x	x		x	x	x	x	x	x	x	x	x	x
Oxygen	x	x	x	x	x	x	x	x	x	x	x	x			x	
Ethane		x	x		x		x	x	x	x	x	x		x		x
Propane		x	x		x		x	x	x	x	x	x		x		x
Nitrogen		x	x		x		x	x	x	x	x	x		x		x
Sum of butanes		x	x		x			x	x	x	x	x		x		x
Sum of Pentanes		x	x		x			x	x	x	x	x		x		x
Delivery temperature	x		x		x			x			x	x	x	x		x
Dust particles				x	x			x			x	x	x			
Contaminants & Odour					x	x		x	x			x				
Hydrogen (H_2)				x	x	x			x		x		x			
Water (H_2O)					x			x			x					
Carbon Monoxide (CO)					x								x			
Incomplete Combustion Factor						x			x							x
Soot Index						x			x							x
THT								x								
Organic Halides																
Radioactivity																
Total parameters monitored by country	**9**	**15**	**14**	**11**	**21**	**9**	**13**	**20**	**16**	**15**	**19**	**17**	**8**	**15**	**10**	**14**

Most countries monitor over 10 parameters related to gas quality, while Lithuania, Hungary and France monitor nearly 20, which demonstrates that countries are attentive to gas quality.

However, some countries consider that some parameters are more important than others as shown in Figure 6.1.

FIGURE 6.1 OVERVIEW OF THE PARAMETERS MONITORED BY EACH COUNTRY



In the remainder of this chapter, results for the parameters considered relevant by countries are presented while other results are available in Annex D.

6.3.2 Definitions and characteristics of the main parameters

This section seeks to allow any reader to understand the links between the various parameters and the characteristics of the main parameters.

Gross Calorific Value: The amount of heat evolved by the complete combustion of a unit certain volume of gas with air [28]

Relative Density: The density of gas in relation to the density of air, when both are at the same reference conditions [28]

Wobbe Index: Wobbe Index (WI) is the main indicator of the interchangeability of fuel gases and is frequently defined in the specifications of gas supply and transport utilities. WI is used to compare the combustion energy output with different composition of fuel gases. If 2 fuels have identical WIs at a given pressure and valve setting, then the energy output will be identical. WI is a critical factor in minimising the impact of fluctuations in fuel gas supply and can therefore be used to increase the efficiency of burner or gas turbine applications [28].

Wobbe Index is defined as:

$$Wobbe\ Index = \frac{Gross\ Calorific\ Value}{\sqrt{Relative\ density}}$$

Water and Hydrocarbon Dew Point: Hydrocarbon Dew Point is the temperature (at a given pressure) at which the hydrocarbon components of any hydrocarbon-rich gas mixture, such as natural gas, will start to condense out of the gaseous phase. Hydrocarbon Dew Point is a function of the gas composition as well as the pressure. The Hydrocarbon Dew Point of gas is a different concept from that of Water Dew Point, the latter being the temperature (at a given pressure) at which water vapour present in a gas mixture will condense from the gas [29].

Hydrogen Sulphide and Mercaptan Sulphur: are composed of sulphur which, when present in sufficient volumes, can lead to serious problems such as increased corrosion rates. Odorants added for safety reasons often also contain sulphur which may explain why sulphur content can be very different if a country has odorised its gas on the transmission network.

6.3.3 Wobbe Index, Gross Calorific Value and Relative Density

Wobbe Index is intrinsically linked to Gross Calorific Value and Relative Density, which means that all are considered as significant by countries. The tables and figure below present the standards usually used by countries, the frequency of measurement and the publication of these values at the entry point of the transmission network.

Due to the different gas supply portfolios and gas system configurations, some countries are used to a relatively narrow Wobbe Index bandwidth near 1 kWh/m³, while in other regions the actual distributed gases have a relatively wide Wobbe Index bandwidth near 3 kWh/m³.

Among countries that monitor this parameter, most of them measure the Wobbe Index on a daily basis.

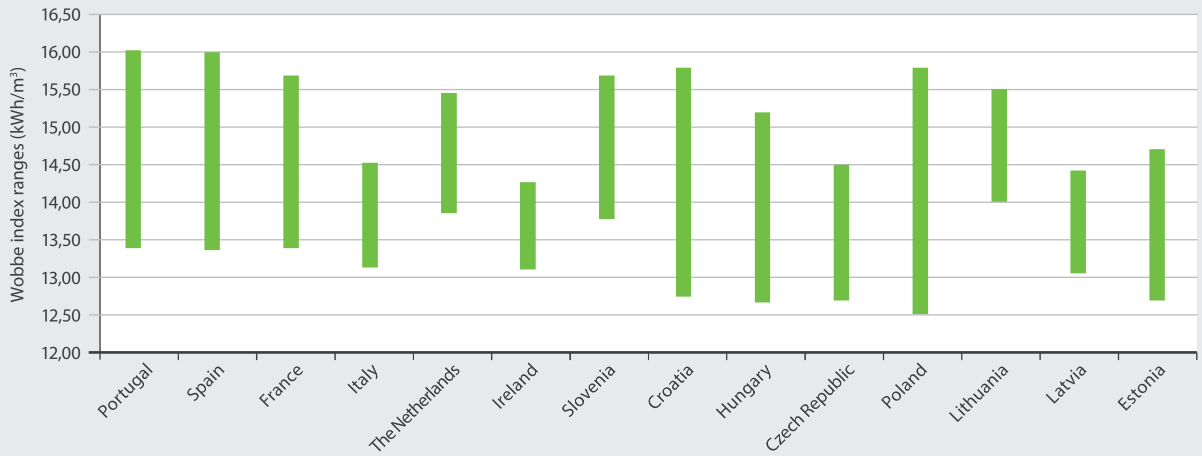
In Figure below, some countries have been classified, side by side, to compare different Wobbe Index ranges between neighbouring countries. Belgium has not been considered in this figure given that different reference conditions have been used in calculating the Wobbe Index.

TABLE 6.2 WOBBE INDEX RANGE AND MONITORING FREQUENCY

Wobbe Index	Min	Max	Unit	Measurement frequency	Frequency of information published
Belgium	12.2	13.02	kWh/m³ (1)	5 minutes	Hourly
Croatia	12.75	15.81	kWh/m³ (2)	Twice per month	Twice per month
Czech Republic	12.7	14.5	kWh/m³	5 minutes	Montlhy
Estonia	12.7	14.7	kWh/m³	5 minutes	Monthly
France	13.4	15.7	kWh/m³	5 minutes	Not published
Hungary	12.68	15.21	kWh/m³ (3)	4 minutes	Daily
Ireland	13.1	14.28	kWh/m³ (3)	Monthly	Yearly
Italy	13.14	14.54	kWh/m³ (3)	Hourly	Monthly
Latvia	13.06	14.44	kWh/m³ (3)	In real time	Monthly
Lithuania	14.02	15.51	kWh/m³	In real time	Daily
The Netherlands	13.86	15.47	kWh/m³ (3)		
Poland	12.5	15.806	kWh/m³	In real time	Monthly
Portugal	13.38	16.02	kWh/m³ (3)	In real time	Monthly
Slovenia	13.79	15.7	kWh/m³	Hourly	Daily
Spain	13.368	16.016	kWh/m³	In real time	Daily

(1) Based on normal reference condition 25°C /0°C while the others values are based on standard reference condition 15°C/15°C.
(2) Values have been converted from MJ/m³ to kWh/m³ which is the standard unit in the Interoperability Network Code.
(3) Values have been converted from kcal/m³ to kWh/m³ which is the standard unit in the Interoperability Network Code.

FIGURE 6.2 WOBBE INDEX RANGE



Portugal, Spain and France have very similar Wobbe Index ranges possibly due to their geographical proximity. However, this is not always the case for other neighbouring countries.

Although the CEN standard has proposed the harmonisation of several parameters relating to natural gas quality, a common Wobbe Index range could not be defined because of different regulations in CEN Member States and limited knowledge of the influence of broadening Wobbe Index range on integrity, efficiency and safe use of appliances in some countries.

Table 6.3 and Table 6.4 present Gross Calorific Value and Relative Density standards used by countries and their monitoring frequency.

TABLE 6.3 GROSS CALORIFIC VALUE RANGE AND MONITORING FREQUENCY

Gross Calorific Value (Real Gross Dry)	Min	Max	Unit	Measurement frequency	Frequency of information published
Belgium (1)	9.53	10.74	kWh/m³	5 minutes	Hourly
Croatia (2)	10.28	12.75	kWh/m³	Twice per month	Twice per month
Czech Republic	9.4	11.8	kWh/m³	5 minutes	Monthly
France	10.7	12.8	kWh/m³	5 minutes	Daily
Hungary (2)	8.6	12.58	kWh/m³	4 minutes	Daily
Italy (2)	9.71	12.58	kWh/m³	Hourly	Monthly
Latvia (3)	9.69		kWh/m³	In real time	Monthly
Lithuania	10.4	12.21	kWh/m³	In real time	Daily
Poland	10.56		kWh/m³	In real time	Daily
Portugal	no value	no value	kWh/m³	In real time	Monthly
Slovenia	10.7	12.8	kWh/m³	Hourly	Daily
Spain	10.23	13.23	kWh/m³	In real time	Daily

(1) based on normal reference condition 25°C /0°C while the others values are based on standard reference condition 15°C/15°C.
(2) Values have been converted from MJ/m³ to kWh/m³ which is the standard unit in the Interoperability Network Code.
(3) values have been converted from kcal/m³ to kWh/m³ which is the standard unit in the Interoperability Network Code.

TABLE 6.4 RELATIVE DENSITY AND MONITORING FREQUENCY

Relative Density	Min	Max	Unit	Measurement frequency	Frequency of information published
Croatia	0.56	0.7	No unit	Twice per month	Twice per month
Czech Republic	0.56	0.7	No unit	5 minutes	Monthly
Estonia	0.555	0.7	No unit	5 minutes	Monthly
France	0.555	0.7	No unit	5 minutes	Not published
Hungary	no limit	no limit	No unit	4 minutes	Daily
Ireland				Monthly	Yearly
Italy	0.555	0.8	No unit	Hourly	Monthly
Latvia	0.55	0.7	No unit	In real time	month, 10 d
Lithuania	0.55	0.63	No unit	In real time	Once per day
Poland				In real time	Monthly
Portugal	0.555	0.700	No unit	In real time	Monthly
Slovenia	0.555	0.7	No unit	Hourly	Daily
Spain	0.555	0.7	No unit	In real time	Daily
CEN standard	**0.555**	**0.7**	**No unit**		

(1) based on normal reference condition 25°C /0°C while the others values are based on standard reference condition 15°C/15°C.
(2) Values have been converted from MJ/m³ to kWh/m³ which is the standard unit in the Interoperability Network Code.
(3) values have been converted from kcal/m³ to kWh/m³ which is the standard unit in the Interoperability Network Code.

Since the relative density range is almost the same in all countries and nearly in line with the standard 0.555 to 0.7 advocated by the CEN standard, a similar spread of values for Gross Calorific Value to that of the Wobbe Index might be observed. This is because the Gross Calorific Value is equal to the Wobbe Index multiplied by the square root of the relative density (see Wobbe Index definition in Section 6.3.1).

6.3.4 Water and Hydrocarbon Dew Point

In the compressed air industry dew point is always a measurement of water content. However, in the natural gas industry, dew point often refers to Hydrocarbon Dew Point.

Table 6.5 and Table 6.6 present the maximum limit of these 2 parameters for each country and the CEN standard's recommendations [30].

In these tables we can notice that all countries that monitor Hydrocarbon Dew Point also monitor Water Dew Point. However, some countries are only monitoring Water Dew Point, which seems to be the most important parameter among these two.

Regarding the results, the maximum limits in Belgium are higher than the CEN standards recommendations for both parameters. The same applies to Lithuania in the case of Water Dew Point. On the contrary, Spain is the only country to have positive maximum limits for these 2 parameters, which seems to be far from the CEN standards recommendations.

Yet, these results should be taken with caution as the maximum allowable temperature may vary according to the time of year or pressure as stated by Poland in Table 6.5 (see footnote).

TABLE 6.5 WATER DEW POINT AND MONITORING FREQUENCY

Water Dew Point	Min	Max	Unit	Measurement frequency	Publication frequency
Belgium	-58	-15.5	°C	In real time	Not published
Croatia		-8	°C	Twice per month	Twice per month
Czech Republic		-7	°C	In real time	Not published
Estonia		-8	°C	In real time	NA
France		-5	°C		
Hungary		-8	°C	Twice per month	Twice per month
Italy		-5	°C	In real time	NA
Lithuania		-10	°C	Monthly	Not published
The Netherlands		-8	°C		
Poland		-5/3.7 (1)	°C	In real time	Monthly
Spain		2	°C	NA	NA
CEN standard		**-8**	**°C**		

(1) based on normal reference condition 25°C /0°C while the others values are based on standard reference condition 15°C/15°C.

TABLE 6.6 HYDROCARBON DEW POINT AND MONITORING FREQUENCY

Hydro Dew Point	Min	Max	Unit	Measurement frequency	Publication frequency
Belgium	-15	-6	°C	10 minutes	Not published
Croatia		-2	°C	Twice per month	Twice per month
Estonia		-2	°C	In real time	NA
France		-2	°C	5 minutes	Not published
Hungary		-2	°C	Twice per month	Twice per month
Italy		0	°C	Monthly	NA
Lithuania		-2	°C	Monthly	Not published
Poland		0	°C	In real time	Monthly
Spain		5	°C	NA	NA
CEN standard		**-2**	**°C**		

6.3.5 Chemical content

Gas usually contains a small amount of sulphur as a result of decaying organic substances. This can be as hydrogen sulphide, carbonyl sulphide, mercaptans, and/or other kind of sulphides, depending on the origin of the gas and its treatment.

Furthermore, the majority of artificial odorants contain strong sulphur organic compounds. These odorants are added to nearly all distribution grids and also to some transmission grids to give gas a smell for the purpose of leak detection.

In some gas storage facilities, higher sulphur contents can lead to serious problems such as increased corrosion rates, degradation of glycol, disposal of produced water and higher sulphur dioxide content in exhaust gases.

Table 6.7 presents the maximum acceptable Sulphur content for each country.

TABLE 6.7 TOTAL SULPHUR MAXIMUM VALUE

Total Sulphure	Max	Unit	Measurement frequency	Frequency of information published
Belgium	30.0	mg/m³	10 minutes	Not published
Croatia	30.0	mg/m³	Twice per month	Twice per month
Czech Republic	30.0	mg/m³	5 minutes	Monthly
Estonia	30.0	mg/m³		Yearly
France	150.0	mg/m³	5 minutes	Daily
Great Britain	50.0	mg/m³		
Hungary	100.0	mg/m³	20 minutes	Daily
Ireland	50.0	mg/m³	Monthly	Yearly
Italy	150.0	mg/m³	Defined by TSO	Defined by TSO
Lithuania	30.0	mg/m³	Quarterly	Not published
Poland	40.0	mg/m³	In real time	Monthly
Portugal	50.0	mg/m³	In real time	Monthly
Spain	50.0	mg/m³	In real time	
CEN standard	**20.0**	**mg/m³**		

As recommended by the CEN standard, the maximum acceptable sulphur content for conveyance should be 20 mg/m³, which is current practice according to CEN in high-pressure networks non-odorised gas. However, with respect to transmission of odorised gas between high-pressure networks, a higher sulphur content value up to 30 mg/m³ may be accepted.

None of the above countries are within the 20mg/m³ set by the CEN standard. France, Hungary, Ireland and Latvia indicated that the gas is odorised at the transmission level which explains some very high sulphur values. For these countries, the amount of odorant added to the gas is provided in Table 6.8 below.

TABLE 6.8 ODORANT

Odorant	Min	Max	Unit
France	15	40	mg/m³
Hungary	13	25	mg/m³
Ireland	3	10	mg/m³
Latvia	8		mg/m³

Table 6.9 and Table 6.10 present the maximum Hydrogen Sulphide and Mercaptan Sulphur values applicable by countries.

Some high values for Hungary, Italy, Latvia, Lithuania, Poland and Spain may also be due to gas odorisation at the transmission level.

TABLE 6.9 HYDROGEN SULPHIDE (H_2S) MAXIMUM VALUE

Hydrogen sulphide (H_2S)	Max	Unit	Measurement frequency	Publication frequency
Belgium	5.0	mg/m^3	5 minutes	Not published
Croatia	6.0	mg/m^3	Twice per month	Twice per month
Czech Republic	6.0	mg/m^3	In real time	Monthly
France	5.0	mg/m^3	5 minutes	Daily
Great Britain	5.0	mg/m^3		
Hungary	20.0	mg/m^3	20 minutes	Daily
Ireland			Monthly	Yearly
Italy	6.6	mg/m^3	Defined by TSO	Defined by TSO
Latvia	7.0	mg/m^3	10 days	Monthly, 10 days
Lithuania	7.0	mg/m^3	Monthly	Not published
Poland	7.0	mg/m^3	In real time	Monthly
Portugal	5.0	mg/m^3	In real time	Monthly
Spain	15.0	mg/m^3	In real time	
CEN standard	**5.0**	**mg/m^3**		

TABLE 6.10 MERCAPTAN SULPHUR MAXIMUM VALUE

Mercaptan Sulphur maximum value	Max	Unit	Measurement frequency	Publication frequency
Belgium	6.0	mg/m^3	1 minute	Not published
Croatia	6.0	mg/m^3	Twice per month	Twice per month
Czech Republic	5.0	mg/m^3	In real time	Monthly
Estonia	6.0	mg/m^3		
France	6.0	mg/m^3	5 minutes	Daily
Hungary	No limit	mg/m^3	20 minutes	Daily
Italy	15.5	mg/m^3	Defined by TSO	Defined by TSO
Latvia	16.0	mg/m^3	10 days	Monthly, 10 days
Lithuania	16.0	mg/m^3	Monthly	Not published
Poland	16.0	mg/m^3	In real time	Monthly
Portugal		mg/m^3	In real time	Monthly
Spain	17.0	mg/m^3	In real time	
CEN standard	**6.0**	**mg/m^3**		

6.4. RESPONSIBILITIES REGARDING NATURAL GAS QUALITY

6.4.1 Responsibilities between TSO and Shipper

If gas quality is not met, it is important to know who is responsible in any given situation. The legal and financial responsibilities are presented in Figure 6.3 and in Table 6.11 listed by country.

For 8 countries the TSO and the shipper are responsible from a legal point of view while 5 other countries consider that both parts are also financially responsible. However, Table 6.11 brings further clarification on the shared responsibilities between the TSO and the shipper.

FIGURE 6.3 RESPONSIBILITIES BETWEEN THE TRANSPORTER (TSO) AND THE SHIPPER ACCORDING TO THE COUNTRIES

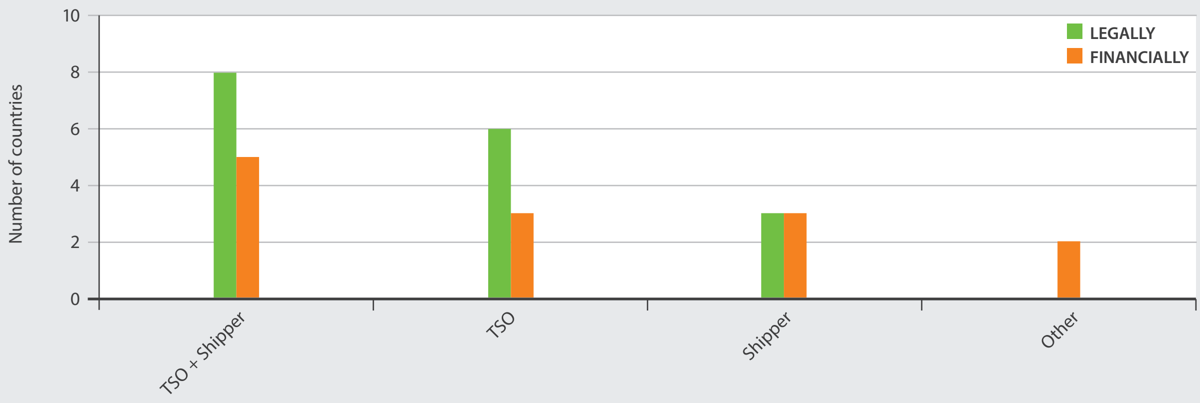


TABLE 6.11 FURTHER CLARIFICATION ON THE RESPONSIBILITIES BETWEEN TSO AND SHIPPER

Countries	Responsibilities	Further clarification
Austria	TSO (legally) Shipper (financially)	The TSO is entitled to refuse acceptance of off-spec gas at the entry point. The system user (shipper) shall be liable to the TSO for costs incurred by the TSO in connection with the cleaning and overhauling of the transmission system and the recovery of full operational performance, and shall indemnify and hold harmless the transmission system operator including towards third parties on whatever legal grounds.
Estonia	TSO (legally)	TSO determines the composition of natural gas entering the transmission network and based on this compiles the average composition of natural gas delivered during the accounting month. Quality of natural gas must be in accordance of TSO standard.
France	TSO + shipper (legally and financially)	TSO has the responsibilities to control gas quality. Shippers are responsible to provide gas within the maximum permissible limits.
Great Britain		The TSO is entitled to refuse acceptance of off-spec gas at the entry point and is legally liable if it conveys off-spec gas in its network. The system user (shipper) is responsible for delivering compliant gas to the TSO's system which it enacts via the upstream party.
Hungary	Shipper (legally and financially)	The shippers are responsible for the quality of the injected natural gas. TSO controls the quality parameters and in case of off-spec gas calls the Shipper for renomination. If the shipper nominates other than 0 volume then it takes the responsibilities.
Ireland	TSO + shipper (legally) Shipper (financially)	TSO has responsibilities to maintain system gas quality but can recover costs from shippers.
Poland	TSO (legally and financially)	National System: according to point 3.2.1. of the Transmission Network Code (TNC), the risk related to the transported gaseous fuel shall pass on the TSO upon the delivery of the gaseous fuel to the transmission system at the physical entry point specified in point 3.1.4. of the TNC. According to point 3.2.2. the risk related to the transported gaseous fuel shall pass on the system user upon the off-take of the gaseous fuel at the physical exit points from the transmission system specified in point 3.1.5. of the TNC.
Slovenia	Shipper (legally)	TSO has an inspection body for gas meters in volume conversion devices. Inspection body is accredited by Slovenian Accreditation (SA). Appointment of inspection body depends on the Metrology institute of the Republic of Slovenia.
Spain	TSO + shipper (legally and financially)	The shipper/trader that introduces the gas into the system (or brings an LNG cargo) is responsible for the quality of the gas introduced to the system (until the moment of the introduction at the system). Once the gas is in the system, LSO, TSO and DSO are responsible for keeping the gas quality inside their facilities.

6.4.2 Cross border responsibilities

Since gas resources are exchangeable on the market, the question of shared responsibilities of transporters between 2 bordering countries is important. As shown in Figure 6.4 and Table 6.12, countries have different views on this subject.

A total of 5 countries consider that the responsibilities have to be at the TSO exit while 6 other countries state the responsibilities have to be shared between both TSOs on either side of the interconnection point.

Table 6.12 gives further clarification on this notion of shared responsibilities at the interconnection point in 2 countries.

FIGURE 6.4 SHARED RESPONSIBILITIES OF TRANSPORTERS BETWEEN 2 BORDERING COUNTRIES

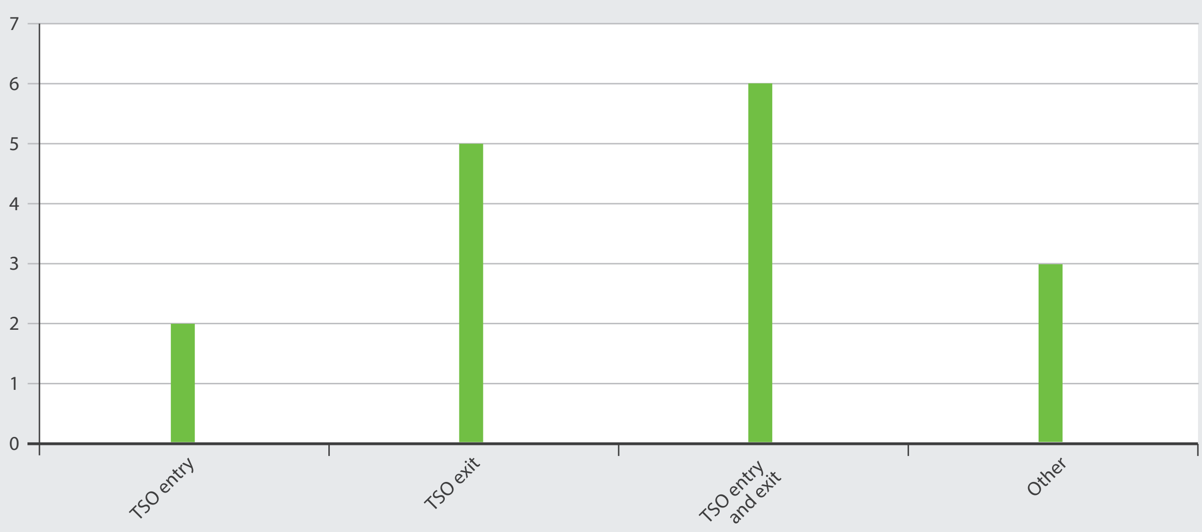


TABLE 6.12 FURTHER CLARIFICATION ON THE SHARED RESPONSIBILITIES BETWEEN TRANSPORTERS

Countries	Responsibilities	Further clarification
Austria	Other	In the interconnection point agreements gas quality is just included regarding which of the adjacent TSOs is responsible for the installation, operation and maintenance of the measurement equipment (including gas quality). Breaches of natural gas quality are handled on both sides of the interconnection point in a TSO-shipper relationship that governs the responsibilities for refusing off-spec gas.
France	TSO entry	Upstream TSO must inform downstream TSO of any breaches. Downstream TSO decides or not to accept gas and in which condition.

TABLE 6.13 PROCEDURES BETWEEN TSOs

Countries	Procedures between TSOs	Further clarification
Austria	No	NA
Belgium	Yes	Some Interconnection agreements foresee that receiving party takes all reasonable endeavours to accept the off-spec gas (i.e., if it is able to lend it with other gas flows to make it in-spec again).
Croatia	No	NA
Czech Republic	Yes	Specified in interconnection agreements.
Estonia	No	NA
France	No	NA
Germany	Yes	NA
Great Britain		Specified in interconnection agreements.
Hungary	Yes	Specified in interconnection agreements.
Ireland	No	NA
Italy		NA
Latvia	Yes	Contracts with TSOs provide for physical – chemical characteristics of gas agreed between parties. When gas quality characteristics do not comply with what is specified in the contract, cross-border gas supply is stopped until the supplier renews gas supply that matches the specification.
Lithuania	Yes	TSO cannot accept the natural gas if quality is below their requirements.
The Netherlands	Yes	Specified in interconnection agreements.
Poland	Yes	There are procedures described in the interconnection agreements concluded between the adjacent TSOs. Each agreement describes specific procedure applied to the given interconnection point at both national systems. Flow breaches of natural gas quality specification at the Polish Section of Yamal Pipeline are also subject to intergovernmental agreement between the Republic of Poland and Russian Federation.
Portugal	No	NA
Slovenia	No	NA
Spain	No	NA

Certain countries have also set up procedures or agreements at the interconnection point between 2 TSOs from 2 bordering countries as described in Table 6.13

As required in the Interoperability Network Code (Chapters II and IV) [30], these agreements which would allow clear rules for cross border exchange should be set up by all TSOs by 1 May 2016.

6.4.3 Findings on Natural Gas Quality

The European Commission has signalled its intent to amend the Interoperability Network Code to include the CEN Standard. ENTSOG has been asked to carry out a detailed analysis on the impact of making the standard binding and based on the evidence, to submit a draft code amendment by June 2017. Due to differing views between the European Commission and certain Member States regarding the possible amendment of the Interoperability Network Code, no conclusions can be drawn at the moment. However, the tables above show that a number of national parameters are outside of what is allowed by the CEN standard.

If the CEN standard was made binding, TSOs might need to invest in costly treatment processes in order to accept gas that would now be outside of specification. The alternative would be to refuse gas that does not meet the CEN standard, thus potentially creating future security of supply issues. Nevertheless, if the standard is implemented by the Commission, it may – in the long term – contribute to reducing restrictions in cross border gas flows and commercial market efficiency.

It is therefore vital that any attempts to harmonise gas quality undertake the following:

- Set out the problem that they are trying to solve (and why the current arrangements are not sufficient);
- Be a proportionate response to the issue, having considered the impacts on the gas value chain of making the standard binding; and
- Do not have any unintended consequences on; inter alia, security of supply.

07

GAS – COMMERCIAL QUALITY

7.1. WHAT IS COMMERCIAL QUALITY AND WHY IS IT IMPORTANT TO REGULATE IT

In a liberalised natural gas market, the customer has either a single contract with the supplier (SP) or separate contracts with the supplier and the distribution system operator (DSO), depending on the national regulations. In both cases, commercial quality is an important issue.

Commercial quality is directly associated with transactions between gas companies (either DSOs or suppliers, or both) and customers. Commercial quality covers not only the supply and sale of gas, but also various forms of contacts established between gas companies and customers. New connections, disconnection upon customer's request, meter reading and verification, repairs and elimination of pressure problems, claims processing are all services that involves some commercial quality aspect. The most frequent commercial quality aspect is the timeliness of services requested by customers.

Where it concerns the need for commercial quality indicators, a distinction should be made between the deregulated market of natural gas energy and the regulated market of network operation. The energy NRA normally does not intervene in the deregulated market, as competition between retailers is expected to result in the sufficient quality. However, in some cases, a certain level of customer protection is needed. The need for such protection differs among different types of customers.

Network operators (i.e. the regulated market) are natural monopolies, free or almost free from competition. Commercial quality indicators help ensure a sufficient level of quality of service by network companies. In some countries, a regulatory framework based on financial incentives (e.g. a bonus/penalty system) has been set: if the operator's performance reaches the quality level expected, it can get a bonus equal to or higher than zero, and if not, it will have to pay a penalty and/or compensation to the affected customer. Numerous commercial quality aspects (e.g. times for connections) in the deregulated market of natural gas energy are also related to distribution networks and therefore, given their monopolistic nature, should still be regulated.

EU legislation provides a framework for commercial quality measures. Directive 2009/72/EC and Directive 2009/73/EC require that Member States shall take appropriate measures to protect final customers, to ensure that they:

- Have a right to a contract with their gas service provider that specifies: the services provided, the service quality levels offered, as well as the time needed for the initial connection; any compensation and the refund arrangements which apply if contracted service quality levels are not met, including inaccurate and delayed billing; and information relating to customer rights, including on the complaint handling and all of the information referred to in this point, clearly communicated through billing or website.
- Benefit from transparent, simple and inexpensive procedures for dealing with their complaints. In particular, all customers shall have the right to a good standard of service and complaint handling by their electricity/natural gas service provider.

Based on these Directives, the national authorities have a duty to monitor the time taken by TSOs and DSOs to make connections and repairs. While these requirements concern the regulated part of energy markets, their functioning is essential for retail markets as a whole. Therefore, it is important to monitor these key services and their timely provision by DSOs so as to provide a full picture of market functioning from a customer perspective.

7.2. STRUCTURE OF THE CHAPTER ON GAS COMMERCIAL QUALITY

The 6th Benchmarking Report is the first CEER Benchmarking Report that includes a part devoted to gas. The Gas commercial quality chapter adopts a largely similar structure as the 5th Benchmarking Report for the commercial quality part for electricity. First, it presents the main aspects of commercial quality and categorises indicators into 6 groups (compared to 4 for electricity), then it provides the list of indicators and the approaches for regulating gas commercial quality.

The contents of this chapter on commercial quality are based on answers provided by 17 CEER countries: Austria, Belgium, Croatia, the Czech Republic, Estonia, France, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Slovenia, Spain and Sweden. The results of the benchmarking are presented in Section 7.4, organised by main groups of commercial quality aspects. A summary of the benchmarking results is provided in Section 7.6.

7.3. MAIN ASPECTS OF GAS COMMERCIAL QUALITY

Like in electricity, commercial transactions between gas companies and customers are traditionally classified as follows:

- Pre-contract transactions, such as information on connection to the network and prices associated with the supply of gas. These actions occur before the supply contract comes into force and incorporate actions by both the DSO and the supplier. Generally, customer rights with regard to such actions are set out in codes (such as Connection Agreements and the General Conditions of Supply Contracts) and are approved by the NRA or other governmental authorities;
- Transactions during the contract period, such as billing, payment arrangements and responses to customers' complaints. These transactions occur regularly like billing and meter readings or occasionally (e.g. when the customer contacts the company with a query or a complaint).

The quality of service during these transactions can be measured by the time the company needs to provide a proper reply. These transactions could relate to the DSO, the supplier/universal supplier (USP) or to the meter operator (MO) and could be regulated according to the regulatory framework of the particular country.

An issue is which customer class (pressure level) the regulation should focus upon. As the database for this section was short, this chapter focuses on all types of customers with a connection to the low pressure, medium pressure and high pressure networks.

7.3.1 Main groups of gas commercial quality indicators

In order to simplify the approach to such a complex matter as commercial quality, indicators relating to commercial quality have been classified into 6 main groups:

- Customer information (Group I)
- Customer Care (Group II)
- Grid access (Group III)
- Activation, Deactivation, and Reactivation of supply (Group IV)
- Metering (Group V)
- Invoices (Group VI).

7.3.2 Commercial quality indicators and their definitions

For the first time, the quality of gas is evaluated in a CEER Benchmarking Report. In this 6th Benchmarking report, "standard" refers to the minimum levels of service quality, as defined by the NRAs, that a company is expected to deliver to its customers. Indicators are defined as a way to measure dimensions of service quality. NRAs can define standard for indicators or they can define indicators without standards and just publish the indicator values of the companies. Therefore, what is "overall" or "guaranteed" are the indicators, not the standards, because "overall" and "guaranteed" refers to the nature of the indicator. A standard is a limit, a value (e.g. a percentage). This report includes 3 types of indicators: the guaranteed indicators (GIs), the overall indicators (OIs), and the other requirements (ORs).

For example, as illustrated in Figure 7.1 below, for the overall indicator "time take to respond to a customer request for a new grid connection", the time taken to respond to a household customer request for a connection to the grid should not exceed 2 working days in country A. The response should inform the customer of the process, the estimated schedule and requests for information required from the customer, including contact details. The time taken to respond to a customer request for a connection to the grid should not exceed 2 working days in 90% of the cases.

FIGURE 7.1 EXAMPLE OF A COMMERCIAL QUALITY INDICATOR

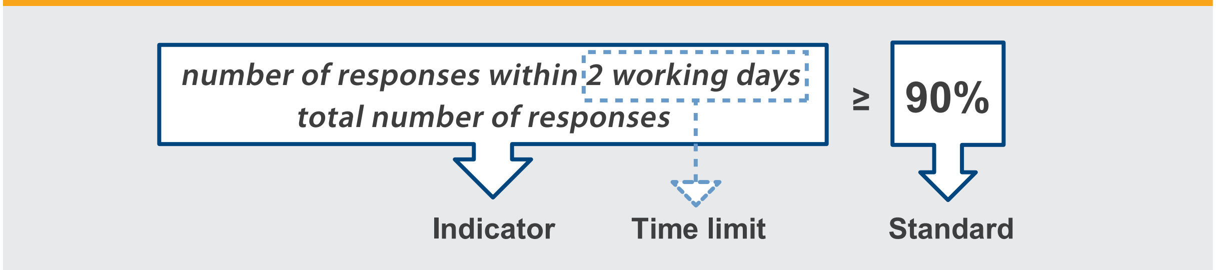


Table 7.1 shows the commercial quality indicators included in the survey of the CEER countries and the definitions for the purpose of this 6th Benchmarking Report.

TABLE 7.1 COMMERCIAL QUALITY INDICATORS SURVEYED

Group	Indicator	Definition
I. Customer information	Time of response to the customer request and/or complaints	Time period between the receipt of the customer request or complaint and the written response of the [market operator].
	Average response time to the customer request and/or complaints	-
	Number of customer requests and/or complaints	-
	Percentage of responses to customer complaints and/or requests in written form within a given time period	-
	Percentage of market participants who display the gas emergency number on invoices, homepage, customer magazine, etc.	-
	Number of market participants who display the quality of supply standards on invoices, homepage, etc.	-
	Time of availability of a market participant's call centre	Time period during which the market participant's call centre is available.
	Time of availability of a network operator's website accessible to providers	Time period during which the network operator website is accessible to providers.
II. Customer care	Punctuality of market participants regarding appointments with customers	The personnel of the Licensee arrives at the customer site within the time range (period of hours) previously agreed with the customer.
	Punctuality of customers regarding appointments with market participants	The customer is present on the customer site when the personnel of the licensee appears, within the time range (period of hours) previously agreed.
	Time limit for market participants/clients to cancel an appointment	-
	Time limit for waiting in customer centres	-
	Percentage of customers with a waiting time below the limit in customer centres	-
	Time limit for waiting in call centres	-
	Target call answer time in call centres	Target time period to reach between the receipt of the customer's call and the answer given to that call by the call centre (telephone contact).
	Percentage of dropped calls in the call centres	Percentage of calls in the call centres for which the customer hangs up before the call is answered.
	Percentage of customers with a waiting time below the limit in call centres	-
	Other performance indicators or targets for different customer issues in call centres (telephone contact)	-
	Obligation for DSO regarding response time for emergency situations	-
III. Grid access	Number of customer requests for technical grid access	-
	Average response time of a DSO to customer requests for technical grid access	Sum of all time periods between the registrations of customers' requests for technical grid access and the dates of the responses to them, divided by the number of those requests.
	Number of customer requests for cost estimations for connecting customers to the network	-
	Time for providing a cost estimation of connecting customers to the network	Time period between the receipt of the customer's written request for connection and the written response of the Licensee including a cost estimation of the works.
	Time of execution of customers' connections to the network	Time period between the receipt of the customer's written claim for connection and the date the customer is connected to network.

Group	Indicator	Definition
IV. Activation, deactivation, reactivation of supply	Number of activations of supply / deactivations of supply due to late payment/reactivations of supply after payment (for bad payer previously disconnected) carried out	-
	Time of response to customer request for activation	Time period between the receipt of the customer's request for activation and the written response of Licensee (date of dispatch).
	Time of activation of supply following a request	Time period between the receipt of the customer's request for activation and the date the customer's connection to network is activated.
	Time of deactivation of supply following a request	Time period between the receipt of the customer's request for deactivation and the date the customer's housing is deactivated (disconnected) from the network.
	Success rate of deactivation of supply on the first request	Percentage of success for deactivation of supply at the first request from the customer.
	Number of calls required to successfully deactivate a customer's connection	-
	Time of reactivation of supply after payment (for bad payers previously disconnected)	Time period between the receipt of the customer's payment for reactivation (for bad payers previously disconnected) and the date the customer's connection to network is reactivated.
	Time of disconnection of a customer following deactivation for non-payment	Time period between the procedure of deactivation for non-payment and the date the customer's housing is deactivated to network.
V. Meters	Number of installed ga3s meters	-
	Number of gas meters not installed in due time	-
	Time for meter verification	Time for the inspection of the meter.
	Time of replacement of the meter (when found out of order after verification)	Time period between the meter problem was notified after the verification of the meter and the replacement of the meter.
	Number of network customers who were informed about meter readings in absentia	-
	Number of market participants who offer the possibility of online meter data reading (self service)	-
	Number of customers receiving real time meter data	-
	Percentage of meter reading successfully transmitted by customers through a dedicated IVR call centre number	-
	Times a year the meter is read by type of customers	Number of meter readings actually performed by the designated meter operator (readings by the customer are excluded) for industrial / commercial / household customers.
	Minimum period of reading the meter	Minimum period between 2 meter readings.
	Regulation value of the readings made by the customers and by DSO or suppliers	-
	Percentage of meter readings made within a certain amount of time after the last one	Percentage of meter readings that were made before a certain amount of time, e.g. 96 days, has passed since the previous reading of the same meter.
VI. Invoices	Percentage of invoices submitted in due time	Number of invoices submitted in due time with respect to the total number of invoices.
	Percentage of corrected invoices submitted in due time	Number of corrected invoices submitted in due time with respect to the total number of corrected invoices.
	Number of customers who have requested settlement data	-
	Number of settlement data not transmitted in due time	-
	Number of DSOs who offer the possibility of cash payment	-
	Number of DSOs who provide settlement data online to their network customers	-
	Time to change provider on customer request	Time period between the receipt of customer's written request for a switching of supplier until the date the switching is effective.

7.3.3 How to regulate commercial quality

For this 6th Benchmarking Report, there are 3 types of requirements for commercial quality:

- **Guaranteed Indicators** (GIs) refer to service quality levels which must be met in each individual case. If the company fails to provide the level of service required by the GI for a specific service, the customer affected is entitled to a ***compensation***. Usually, a GI includes the following features:
  - a performance standard, which sets the expected level of service for each case (e.g. 5 working days); and
  - economic compensation to be paid to the customer in case of failure to comply with the requirements (e.g. €20).

- **Overall Indicators** (OIs) refer to a given set of cases (e.g. all customer requests in a given region for a specific service) and are used as a metric with respect to the whole population in that set. In some cases a penalty has to be paid whenever companies' performances are not up to a standard set for a given indicator. OIs usually include the following features:
  - a time limit that sets the reasonable period for the completion of the specific service (e.g. 20 working days); and
  - a performance standard (commonly a given percentage of cases), which has to be met for a whole set of customers (e.g. 90% of new customers have to be connected to the distribution network within 20 working days).

- **Other Requirements** (ORs). In addition to GIs and OIs, NRAs (or other competent parties) can issue requirements in order to achieve a certain quality level of service that are not easily classified as either GI or OI. These quality levels can be set as the NRA wants, e.g. a minimum set of information that must be given to customers when they are connected. If the requirements set by the NRAs are not met, the NRA can impose sanctions (e.g. financial penalties) in most of the cases.

7.4. MAIN RESULTS OF BENCHMARKING COMMERCIAL QUALITY INDICATORS

7.4.1 Commercial quality indicators applied

Responses are included in Table 7.2, in accordance with the survey structure.

Table 7.2 shows whether a country monitors or applies a requirement (GI, OI or OR) for the different commercial quality aspects. In the last column, the total number of countries where an indicator is in effect is shown. The most common indicators among the NRAs are the ones concerning customer information (Group II) and metering (Group V) issues. In total 13 of the responding countries apply some types of indicator regarding the time for response to customer request and/or complaints (indicator I.1) and the number of customer requests and/or complaints (indicator I.2); and 9 countries monitor a minimum period for reading the meter (V.10). A total of 10 countries have more than 10 indicators: Austria, Belgium, Croatia, the Czech Republic, France, Hungary, Italy, Latvia, Lithuania and Portugal.

TABLE 7.2 SUMMARY OF COUNTRIES WHICH ADOPT COMMERCIAL QUALITY INDICATORSS

Group	Indicator	AT	BE	CZ	EE	ES	FR	HR	HU	IE	IT	LT	LV	NL	PL	PT	SE	SI	Total
I. Customer information	I.1 Time for response to the customer request and/or complaints	X	X	X	X		X	X	X	X		X	X	X	X	X			**13**
	I.2 Number of customer requests and/or complaints	X	X	X			X	X	X	X		X	X	X	X	X		X	**13**
	I.3 Percentage of responses to customer complaints and/or requests in written form within a given time period				X		X	X			X	X	X			X			**7**
	I.4 Percentage of market participants who display the gas emergency number on invoices, homepage, etc.	X	X	X		X	X	X					X						**7**
	I.5 Number of market participants who display the quality of supply standards on invoices, homepage, etc.	X					X	X											**3**
	I.6 Time of availability of a market participant's call centre		X				X						X			X			**4**
	I.7 Time of availability of a network operator's website accessible to providers						X		X				X						**3**
	I.8 Average response time to customer request and/or complaints															X			**1**
II. Customer care	II.1 Punctuality of market participants regarding appointments with customers	X					X	X	X		X					X			**6**
	II.2 Punctuality of customers regarding appointments with market participants								X							X			**2**
	II.3 Time limit for market participants / for clients to cancel an appointment						X												**1**
	II.4 Time limit for waiting in customer centers								X										**1**
	II.5 Percentage of customers attended within the waiting time limit in customer centers								X							X			**2**
	II.6 Time limit for waiting in call centers								X										**1**
	II.7 Target call answer time in call centers								X				X						**2**
	II.8 Percentage of dropped calls in the call centers		X				X		X			X							**4**
	II.9 Other performance indicators or targets for different customer issues in call centers (telephone contact)								X				X			X			**3**
	II.10 Obligation for DSO regarding response time for emergency situations							X	X				X			X			**4**
	II.11 Percentage of customers with a waiting time below the limit in call centres															X			**1**
III. Grid access	III.1 Number of customer requests for technical grid access	X	X	X				X				X						X	**6**
	III.2 Average response time of a DSO to customer requests for technical grid access	X						X	X			X						X	**5**
	III.3 Number of customer requests for cost estimations for connecting customers to the network	X	X								X	X						X	**5**
	III.4 Time for providing a cost estimation of connecting customers to the network	X					X				X	X	X						**5**
	III.5 Time for execution of connecting customers to the network						X	X	X		X	X	X						**6**

Group	Indicator	AT	BE	CZ	EE	ES	FR	HR	HU	IE	IT	LT	LV	NL	PL	PT	SE	SI	Total
IV. Activation, deactivation, reactivation of supply	IV.1 Number of activations of supply / deactivations of supply due to late payment/reactivations of supply after payment (for bad payer previously disconnected) carried out						X	X	X		X	X	X						9
	IV.2 Time of response to customer request for activation	X							X										2
	IV.3 Time for activation of supply following a request			X			X		X		X		X			X			6
	IV.4 Time for deactivation of supply following a request		X	X			X		X		X								5
	IV.5 Success rate for deactivation of supply on the first request			X					X										2
	IV.6 Number of calls required to successfully deactivate a customer																		0
	IV.7 Time of reactivation of supply after payment (for bad payers previously disconnected)	X		X				X	X		X		X			X			7
	IV.8 Time for disconnection of a customer following deactivation for non-payment		X						X						X				3
V. Meters	V.1 Number of installed gas meters	X	X	X				X				X	X		X				7
	V.2 Number of gas meters not installed in due time	X		X															2
	V.3 Time for meter verification			X			X	X	X		X	X	X					X	8
	V.4 Time for replacement of the meter (when found out of order after verification)			X			X		X		X								4
	V.5 Number of network customers who were informed about meter readings in absentia	X							X										2
	V.6 Number of market participants who offer the possibility of online meter data announcement (self service)	X					X		X				X						4
	V.7 Number of customers receiving real time meter data		X					X	X										3
	V.8 Percentage of meter reading successfully transmitted by customers through a dedicated IVR call centre number															X			1
	V.9 Times a year the meter is read by type of customers (Industrial / Commercial / Household)		X	X			X	X	X			X	X				X		8
	V.10 Minimum period for reading the meter	X	X	X				X	X			X	X			X	X		9
	V.11 Regulation value of the readings made by the customers and by DSO or suppliers	X	X	X				X	X				X				X		7
	V.12 Percentage of meter readings made within a certain amount of time after the last one																	X	1
VI. Invoices	VI.1 Percentage of invoices submitted in due time	X	X						X				X						4
	VI.2 Percentage of corrected invoices submitted in due time	X						X	X				X						4
	VI.3 Number of customers who have requested settlement data	X																	1
	VI.4 Number of settlement data not transmitted in due time	X																	1
	VI.5 Number of DSOs who are offering the possibility of cash payment	X											X		X				3
	VI.6 Number of DSOs who are providing settlement data online to their network customers	X							X				X						3
	VI.7 Time for changing provider on customer request			X			X	X	X						X				5
Total number of indicators per country		**24**	**16**	**17**	**2**	**1**	**19**	**19**	**33**	**2**	**11**	**14**	**24**	**2**	**6**	**16**	**3**	**7**	**216**

In Table 7.3, the number of various commercial quality indicators is shown together with the type of company they refer to (DSO, Supplier, USP and MO). The largest number of indicators is for customer information (Group I) and customer care (Group II).

TABLE 7.3 NUMBER OF COMMERCIAL QUALITY INDICATORS (GI, OI, OR) IN FORCE PER GROUP AND PER COMPANY TYPE

Group	Indicator	DSO	SP/ USP	MO	TSO	Total
I. Customer information	I.1 Time for response to customer request and/or complaints	8	6	1	6	**21**
	I.2 Number of customer requests and/or complaints	9	4	2	5	**20**
	I.3 Percentage of responses to customer complaints and/or requests in written form within a given time period	4	1	2	1	**8**
	I.4 Percentage of market participants who display the gas emergency number on invoices, homepage, etc.	5	2		1	**8**
	I.5 Number of market participants who display the quality of supply standards on invoices, homepage, etc.	3	1		1	**5**
	I.6 Time of availability of a market participant's call centre	5	3		1	**9**
	I.7 Time of availability of a network operator's website accessible to providers	3			2	**5**
	I.8 Average response time to customer request and/or complaints				1	**1**
II. Customer care	II.1 Punctuality of market participants regarding appointments with customers	8	2	1	2	**13**
	II.2 Punctuality of customers regarding appointments with market participants	5	2		2	**9**
	II.3 Time limit for market participants / clients to cancel an appointment	4	1		2	**7**
	II.4 Time limit for waiting in customer centres	4	3	1	2	**10**
	II.5 Percentage of customers attended within the waiting time limit in customer centres	3	1		2	**6**
	II.6 Time limit for waiting in call centres	3	1		2	**6**
	II.7 Target call answer time in call centres	3	2		2	**7**
	II.8 Percentage of dropped calls in the call centres	4	2		2	**8**
	II.9 Other performance indicators or targets for different customer issues in call centres (telephone contact)					**0**
	II.10 Obligation for DSO regarding response time for emergency situations	5	1		3	**9**
	II.11 Percentage of customers with a waiting time below the limit in call centres	1	1			**2**
III. Grid access	III.1 Number of customer requests for technical grid access					**0**
	III.2 Average response time of a DSO to customer requests for technical grid access	6	1		1	**8**
	III.3 Number of customer requests for cost estimations for connecting customers to the network					**0**
	III.4 Time for providing a cost estimation of connecting customers to the network	5		1	1	**7**
	III.5 Time for execution of connecting customers to the network	7	1	1	1	**10**

Group	Indicator	DSO	SP/ USP	MO	TSO	Total
IV. Activation, Deactivation, Reactivation of supply	IV.1 Number of activations of supply / deactivations of supply due to late payment/reactivations of supply after payment (for bad payer previously disconnected) carried out					**0**
	IV.2 Time of response to customer request for activation	3	1		1	**5**
	IV.3 Time for activation of supply following a request	6	1	1	1	**9**
	IV.4 Time for deactivation of supply following a request	6	2	1	1	**10**
	IV.5 Success rate for deactivation of supply on the first request					**0**
	IV.6 Number of calls required to successfully deactivate a customer					**0**
	IV.7 Time of reactivation of supply after payment (for bad payers previously disconnected)	7	4	2	2	**15**
	IV.8 Time for disconnection of a customer following deactivation for non-payment	4	2	1	1	**8**
V. Meters	V.1 Number of installed gas meters					0
	V.2 Number of gas meters not installed in due time	4	1		2	7
	V.3 Time for meter verification	6	1	1	3	11
	V.4 Time for replacement of the meter (when found out of order after verification)	6	1	1	2	10
	V.5 Number of network customers who were informed about meter readings in absentia	4	1		1	6
	V.6 Number of market participants who offer the possibility of online meter data announcement (self service)					0
	V.7 Number of customers receiving real time meter data					0
	V.8 Percentage of meter reading successfully transmitted by customers through a dedicated IVR call centre number	1				1
	V.9 Times a year the meter is read by type of customers (Industrial / Commercial / Household)					0
	V.10 Minimum period for reading the meter	5			2	7
	V.11 Regulation value of the readings made by the customers and by DSO or suppliers					0
	V.12 Percentage of meter readings made within a certain amount of time after the last one	1				1
VI. Invoices	VI.1 Percentage of invoices submitted in due time	5	3	1	2	11
	VI.2 Percentage of corrected invoices submitted in due time	4	2		2	8
	VI.3 Number of customers who have requested settlement data					0
	VI.4 Number of settlement data not transmitted in due time	3	1	1	1	6
	VI.5 Number of DSOs who offer the possibility of cash payment					0
	VI.6 Number of DSOs who provide settlement data online to their network customers					0
	VI.7 Time for changing provider on customer request	5	4	1	2	12
Total		**165**	**59**	**19**	**63**	**306**

Table 7.4 shows the number of commercial quality indicators per country, distinguishing between GIs, OIs and ORs. The results show that NRAs make more use of OIs (112 in total) and GIs (78 in total) than ORs. However, in many countries requirements applicable to each single transaction are applied as well, albeit without compensation to the customer in case of non-compliance. From the customer protection point of view, the most efficient regulation is based on GIs, or OIs with minimum requirements set by the NRA where sanctions can be issued.

Austria, Belgium, Lithuania, the Czech Republic, Hungary, Italy, Latvia, Lithuania and Portugal use OIs, and GIs or ORs. Estonia and the Netherlands use only OIs while Poland uses only GIs. Croatia, Hungary and Latvia make use of all 3 types of indicators (GIs, OIs, ORs).

All customer types (low pressure, medium pressure and high pressure) are taken into account in this chapter.

TABLE 7.4 NUMBER OF COMMERCIAL QUALITY INDICATORS SURVEYED

Countries	GI	OI	OR	Total
Austria	0	11	2	**13**
Belgium	0	3	3	**6**
Croatia	5	4	8	**17**
Czech Republic	9	26	0	**35**
Estonia	0	1	0	**1**
Finland	0	0	0	**0**
France	5	0	12	**17**
Germany	0	0	0	**0**
Hungary	24	24	7	**55**
Ireland	0	0	0	**0**
Italy	8	2	0	**10**
Latvia	19	22	11	**52**
Lithuania	0	6	3	**9**
The Netherlands	0	2	0	**2**
Poland	3	0	0	**3**
Portugal	5	11	0	**16**
Slovenia	0	0	3	**3**
Spain	0	0	1	**1**
Total	78	112	50	**240**

7.4.2 Group I: Customer information and requests/complaints

Customer information is an important aspect of commercial quality. It is essential that market participants keep the customer informed via invoices, their homepage or customer communications material about issues such as gas emergency numbers. The time for availability of a network operator's call centre or website is also important from both the customer's and the supplier's point of view. In addition, **complaints and requests** are an important tool to take into account the customers' expectations.

A claim is a written or oral expression of a discontentment from a network user. The analysis of the customers' complaints (cause, frequency, volume, etc.) or requests can allow the apprehension of the quality of the services perceived by the customer and to improve them. The time to treat a complaint/request and the quality of response are a major issue in commercial quality.

For this section, most of the countries answered to the question regarding the "Response to customer requests and/or complaints", therefore, the analysis will be focused on this point.

TABLE 7.5 TYPES OF INDICATORS USED ON "RESPONSE TO CUSTOMER REQUESTS AND/OR COMPLAINTS"

Subject	Countries grouped by types of indicators in 2014			Time limit (median value and range)	Compensation (median value and range)	Company involved
	GI	OI	OR	2014	2014	
Response to customer requests and/or complaints	CZ, FR, LV, PL, PT	AT, CZ, EE, HR, HU, LT, LV, NL, PT	-	23 days (range 5 working days-30 days)	€23 (range 20-25)	DSO, USP/SP, MO, TSO

Response to customer requests and/or complaints is measured with overall indicators in 9 countries [Austria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, the Netherlands and Portugal (average time)] and with guaranteed indicators in 5 countries [the Czech Republic, France, Latvia, Poland and Portugal (complaints)]. In Belgium, this subject is monitored by the supplier and is neither a GI nor an OI.

Most of the countries monitor both complaints and requests (Austria, Croatia, Hungary, Latvia, Lithuania and Poland). Some countries monitor the response time only for complaints (Belgium, the Czech Republic, Estonia and France). Portugal monitors the response time separately for complaints and requests.

In 2014, Austria had a good annual performance of 99.98% with a standard of 95% and a time limit of 5 working days. The Czech Republic had 100% performance record with a standard of 100% and a time limit of 30 days to answer. Lithuania also registered a good performance of 100% of the requests and complaints answered within the time limit of 30 days.

TABLE 7.6 EXAMPLES OF CRITERIA AND OBLIGATIONS BY WHICH THE RESPONSE TO CUSTOMER REQUEST AND/OR COMPLAINT IS MONITORED

Country	Limit	Standard that must be met	Number of cases for which the limit was fulfilled	Value of the indicator	Compensation for non-compliance	Penalty or other consequences	Pressure levels	Request / complaint
Austria	5 working days	95%	1.205.016	99,98%	None	administrative offence – fined up to €75,000	LP, MP	Requests & complaints
Belgium	10 working days							Complaints
Croatia	10 working days	90%						Requests & complaints
Czech Republic	30 days	100%	20.813 requests 11.651 complaints	100%	NA	0	LP, MP, HP	Complaints
France	30 calendar days	100%		90,60%	€25	None	LP, MP	Complaints
Hungary	30 days	100%	19				HP	Requests & complaints
Latvia	30 days	100%					LP, MP, HP	Requests & complaints
Lithuania	30 days	100%	134	100%	None		HP	Requests & complaints
Portugal	15 working days	98% DSO 90% USP/SP	11.863 221.234	96% 53%	NA	NA	LP, MP, HP	Requests

Concerning the **percentage of market participants who display the gas emergency number on invoices, their homepage, customer magazines and others** (I.4), Austria, the Czech Republic and France registered a performance of 100%. In the Czech Republic, the objective is that 100% of the invoices include an emergency number. Regarding the **number of market participants who display the quality of supply standards on invoices, homepage and others** (I.5), this indicator is being monitored in 3 countries (Austria, Croatia and France).

In Belgium, under the current Walloon legislation, suppliers are required to provide a range of detailed information to their customers. Fulfilment of these obligations is controlled by the regional NRA, as legal obligations, through on-the-spot periodic monitoring (at least every 2 years).

As concerns **the time for availability of a market participant's call centre** (I.6), Latvia had a performance of 100%, with a standard of 100% and a time limit of 5 working days. In Portugal, (1) call centres must allow customers to leave their contact and purpose of the call in case the waiting time is expected to be over 60 seconds; in such cases, companies have to call back those customers within 2 working days; (2) assistance and emergency numbers are monitored separately from commercial calls.

Concerning the time for response to customer request and/or complaints (I.1), the time limits vary from 5 working days (in Austria) to 30 days (in the Czech Republic, Estonia, Hungary, Latvia, Lithuania), with a median value of 23 days. There is no compensation for the non-compliance of the standard for the time for response to customer request and/or complaints (I.1) in Austria (but there is an administrative offence fine of up to €75,000) and Lithuania. The compensation for complaints is €25 in France and €20 in Portugal.

7.4.3 Group II: Customer care

The punctuality of operators with respect to planned appointments with customers is a major commercial quality issue. It is essential that the customer does not wait too long before getting a response in customer centres and on phone calls. In this section, all the indicators concern the punctuality of appointments, and the time limits related to the customer centres and call centres. The most monitored indicator is the punctuality of market participants regarding appointments with customers (II.1). It is monitored as a GI in Croatia, France, Hungary, Italy, Latvia and Portugal, and as an OI in Austria, the Czech Republic, Hungary and Latvia.

TABLE 7.7 TYPES OF INDICATORS USED ON PUNCTUALITY OF MARKET PARTICIPANTS REGARDING APPOINTMENTS WITH CUSTOMERS

Subject	Countries grouped by types of indicators in 2014			Time limit (median value and range)	Compensation (median value and range)	Company involved
	GI	OI	OR	2014	2014	
Punctuality of market participants regarding appointments with customers	FR, HR, HU, IT, LV, PT	AT, CZ, HU, LV	-	2.3 hours (range 2-3)	€33 (range 20-35	DSO, USP/SP, MO, TSO

In 2014, Austria achieved a good performance (99.50%) above the standard (95%), with a 2-hour-time window as a time limit and a total amount of 313,166 appointments. In Italy, the performance is also good (99.6%), with a total amount of 1,658,352 appointments and a time limit of 2 hours.

TABLE 7.8 EXAMPLES OF CRITERIA AND OBLIGATIONS BY WHICH THE PUNCTUALITY OF MARKET PARTICIPANTS REGARDING APPOINTMENTS WITH CUSTOMERS IS MONITORED

Country	Limit	Standard that must be met	Number of cases for which the limit was fulfilled	Value of the indicator	Compensation for non-compliance	Penalty or other consequences	Pressure levels
Austria	2-hour time window	95%	313.166	99,50%	None	administrative offence – fined up to €75,000	LP, MP
Croatia	3 hours						
France			11.488		€33	penalty of €27.46 (+ VAT is paid to the supplier)	LP, MP
Italy	2 hours		1.658.352	99,60%	€35		LP
Portugal	within a 2.5 hours interval agreed with the customer		112.691		€20		LP, MP, HP

In France, as part of the incentive regulation scheme, appointments that the DSO has not met are monitored (in number, not in percentage). It includes planned appointments that require the customer's presence but where the intervention was not performed because of the DSO. For each case, a penalty of €27.46 (excluding tax) is charged to the supplier. GRDF (the main French DSO) faced a penalty of €311,884 in 2014 because of 11,488 missed appointments. The detection of missed appointments is processed automatically by the grid operator since July 2013 (before this date, it was the supplier or the customer).

In Portugal, appointments are made between the customer and the supplier (USP/SP). If the DSO does not arrive within the 2.5 hours interval set with the customer, then the customer must receive €20 compensation from either the USP/SP or DSO, depending on whose fault it was. If customers are not present when the DSO arrives, then the DSO has the right to receive €20 compensation. Cancelation of the visits is possible, by either part, up to 12 hours before the appointment hour.

As regards the **percentage of dropped calls in the call centres** (II.8), France monitors an OR and registered a performance of 93.4% in 2014. In Portugal, there is an overall indicator for commercial themed calls, another for emergency and assistance calls (the standard is that 85% of the calls must not have a waiting time of more than 60 seconds) and another for meter readings. By law, in Portugal, call backs to clients must be made within 2 working days after the client -having waited more than 60 seconds- has left his contact details and stated the purpose of the call.

Concerning the **obligations for DSO on response times for emergency situations** (II.10), Portugal responded to 93% of the requests related to emergency situations within 60 minutes (with a standard of 85%). In France, "emergency situations" are seen from the customer's need (e.g. a customer has an urgent need to activate the gas supply for his home) and not "emergency situations" from a safety point of view (because this questionnaire is focused on commercial quality and not on safety issues). When a customer needs quicker service than standards allow, GRDF's service catalogue provides options for quicker activation of supply (beginning of contract) and for quicker reactivation of supply (after deactivation for non-payment).

For the **"Punctuality of market participants regarding appointments with customers"** (II.1) the time limits vary from 2 hours (in Italy, Austria) to 3 hours (in Croatia), with a median value of 2.3 hours. The compensation for non-compliance is €33 in France, €35 in Italy and €20 in Portugal.

7.4.4 Group III: Grid access

Connection to the gas network is one of the most important commercial quality issues. When a customer moves in a new housing, the customer expects that the time limit to be connected to the network to be respected. Among the indicators of Group III, only 3 indicators provided sufficient results for analysis: the average response time of a DSO to customer requests for technical grid access (III.2); the time for providing a cost estimation of connecting customers to the network (III.4); and time for execution of connecting customers to the network (III.5) (see the results in Table 7.9).

TABLE 7.9 TYPES OF INDICATORS USED TO MONITOR INDICATORS IN GROUP III

Subject	Countries grouped by types of indicators in 2014			Time limit (median value and range)	Compensation (median value and range)	Company involved
	GI	OI	OR	2014	2014	
III.2 Average response time of a DSO to customer requests for technical grid access	HR, HU	AT, CZ, HU, LT	SI	25 days (range 14-30)	-	DSO, SP/USP, TSO
III.4 Time for providing a cost estimation of connecting customers to the network	IT	AT, CZ, LT	FR	14 days for simple works (range 8 work days-30 days) 30 days for complex works (range 14-30)	€35 Only one country)	DSO, MO, TSO
III.5 Time for execution of connecting customers to the network	HR, HU, IT	CZ, HU, IT, LT	FR	10 days for simple works (range 5 work days-20 work days) 35 days for complex works (range 10 work days-60 work days)	€35 (Only one country)	DSO, SP/USP, MO, TSO

Concerning the **average response time of a DSO to customer requests for technical grid access** (III.2), only 2 countries monitor a GI (Croatia and Hungary) while the majority of the countries monitor an OI (Austria, the Czech Republic, Hungary and Lithuania). Only Slovenia monitors an OR. In 2014, Austria registered a good performance of 99.8%, with a standard of 95% and a time limit of 14 days. Lithuania had a 100% performance record in 2014, with a time limit of 30 days in 100% of the cases.

The **time for providing a cost estimation of connecting customers to the network** (III.4) is mainly monitored as an OI (by Austria, the Czech Republic and Lithuania). In some countries, time for providing cost estimation depends on the types of work: simple or complex work. All the performances reported are above 98.8%: Austria's was 99.58% for complex and simple works; Italy had a performance of 99.1% for simple works and 98.8% for complex works.

The **time for execution of connecting customers to the network** (III.5), Italy had a performance of 98.10% for simple works (with 117,074 cases for which the limit was fulfilled and a time limit of 10 working days) and 98.8% for complex works (with 2,956 cases for which the limit was fulfilled and a time limit of 60 working days and a standard of 90%). Lithuania had a performance of 99.58% for both simple and complex works.

TABLE 7.10 EXAMPLES OF CRITERIA AND OBLIGATIONS BY WHICH THE INDICATOR III.4 "TIME FOR PROVIDING A COST ESTIMATION OF CONNECTING CUSTOMERS TO THE NETWORK" IS MONITORED

Country	Type of work	Limit	Standard that must be met	Number of cases for which the limit was fulfilled	Value of the indicator	Compensation for non-compliance	Penalty or other consequences	Pressure levels
Austria	For simple and complex works	14 days	95%	6.171	99,58%		administrative offence – fined up to €75,000	LP, MP
Italy	For simple works	15 working days		159.334	99,10%	€35	doubles after 30 working days, triples after 45 working days	LP
	For complex works	30 working days		5.085	98,80%		doubles after 60 working days, triples after 90 working days	
Lithuania	For simple and complex works	30 days	100%					

The **time limit** for the average response time of a DSO to customer requests for technical grid access (III.2) varies from 14 days (Austria) to 30 days (Latvia and Lithuania), with a median value of 25 days, but only 4 countries provided their time limits.

Regarding the time for providing a cost estimation of connecting customers to the network (III.4) and the time for execution of connecting customers to the network (III.5), in most of the countries, time limits depend on whether it is a simple or a complex work. For example, in Italy, the limit time for providing a cost estimation of connecting customers to the network is 15 working days for simple works, and 30 working days for complex work. For this indicator, the time limits vary from 8 working days to 30 days for simple work, and from 14 days to 30 days for complex work.

Only Italy provided the amount (€35) of the **compensation** for non-compliance of the time for providing cost estimation of connecting customers to the network (III.4) and of the time for execution of connecting customers to the network (III.5). Regarding the time for providing a cost estimation of connecting customers to the network (III.4) in Italy, compensation for simple works doubles after 30 working days and triples after 45 working days; and for complex works, it doubles after 60 working days and triples after 90 working days. In Belgium, besides commercial quality indicators, grid access is also ensured by a compensation regime. The Walloon gas decree defines a set of conditions under which aggrieved customers may receive flat-rate compensation from DSO. Once a year, the DSO must report customers' compensation requests to the Walloon energy regulatory authority (e.g. for late connection).

7.4.5 Group IV: Activation, Deactivation and Reactivation

Interventions with customers such as activation or deactivation are a major issue for gas network operators, particularly at the distribution level. Activation consists of linking a connection and estimation point to the scope of the transportation contract of a gas supplier when an occupant arrives in his premises. If the premises are not served by gas and unoccupied, the activation will require an intervention. A deactivation consists of separating a connection and estimation point to the scope of the transportation contract of a gas supplier when an occupant leaves his premises, at the time of the cancellation of its supply contract. The DSO often intervenes and reads the consumption data if the DSO has access to the gas meter.

In this section, the analysis focuses on the 3 indicators for which countries provided the highest number of responses: the **time period for activation of supply following request** (IV.3), the **time period for deactivation of supply following a request** (IV.4), the **time period for reactivation of supply after payment (for bad payers previously disconnected)** (IV.7). These indicators are mostly monitored as guaranteed indicators, particularly by the Czech Republic, France, Hungary, Italy and Latvia. The number of activations, deactivations, reactivations and customer requests for activation of supply is also monitored by numerous countries (see Figure 7.2).

FIGURE 7.2 NUMBER OF CUSTOMER REQUESTS FOR ACTIVATION, ACTIVATIONS OF SUPPLY, DEACTIVATIONS OF SUPPLY DUE TO LATE PAYMENT/REACTIVATIONS OF SUPPLY AFTER PAYMENT (FOR BAD PAYER PREVIOUSLY DISCONNECTED) CARRIED OUT

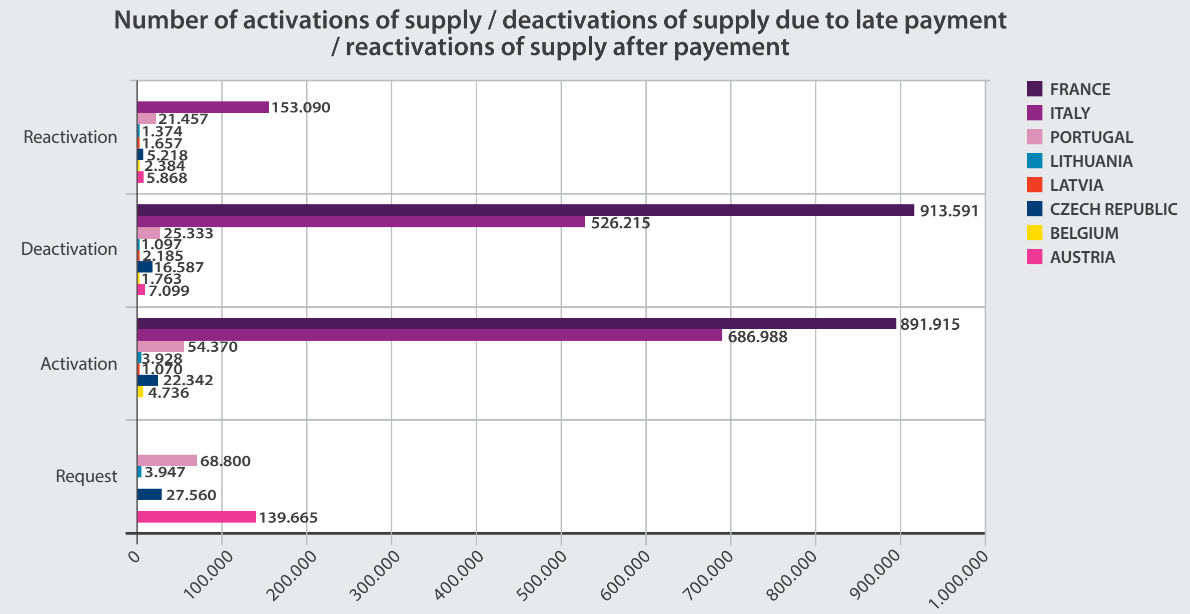


TABLE 7.11 TYPES OF INDICATORS USED IN GROUP IV

Subject	Countries grouped by types of indicators in 2014			Time limit (median value and range)	Compensation (median value and range)	Company involved
	GI	OI	OR	2014	2014	
IV.3 Time period for activation of supply following request	CZ, FR, HU, IT, PT	HU	LT	5 working days (range 2 work days-10 work days)	€27 (range 20-35)	DSO, SP/USP, MO, TSO
IV.4 Time period for deactivation of supply following a request	CZ, FR, HU, IT, LV	HU, LV	BE, LV, LT	5 working days (range 2 work days-45 work days)	€35 (Only one country)	DSO, SP/USP, MO, TSO
IV.7 Time period for reactivation of supply after payment (for bad payers previously disconnected)	CZ, HR, HU, IT, LV, PT	AT, HU	-	2 days (range 0.5-5)	€27 (20-35)	DSO, SP/USP, MO, TSO

The **time period for activation of supply following a request** (IV.3) is monitored as a GI by the Czech Republic, France, Italy and Portugal. In Hungary it is monitored as a GI and an OI. In Lithuania, it is monitored as an OR. The Czech Republic and Latvia had a 100% a performance rate, with a standard of 100% and a time limit of 5 days for the Czech Republic and 5 working days for Latvia. France had a performance of 92.2%, slightly above the standard (92%) (See case study).

For the **time period for deactivation of supply following a request** (IV.4), in Italy: 99.2% of the deactivations have been performed within 5 working days. In France, 95.8% of the deactivations have been realised in the agreed lead times with the customer, which is above the standard of 94% (see case study).

TABLE 7.12 EXAMPLES OF CRITERIA AND OBLIGATIONS BY WHICH THE INDICATOR IV.4 "TIME PERIOD FOR DEACTIVATION OF SUPPLY FOLLOWING A REQUEST" IS MONITORED

Country	Limit	Standard that must be met	Number of cases for which the limit was fulfilled	Value of the indicator	Compensation for non-compliance	Penalty or other consequences	Pressure levels
Belgium	2 to 45 working days						
Czech Republic	5 days						LP, MP, HP
France	in the agreed lead times	94%		95,80%		€100,000 / year	LP, MP
Italy	5 working days		522.040	99,20%	€35	doubles after 10 working days, triples after 15 working days	LP
Latvia	2 working days						LP, MP, HP
Lithuania	15 working days						

Concerning **the time period for reactivation of supply after payment** (IV.7), in the Czech Republic and Latvia, 100% of the reactivations (for bad payers previously disconnected) have been performed within 5 days in Latvia (1,657 cases) and 5 working days in the Czech Republic.

There is not a wide range of **time limits for the time period for activation of supply following request** (IV.3): it varies from 2 working days (Belgium) to 10 working days (Italy), while most of the countries have a time limit of approximately 5 working days. In France, the indicator is monitored in the agreed lead times with the customers; but standard lead times exist in the service catalogue of the main French DSO: 5 working days or 21 working days when the meter has to be installed (see case study).

There is a larger range of values for the **time period for deactivation of supply following a request** (IV.4). The time limits vary from 2 working days (in Belgium and Latvia) to 45 working days (it can vary from 2 to 45 working days in Belgium) but the median value is rather low (5 working days). In France, as for the activation rate, the indicator related to deactivation is monitored in the agreed lead times with the customer; even though standard lead times exist in the network operator's service catalogue: the time limit is 5 working days when requested by customer, and 10 working days when requested by the supplier.

In Belgium, in the Brussels-Capital Region, the supplier is allowed to disconnect consumers solely after a court ruling authorised him to do so on the basis of a specific procedure: (1) there is a first reminder (15 days after the bill due date); (2) then, a formal notice; (3) 7 days after formal notice, if there is no reaction from the customer or if it is impossible to reach agreement about the reimbursement outstanding debt plan. The supplier has the obligation to continue to provide power until the disconnection has been allowed by the judge.

There is a short range of **time limits** for the **time period for reactivation of supply after payment indicator** (IV.7): from 0.5 days to 5 working days (median value is 2 days). In Portugal, the time for reactivation after disconnection following non-payment is 12 hours for domestic customers, 8 hours for non-domestic and 4 hours if customer pays for urgent reactivation. Since 2014 the time is not counted between 20h00 and 8h00, and this rule applies only to simple works.

Portugal and Italy are the only 2 countries that have provided **compensation** amounts for the **time period for activation of supply following request** (IV.3) and the time period for reactivation of supply after payment (IV.7): €35 for Italy and €20 for Portugal. In Italy, the level of the compensation depends on the delay of the network operator: for example, for the time period for activation of supply following the request (IV.3), the compensation is €35 if the 10 working days are not respected, €70 after 20 working days and €105 after 30 working days.

7.4.6 Group V: Metering

Another important commercial quality issue is the meter, and more particularly, the time for meter verification and reading, and the time to replace the meter in case of need. In this section, the analysis focuses on the following indicators: the **time for meter verification (V.3); and the time for the replacement of the meter (when found out of order after verification)** (V.4).

TABLE 7.13 TYPES OF INDICATORS USED IN GROUP V

Subject	Countries grouped by types of indicators in 2014			Time limit (median value and range)	Compensation (median value and range)	Company involved
	GI	OI	OR	2014	2014	
V.3 Time for meter verification	CZ, HU, IT, LV	LV	FR, HU, LT, SI	range 3 work days-20 years	€35 (Only one country)	DSO, SP/USP, MO, TSO
V.4 Time for replacement of the meter (when found out of order after verification)	CZ, HU, IT, LV	LV	FR, HR, LV	5 days (range 0-15 days)	€35 (Only one country)	DSO, SP/USP, MO, TSO

Only Italy provided its performance related to the **time for meter verification** (V.3) and the **time for replacement of the meter (when found out of order after verification)** (V.4). In Italy, 80% of the meter verifications have been performed within 20 working days and in 99.5% of the cases, the replacement of the meter (when found out of order after verification) has been realised within 5 working days.

There is a wide range of **time limits** for the **time for meter verification** (V.3) because it depends on the type of meter: from 3 working days (Croatia) to 20 years (in France, for meters under 15 m^3/h). In France and in Lithuania, the time limit depends on the type of meter: in France, the time limit is 20 years (for a meter under 10 m^3/h), 15 years for diaphragm meters (above 10 m^3/h) and 5 years for turbine and rotary meters (above 10 m^3/h), and in Lithuania it can vary from once in 2 years to once in 12 years.

Italy is the only country that provided compensation amounts (for low pressure customers) for the time for meter verification (V.3) and the time for replacement of the meter (V.4). For the time for replacement of the meter, the compensation is €35 if the 5 working days are not respected, €70 after 10 working days and €105 after 15 working days.

7.4.7 Group VI: Invoices

Some requirements must be respected for **invoices** such as the lead time for the network operator to issue the invoices. In addition, settlement data and corrected invoices must be sent in due time. In this section, the time for **changing provider** based on a customer request is also presented. The analysis focuses on the following indicators: the **percentage of invoices submitted in due time** (VI.1); the **percentage of corrected invoices submitted in due time** (VI.2); and the **time for changing provider at the customer's request** (VI.7).

TABLE 7.14 TYPES OF INDICATORS USED IN GROUP VI

Subject	Countries grouped by types of indicators in 2014			Time limit (median value and range)	Compensation (median value and range)	Company involved
	GI	OI	OR	2014	2014	
VI.1 Percentage of invoices submitted in due time	HU, LV	AT, CZ, HU, LV	BE, HR	from 6 working days to 6 weeks	-	DSO, SP/USP, MO, TSO
VI.2 Percentage of corrected invoices submitted in due time	HR, HU, LV	AT, CZ, HU, LV	-	5 working days (range 2-10 work days)	-	DSO, SP/USP, MO, TSO
VI.7 Time for changing provider on customer request	CZ, HU, PL	HU	FR, HR	13 days (4-21 days)	-	DSO, SP/USP, MO, TSO

The percentage of invoices submitted in due time (VI.1) is mainly monitored as an OI indicator (by Austria, the Czech Republic, Hungary and Latvia). It is also monitored as a GI and an OR by 2 countries. In Austria, 98.02% of the invoices have been submitted in due time (standard is 95%) for 1,509,684 cases for which the limit was respected. In Latvia, 100% of the invoices have been submitted in due time (the time limit varies from 6 to 8 working days and the standard is 100%).

The percentage of corrected invoices submitted in due time (VI.2) is monitored as a GI in Croatia, Hungary and Latvia, and as an OI in Austria, the Czech Republic, Hungary and Latvia. In Austria, 95.7% of the corrected invoices have been submitted in due time (standard is 95%). In Latvia, 100% of the corrected invoices have been submitted in due time (standard is 100%).

The time for changing provider on a customer's request (VI.7) is monitored as a GI in the Czech Republic, Hungary and Poland; as an OI in Hungary; and as an OR in Croatia and France. In the Czech Republic, 100% of the supplier changes have been performed within 10 working days (standard is 100%).

Some time limits vary significantly depending on the process. For example, for the indicator **"percentage of invoices submitted in due time"** (VI.1). In Austria, the time limit is 6 weeks after meter reading if the invoice is sent to a customer and 3 weeks if the invoice is sent to a supplier, who also invoices the network bill (integrated invoice). In Belgium, various limits apply depending on the process (from 6 weeks after meter data, to 60 days as and from the meter readings transmission by the DSO).

7.5. CASE STUDIES

7.5.1 Case study: Activation rates in the agreed lead times in France

In France, activation is carried out at the initiative of the customer that moved in and who has, beforehand, chosen an energy supplier. Activations in gas and electricity are ensured by the same technical teams. Activation is an important issue as it is one of the few occasions of a direct interaction between the DSO and its customer.

Activation consists of linking a connection and estimation point (PCE) to the scope of the transportation contract of a gas supplier when an occupant arrives in his/her premises. If the premises are unoccupied and already served by gas, activation does not require the intervention of an agent. In the case of premises that have been recently connected to the gas network or were previously served but have since then been cut off, activation will require an intervention.

GRDF (the main DSO) monitors the activation (with intervention) rates in the agreed lead times, since 1 July 2011, for all types of customers. In this indicator, GRDF mainly takes into account the activations with intervention and the first activation. Activations without intervention are not taken into account in the calculation of this indicator. The standard lead time (in GRDF's service catalogue) to achieve activation is either 5 or 21 days depending on whether the activation requires a meter installation.

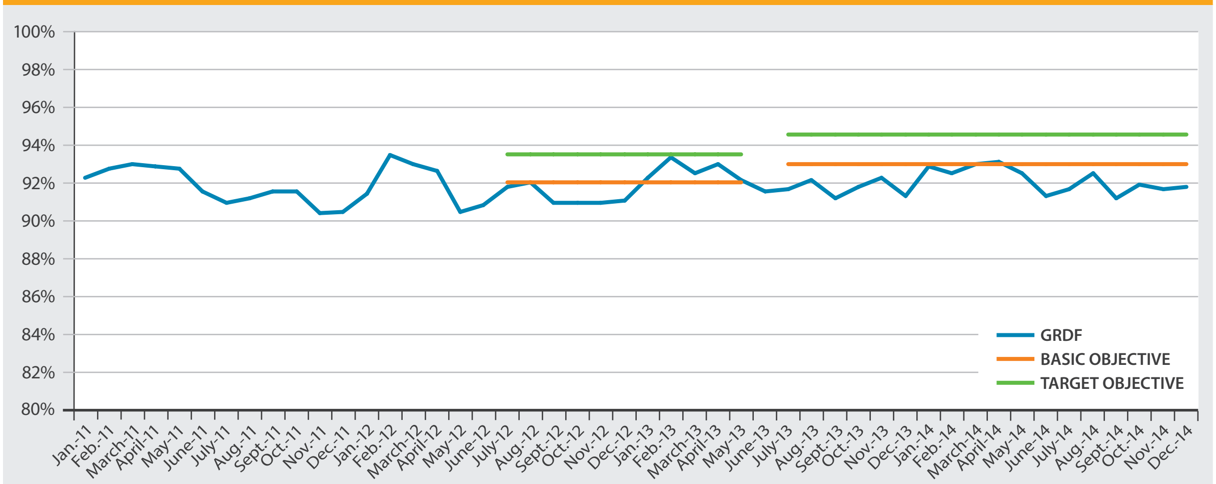
This indicator has financial incentives since 1 July 2012. In practice, the financial incentives had no effect on GRDF's performance. Whilst there had been progress, the activation rates had not reached the basic objective of 92%. Therefore, in July 2013, the French NRA reinforced the objectives and the incentives related to this indicator to:

- A penalty of €100,000 per point of percentage if the biannual rate is strictly lower than the basic objective of 93%; and
- A bonus of €50,000 per point if the monthly rate is equal to or higher than the target objective of 94.5%.

In 2014, the average annual activation rate achieved in the agreed lead times stagnated at a level slightly below the basic objective (93%). It reached 92.2% in 2014, which represents an increase of 0.4 points since 2011. According to GRDF, the failure to comply with the agreed lead times for the first activations can be explained by different factors. For example, when the grid operator intervenes, customer's installation may not be configured properly and consequently the first activation cannot be realised in the agreed lead time. In these cases, the operator is not liable.

For biannual meter reading customers (household and professional customers, including small businesses for which annual consumption is lower than 300 MWh that represent the majority of the customers), GRDF performance reached 92.2% in 2014 and is stable since the implementation of the indicator (+0.30 points compared to 2011). Concerning monthly meter reading customers, the performance of the operator increased from 2011 to 2014 reaching 89% in 2014 (+3.9 points). For daily meter reading customers, the compliance with the time limits regarding activations fell and reached 75.5% in 2014 (-12.1 points). Nevertheless, the number of activations for daily meter reading customers is rather low, which can skew the performance analysis. In 2014, GRDF faced a penalty of €166,000 for the activation rates in the agreed lead times.

FIGURE 7.3 GRDF ACTIVATION RATES IN THE AGREED LEAD TIMES



7.5.2 Case study: Deactivation rates in the agreed lead times in France

A deactivation consists of separating a connection and estimation point (PCE) to the scope of the transportation contract of a natural gas supplier when an occupant leaves his premises, at the time of the cancellation of its supply contract. For all deactivations, the DSO intervenes and reads the consumption data if the DSO has access to the gas meter.

GRDF monitors the deactivation (with intervention) rates in the agreed lead times since 1 July 2011. This indicator measures the proportion of deactivations achieved in the agreed deadlines with the customer. The standard lead time (in GRDF's service catalogue) for a deactivation is 5 days. This indicator has financial incentives since 1 July 2012:

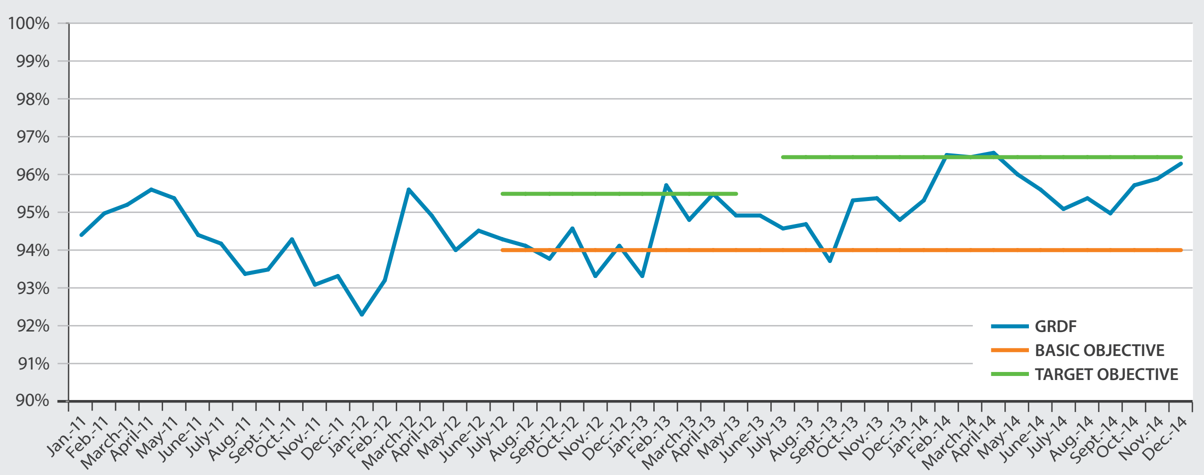
- A penalty of €100,000 per point of percentage if the biannual rate is strictly lower than the basic objective of 94%;
- A bonus of €50,000 per point of percentage if the monthly rate is equal or higher than the target objective of 96.5%.

For all the customers, the deactivation rate in the agreed lead times is increasing since 2011. It reached 95.8% in 2014 (corresponding to an increase of 1.5 points from 2011) and is between the basic objective and the target objective. Since the reinforcement of the financial incentives in July 2013, GRDF's performance has improved.

For biannual meter reading customers (household customers and professional customers, which include small businesses for which annual consumption is lower than 300 MWh, represent the majority of the customers), GRDF performance reached 95.9% in 2014 and is increasing since July 2013 (by +1.5 points compared with 2011). GRDF attributes the improvement to a specific mobilisation of the operational units during the interventions. Regarding monthly meter reading customers, the performance declined slightly from 2011 to 2014 reaching 78.4% in 2014 (-9.7 points). Concerning daily meter reading customers, the compliance of the lead times fell by -18.3 points reaching 69.5% in 2014. Nevertheless, the number of activations for daily meter reading customers is rather low, which can skew the analysis of the performance.

After 1 July 2012, the financial incentives did not have any effect on the performance of GRDF. Whilst there had been progress, the deactivation rate was between the basic objective (94%) and the target objective (95.5%). Therefore, since 1 July 2013, CRE has reinforced the objectives and financial incentives related to this indicator with a basic objective of 94% per semester and a target objective of 96.5% per month.

FIGURE 7.4 GRDF DEACTIVATION RATES IN THE AGREED LEAD TIMES



7.5.3 Case study: Claims processing in France

In France, the processing and registration of claims are mainly carried out via a web portal (called OMEGA), which is used as an interface between the DSO and the natural gas suppliers. However, claims can be submitted in written or oral forms directly by the customer or by the supplier. For gas, the majority of claims come from suppliers. Claims are then classified according to customers' satisfaction about the DSO's response.

The number of suppliers' claims declined by 26% from 2011 to 2012, and by 1.1% from 2013 to 2014. Specifically, the number decreased from 69,834 in 2013 to 69,066 in 2014. The time for processing suppliers' claims is monitored by a financial incentive indicator since 1 January 2010. GRDF has to pay a penalty of €2,000 by percentage point if the monthly rate of response to suppliers' claims within a time limit of 15 calendar days is below 95%. The performance of GRDF is above the objective of 95%. In 2014, GRDF improved its claims processing lead times whereby 98.4% of the claims have been handled in a lead time lower than 15 days while in 2013 its performance was 97.9%. According to GRDF, the improvement can be explained by a mobilisation of its teams on suppliers' claims in 2012. In particular, the financial incentives have had an impact. In 2011, the average annual response rate was equal to 90.9% while since 2013 it is above the objective of 95%, with a rate of 97.9% in 2013 and 98.4% in 2014.

The time for processing customers' claims is monitored via a financial incentive indicator since 1 January 2010. All monthly customers' claims have to be treated within 30 calendar days by the DSO. If the operator does not comply with the time limit, a compensation of €25 per claim not handled within the time limit has to be given to the customer. The rate of responses for customers' claims varied from 93.9% in 2013 to 90.6% in 2014. In 2014, GRDF paid a total amount of €1,225 of compensations in claims related to this indicator. Furthermore, the number of claims made directly by customers diminished by 50% since the introduction of the indicator in 2008.

7.6. SUMMARY OF BENCHMARKING RESULTS

Table 7.15 and 7.16 below synthesise the results in terms of the indicators (see also Section 7.4.1). Indicators for DSOs are the largest part of the total: 165 out of 306 national indicators (see Table 7.3).

TABLE 7.15 TOTAL OF APPLIED INDICATORS PER TYPE

Indicator	GI	OI	OR	Total
I. CUSTOMER INFORMATION				
I.1 Time for response to customer request and/or complaints	5	6		**11**
I.2 Number of customer requests and/or complaints	3	4	2	**9**
I.3 Percentage of responses to customer complaints and/or requests in written form within a given time period	1	3	2	**6**
I.4 Percentage of market participants who display the gas emergency number on invoices, homepage, etc.		1	3	**4**
I.5 Number of market participants who display the quality of supply standards on invoices, homepage, etc.		1	3	**4**
I.6 Times of availability of a market participant's call centre		3	2	**5**
I.7 Time of availability of a network operator's website accessible to providers	2	3		**5**
I.8 Average response time to customer request and/or complaints		1		**1**
TOTAL FOR CUSTOMER INFORMATION INDICATORS	**11**	**22**	**12**	**45**

Indicator	GI	OI	OR	Total
II. CUSTOMER CARE				
II. 1 Punctuality of market participants regarding appointments with customers	6	4		**10**
II. 2 Punctuality of customers regarding appointments with market participants	3	3	3	**9**
II. 3 Time limit for market participants / clients to cancel an appointment	2	3	3	**8**
II. 4 Time limit for waiting in customer centres	2	3	2	**7**
II. 5 Percentage of customers attended within the waiting time limit in customer centres	2	3		**5**
II. 6 Limit time for waiting in call centres	1	2	2	**5**
II. 7 Target call answer time in call centres	1	3	1	**5**
II. 8 Percentage of dropped calls in the call centres	1	3	1	**5**
II. 10 Obligation for DSO regarding response time for emergency situations	1	5		**6**
II. 11 Percentage of customers with a waiting time below the limit in call centres		2		**2**
TOTAL FOR CUSTOMER CARE INDICATORS	**19**	**31**	**12**	**62**
III. GRID ACCESS				
III.2 Average response time of a DSO to customer requests for technical grid access	2	4	1	**7**
III.4 Time for providing a cost estimation of connecting customers to the network	1	2	1	**4**
III.5 Time for execution of connecting customers to the network	3	4	1	**8**
TOTAL FOR GRID ACCESS INDICATORS	**6**	**10**	**3**	**19**
IV. ACTIVATION & DEACTIVATION OF SUPPLY				
IV.2 Time to response to customer request for activation	1	3		**4**
IV.3 Time period for activation of supply following a request	4	1	0	**5**
IV.4 Time period for deactivation of supply following a request	5	2	2	**9**
IV.7 Time period for reactivation of supply after payment	6	2		**8**
IV.8 Time a customer is deactivated following deactivation for non-payment	2	3	1	**6**
TOTAL FOR ACTIVATION & DEACTIVATION INDICATORS	18	11	3	**32**
V. METERING				
V.2 Number of gas meters not installed in due time	2	2	2	**6**
V.3 Time for meter verification	2	1	2	**5**
V.4 Time for replacement of the meter (when found out of order after verification)	3	1	3	**7**
V.5 Number of network customers, who were informed about meter readings in absentia	2	3	1	**6**
V.10 Minimum period for reading the meter	2	2	1	**5**
V.12 Percentage of meter readings made within a certain amount of time after the last one		1		**1**
TOTAL FOR METERS INDICATORS	**11**	**10**	**9**	**30**
VI. INVOICING				
VI.1 Percentage of invoices submitted in due time	2	4	1	**7**
VI.2 Percentage of corrected invoices submitted in due time	2	4		**6**
VI.4 Number of settlement data not transmitted in due time	1	3		**4**
VI.7 Time for changing provider on customer request	3	1	2	**6**
TOTAL FOR INVOICES INDICATORS	**8**	**12**	**3**	**23**

The most monitored indicator is the time for response to customer claim for network connection (I.1). The average number of indicators whose type is specified is 6 ("indicators/activity", that is "(11+21+12)/ 7 activities") in the Customer information group. This figure is one of the highest among the other groups (see below), meaning that customer information and the time to response to complaints in the CEER countries is of primary importance. Customer care indicators (Group II) are the largest group of indicators (with an average value of 7 indicators/activities and a total of 62 indicators). The punctuality of market participants regarding appointments with customers (II.1) and the punctuality of customers regarding appointments with market participants (II.2) are one of the most monitored indicators.

Grid access (Group III) and activation and deactivation of supply (Group IV) have an average value of approximately 6 indicators/activity. A key issue is access to the grid as quickly as possible: the average response time of a DSO to customer requests for technical grid access (III.2) and the time for execution of connecting customers to the network (III.5) are the 2 most monitored indicators of the Grid access group. Regarding the Activation & Deactivation of supply group, the focus is on the time to perform activation, deactivation and reactivation.

Metering and invoicing are regulated to the same extent, with an average value of approximately 6 indicators/activities. In particular, DSO give high priority to submitting invoices in the due time; the percentage of invoices submitted in due time (VI.1) in the Invoicing group is the most monitored indicator.

Looking at the average number of indicators per activity group, there is a considerable difference between them. OIs are the most frequently applied indicators for regulation of customer information, customer care, grid access and invoicing issues. In some important cases GIs, OIs and ORs are used in parallel in CEER countries. GIs are frequently applied for activation and deactivation of supply and metering activities. Many GIs and ORs are applied for customer information and customer care issues. Table 7.16 shows the indicators applied in CEER countries, per group and per type.

TABLE 7.16 COMMERCIAL QUALITY INDICATORS APPLIED BY CEER COUNTRIES PER GROUP AND TYPE OF INDICATORS

Countries	I. Customer information			II. Customer care			III. Grid access			IV. Activations			V. Meters			VI. Invoices		
	GI	OI	OR	GI	OI	OR	GI	OI	OR	GI	OI	OR	GI	OI	OR	GI	OI	OR
Austria		X	X		X			X			X			X			X	
Belgium		X	X		X							X						X
Croatia		X	X	X	X		X			X					X	X		X
Czech Republic	X	X			X			X		X	X		X	X		X	X	
Estonia		X																
Finland																		
France	X		X	X		X			X	X					X			X
Great Britain																		
Greece																		
Hungary		X		X	X	X	X	X		X	X		X		X	X	X	
Italy		X		X			X	X		X			X					
Latvia	X	X	X	X	X	X				X	X	X	X	X	X	X	X	
Lithuania		X						X				X			X			
Luxembourg																		
Malta																		
The Netherlands		X																
Norway																		
Poland	X															X		
Portugal	X	X		X	X					X				X				
Slovenia			X						X						X			
Sweden																		

7.7. FINDINGS AND RECOMMENDATIONS ON COMMERCIAL QUALITY OF GAS

It is important to recall that the results on commercial quality should be interpreted with caution as some elements can be measured in different ways and data are not yet available in every country. This may reflect differences in measurement. For example, some indicators do not differentiate between requests and complaints. Furthermore, the performances of the operators are not comparable across countries since each country has its own regulatory system (with specific time limits, standards, compensation levels, penalty amounts, etc.).

Finding 1

An increased focus by NRAs on the quality of the services provided to customers.

A first finding, in line with the conclusions for electricity from CEER's past Benchmarking Reports, is that NRAs devote significant attention to the commercial quality of the services provided. A total of 17 responding countries reported 211 national commercial quality indicators referring to 36 performances requested by customers.

Finding 2

A broad but increasingly harmonised, range of commercial quality indicators are monitored.

There are significant differences concerning the nature and the number of indicators monitored across countries. The regulation of a given service can be achieved in many different ways such as time limits, standards, compensation levels and penalty levels. NRAs should set the commercial quality regulations taking into account their national, political, cultural and economic specificities. There are significant differences between countries concerning the number and the nature of the indicators. The survey of the 6th Benchmarking Report reveals a considerable number of identical or partially identical regulations concerning commercial quality indicators.

Finding 3

Requirements and compensations vary a lot depending on the customer type

Commercial quality concerns different types of customers: the difference in the amount of consumption is also important from a regulatory point of view. Their classification (location, pressure levels) varies from country to country and from network operator to network operator. In a given country, requirements may vary significantly depending on whether the customer concerned is a low pressure, medium pressure or high pressure customer.

Finding 4

A significant number of OIs and GIs are monitored in the regulation of gas commercial quality.

The data collected shows that commercial quality indicators can be used by NRAs in 3 ways:

- To define OIs, either without any economic consequence for the DSO or supplier upon non-compliance or including economic sanctions. NRAs are entitled to impose sanctions such as penalties;
- To set GIs by which customers receive direct compensation if standards are not met; or
- To apply OR, and in the case of non-compliance, sanctions can be imposed by the NRA.

This benchmarking exercise reports 78 GIs and 112 OIs being applied, out of a total number of 240 indicators.

Finding 5

Commercial quality is mainly focused on the DSO's relationship with customers.

In countries where competition works well, the NRAs are focused more on the DSOs' commercial quality obligations (rather than those of the suppliers) as the distribution activities are closely linked to customers (connection to the grids, activations, etc.).

Finding 6

Customer information, customer care and activations to the network are key considerations.

From a consumer perspective, activations and deactivations are very relevant processes not least because in some cases they represent the customer's first interaction with the energy market. If these processes are well designed and function efficiently, they will help to improve the customer's perception of the energy market. The survey results shown in Table 7.3 demonstrate that priority is given to the standards for customer information, customer care and activation/deactivation.

Finding 7

Automatisation of compensation payment is being developed.

The compensation paid to the customer for non-compliance exists in some countries but it is still not at a sufficient scale: some countries already apply automatic compensation in case of non-compliance for certain indicators. For example, in France, since 2013 the number of missed appointments by the main French DSO (GRDF) is systematically detected and the customers are automatically reimbursed.

Finding 8
The focus needs to be wider than DSO's written responses to consumers.

In addition to the customer's expectation to be connected or reconnected as quickly as possible, there is the noticeable need for a substantive response from the DSO/supplier to any customer request within a reasonable limit of time. The data reveals that the current emphasis is placed on performance with respect to written forms of communication. This results in an incomplete picture of the quality of responses to customer requests for 2 different reasons: (1) non-written forms of communication like telephone (fixed and cell-phone) and internet (website) have been developed significantly and are widespread; (2) in some countries, the more traditional approach of visiting local customer centres continues. In France, in 2014, some improvements have been realised for GRDF (the main natural gas French DSO) with measures to allow better traceability of oral and internet-based complaints, and for recording mails and phone calls. Since 2015, GRDF now takes into account, in addition to the written complaints, oral and internet-based complaints.

RECOMMENDATION 1

PERFORM REGULAR REVIEWS OF NATIONAL REGULATIONS.

It is important for CEER (and NRAs) to regularly review the commercial quality indicators, taking into account the development of national conditions (e.g. the development of smart grids) and the expectations of the customers. Monitoring the actual level of commercial quality (average values of the indicators and percentages of fulfilment) has an important role in such reviews. The most important factor in this process is the availability of wide and realistic data. Therefore, it is necessary to examine in detail (including questioning stakeholders about) the commercial quality regulations in place to know if other indicators or requirements are monitored, or to understand the specificities of each country surveyed. In addition, the number of indicators surveyed by CEER should be limited to make the analysis manageable.

RECOMMENDATION 2

PURSUE THE HARMONISATION OF COMMERCIAL QUALITY INDICATOR DEFINITIONS.

Harmonising the definitions facilitates significant results from European countries and a more consistent and understandable database. Comparisons are difficult to make between Member States, as the regulation of a given activity can be achieved in many different ways depending on the country. A clear framework and harmonised parameters can help the analysis of the results and thus the identification of further improvements and recommendations.

RECOMMENDATION 3

ENSURE GREATER PROTECTION THROUGH GUARANTEED INDICATORS WITH AUTOMATIC COMPENSATION FOR CUSTOMERS.

It is recommended that NRAs should apply GIs with automatic compensation or OIs or ORs associated with the option of sanctioning. For the most important indicators (e.g. for connection activities), a combination of OI with economic sanctions (like penalties) and GIs is recommended, in order both to improve the average performances and to protect customers from worst service conditions. This recommendation is targeted mainly at DSOs given their important relationship with customers. In addition, the automatisation of the compensation payment, which is increasingly applied, should be extended to every country.

RECOMMENDATION 4

NRAs SHOULD MONITOR INDICATORS IN ALL FORMS OF COMMUNICATION FOR MORE ACCURATE PERFORMANCE LEVELS.

CEER recommends that, in addition to written form of communication, NRAs should also regulate the performance of the service level of provided to customers through communications such as phone, e-mail and online (e.g. website/apps), and visits to customer centres. In particular, in the performances of DSOs and USPs in the increasingly important field of phone contacts should be monitored. Attention should be paid not only to a rapid response but also to a thorough and useful response. All types of responses should be taken into account in the commercial quality regulation: oral, internet-based and written complaints.

RECOMMENDATION 5

ENSURE THE AVAILABILITY OF THE SERVICES, IN PARTICULAR REGARDING CONNECTION AND CUSTOMER CARE.

CEER recommends countries and their NRAs evaluate customer priorities before creating new regulatory frameworks.

RECOMMENDATION 6

FURTHER DEVELOP THE REGULATION OF CUSTOMER RELATIONS.

Quality perception is not sufficiently evaluated in the Member States. To further develop the commercial quality regulation, satisfaction surveys -although costly- could be implemented to have qualitative elements (in addition to the quantitative elements the CEER questionnaire provides), since it could help in assessing how the customers actually perceive the service achieved by the operator.