

**Performance Indicators Report
 without reference to countries
 2008 – 2016**

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1. EXECUTIVE SUMMARY

Through comparing specific performance indicators across European Gas Distribution System Operators (DSO's), this study shows that safety, quality and security of supply are shared by all distributors and are under control.

Differences mainly related to the history of networks exist but quality levels are comparable between Countries.

2. INTRODUCTION

MARCOGAZ Working Group (WG) Distribution initiated a project to define a standard set of performance indicators to apply to DSOs at European level.

These can relate to the growing interests of the European Commission and Regulators to define such indicators, especially in terms of quality of service, and to benchmark DSOs at European level.

3. SCOPE AND LIMITS

3.1. Scope and limits

The purpose of this report is to give an overview on how DSOs deal with their major challenges (safety, continuity of supply, quality of service, market facilitation) by analysing the results of Performance Indicators defined in those key areas.

The WG Distribution set out each Performance Indicator according to the following principles:

- Relevance to the theme covered.
- Ability to collect the data within the different WG Members organisations and associations.
- Accuracy, clarity and stability of harmonized definitions of each performance indicator, in order to avoid misunderstanding and to provide a comparative analysis over several years.

The selection of the list of indicators is based on a questionnaire prepared by the WG Distribution and sent to MARCOGAZ Members. 20 different Performance Indicators are identified, covering 5 different areas, and representing major gas distribution activities:

- A: Aspects on the opening of the gas market (3 indicators).
- B: Aspects on continuity of supply (3 indicators).
- C: Aspects on the quality of service (3 indicators).
- D: Aspects on safety (7 indicators).
- E: Aspects on networks characteristics (4 indicators).

The objective is to provide a benchmark analysis by collecting data on a yearly basis at a national level, according to the common definitions validated by the WG.

All MARCOGAZ Members were invited to participate in the data collection. The number of contributing Countries varies between 2008 and 2016. The data collection in 2016 includes figures from 10 Countries. In total, those 10 Countries represent about 1 Million km of distribution network with about 50 Million customers connected to this overall network, which is quite representative of the European DSO activity.

The benchmark of those indicators aims to identify a range of values for each indicator. Furthermore the analysis considers the reasons why, for some indicators, the results can vary widely from one country to another. The interpretation of those indicators over several years enriches the analysis by providing a dynamic view of the results. Ultimately, the purpose of this suite of indicators is to help participants share best practice within each DSO and measure progress.

Although there has been a substantial improvement of the quality of data provided, the collection of certain data may still face some difficulties:

- Due to the large number of existing DSOs in some Countries (e.g. Germany and Italy), it is difficult for those Countries to determine a consolidated result of indicators at national level. Therefore, for some countries, the data collected only represents the results of the DSO Member of MARCOGAZ and not an average of all DSOs of a Country.
- Not all data to be collected is available in all the European Countries (e.g. the average unplanned interruption duration is not available in France, as for indicators on customer complaints in Germany).
- Differences in definitions may persist among the different Countries.

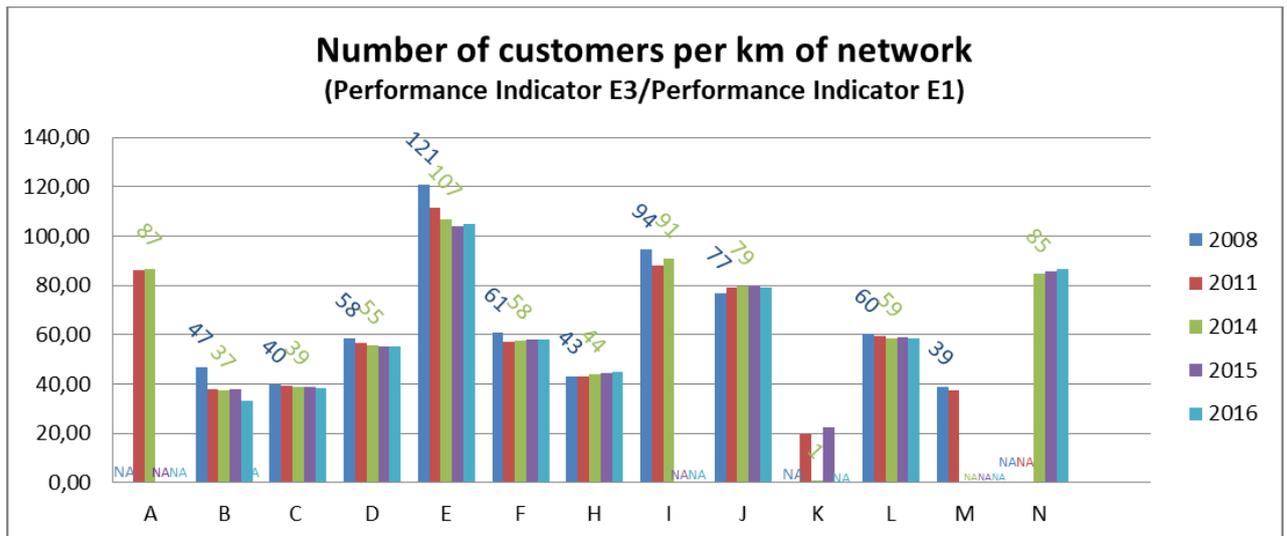
3.2. General information

Period : 2008-2016 Participating Countries : 10 for 2016 Included number of customers (2014) : 80,9 Million (2016 : 48,1 million for 10 countries) Included length of mains (2014) : 1 368 931 km (2016 : 961 966 km for 10 countries)	
Contributing Countries : (in 2016)	
<ul style="list-style-type: none"> • Austria (up to 2014) • Belgium • Czech Republic • Denmark • France • Germany • Romania 	<ul style="list-style-type: none"> • Ireland • Italy (up to 2014) • The Netherlands • Portugal • Spain • United Kingdom (up to 2014)

4. ANALYSIS AND RESULTS

4.1. Aspects on the opening of the market

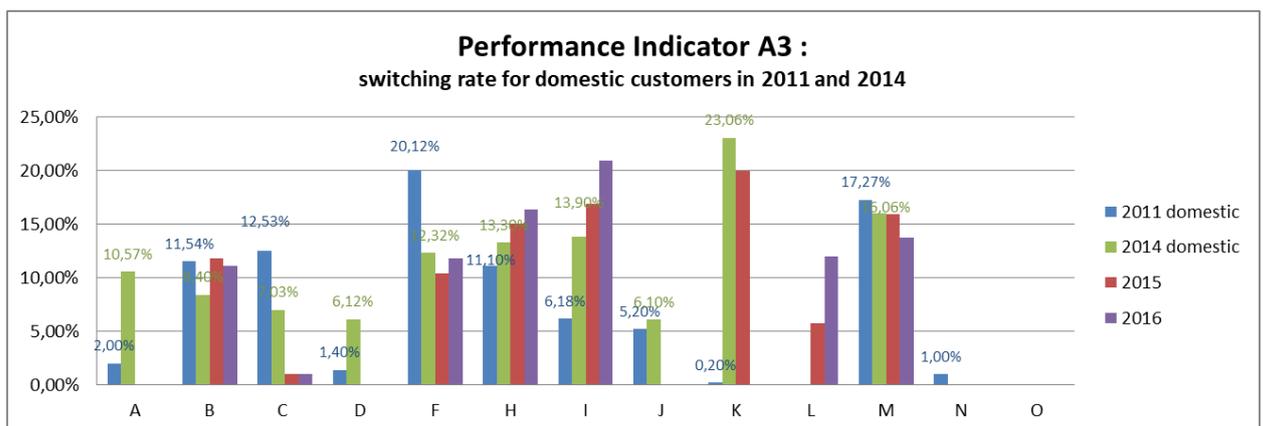
- The world of Gas Distribution is very diverse (history, length of network, number of customers...etc.)
- In particular, due to historical reasons, the number of gas DSOs varies greatly from one Country to another (e.g. Ireland: 1, Germany: 700 +).
- However all DSO's have succeeded in adapting to the opening of the gas market to competition (including residential customers) in compliance with the Energy Directives. They play an important role in this process as market facilitators, supporting the switching process.
- Strong differences exist in the volume of gas consumed per Country: the penetration rate of natural gas (% of natural gas in the energy mix of each Country is widely different, due to the maturity of the gas markets. e.g. UK/Netherlands versus Spain and France). Therefore the potential for development of natural gas is limited in certain Countries but remains important in some others. It is important for gas DSOs to continue to gain new customers and to develop new uses of natural gas (e.g. biomethane, NGV) to compensate for the loss of gas consumers and the decrease of unit consumption per customer due to energy savings and efficiency.



The graph shows that for each country, there's no major difference between 2008 and 2016. The average number of customers per km is close to 60 during this period. However there are differences between countries varying from 20 to 120 customers per km.

This difference could be explained by the following historic topics:

- The history of distribution of gas for each country.
- The network coverage within the country or specific concentration in urban conurbations.
- Strong competition from other alternative energy sources shaping the networks.



Most of the countries have a switching rate close to the average (12%). The main differences between countries are:

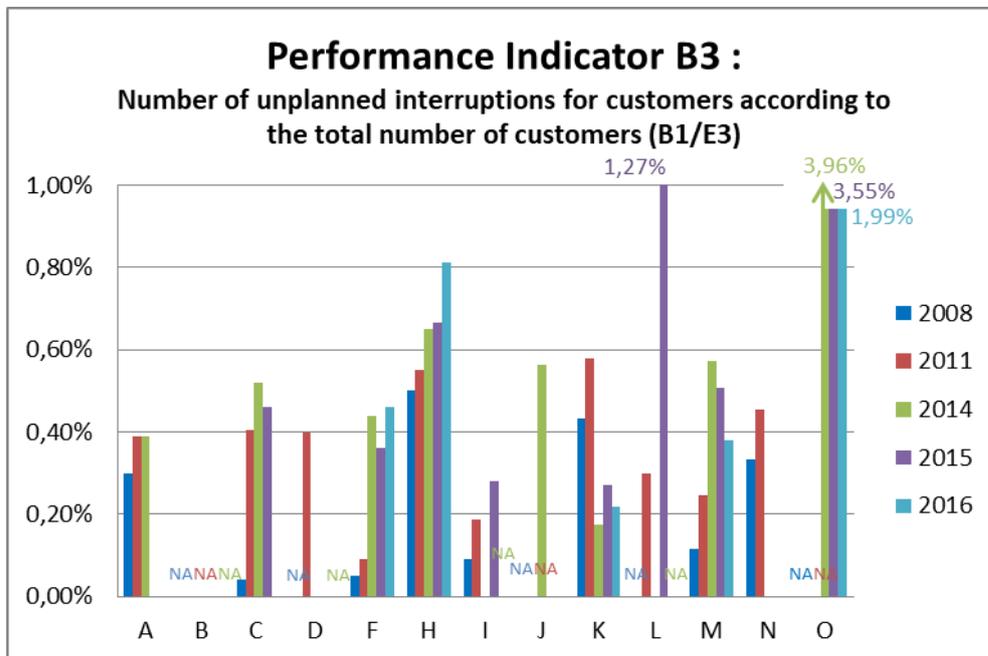
- More suppliers and better information available for the customer population, which is a new experience, giving new possibilities for customers in an open gas and electricity market., Splits or merging of companies contributing to a change to their customer portfolio.
- Proactive suppliers encouraging switching, so customers who had switched the previous year and lost their switch bonus moved to other suppliers who offered them introductory offers as 'new' customers.

4.2. Aspects on continuity of supply

4.2.1. Number of interrupted customers

For this indicator, only unplanned interruptions have been included (excluding vandalism and problems downstream of the meter).

Only half of the countries are able to give a figure. This data is difficult to collect, and an analysis should be done in order to define a harmonized way of collecting the data for coming years.



4.2.2. Duration of interruption

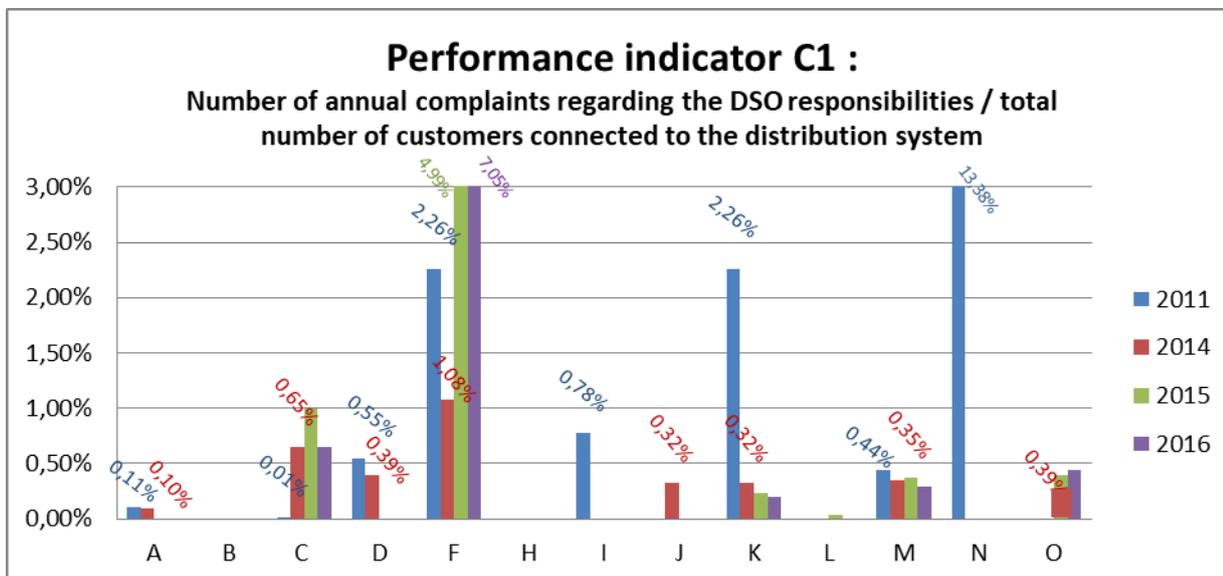
The Average unplanned interruption duration per year (in minutes) (Performance Indicator B2) has not been calculated in all countries. Indeed, each country can give a different definition to the average time of interruption for each customer.

As a result, the differences in data collected remain different for a number of countries. For example, only the time for the gas to be back in the network at the right pressure level is considered by some countries, whereas in other countries it is the time for which gas is supplied back to the customer.

Depending both on the regulation and on the nature of the network (low pressure or medium pressure), the technical way to proceed may be different. Therefore, the duration of the interruption has to be calculated according to this difference. Moreover, in both cases, the presence of the customer is necessary to supply the gas back, which has an impact on the total duration. In particular, this last point is different in an urban environment to that in a rural one. For these reasons, the collected performance indicator B2 has not been comparable between countries because of its significant variation from one country to another.

4.3. Aspects on quality of service

4.3.1. number of complaints



Complaints regarding DSO's responsibility do not include those concerning equipment downstream of the meter. Indeed, for most countries, the responsibility of the DSO stops at the meter.

The number of complaints received by the majority of the operators is small. Furthermore, the complaints are dealt with in a timely manner (within the deadline).

Data is only available for five countries in 2016.

Most of the complaints received concern gas metering (blocked gas meter, disagreement with the metered quantity (false figure)), delay for connecting new premises and quality of road work.

4.3.2. Cut-offs asked by supplier

Rules about the handling of cut-offs by the DSO on request of the suppliers are not harmonized in Europe.

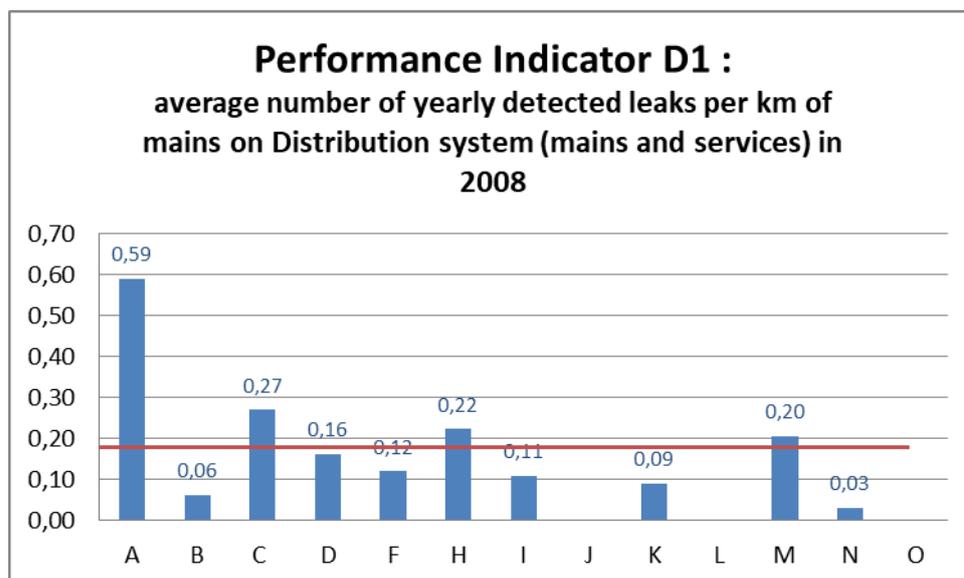
- For most of the countries, all cut-offs or nearly all cut-offs requested by the supplier are realized. In one of those countries, suppliers ask for two types of cut-off: a strict one, immediate, and an optional one (no cut-off if the customer pays during the DSO's visit). For three other countries, the cut-off is immediate.
- For two countries, nearly half of the requested cut-offs are realized.
- In one country the law prohibits disconnection thereby resulting in more work required by the DSO.
- In Denmark cut-offs of customers are decided and executed by the DSO and not requested by the supplier. The total cut-offs in Denmark because of lack of payment was about 1% of the total number of customers.
- Data are available for four countries in 2016.

4.4. Aspects on safety

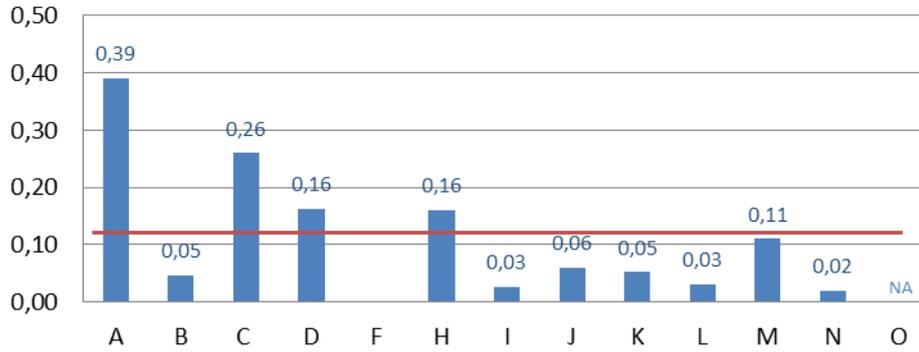
4.4.1. Detected leaks

This indicator, D1, is not defined as the number of leaks but as the total number of repairs, both detected by planned inspection and by unplanned situations. However, there is not a repair for each detected leak. In some countries, only detected leaks are collected, whereas in other countries, detected leaks that lead to a repair are collected. In the first case, the figure is higher. Therefore, the comparison of the figures between countries is difficult to interpret.

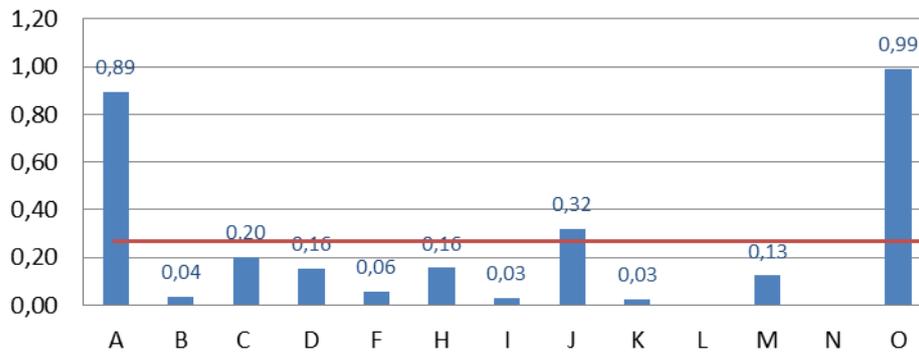
The situation is heterogeneous between Countries, related to the age and the materials used in the network.



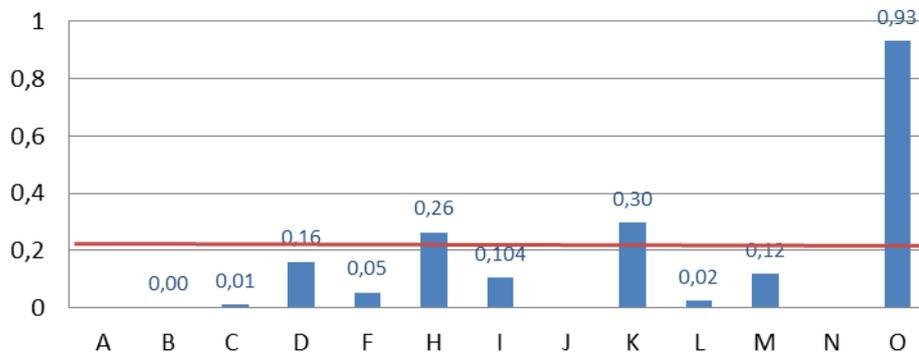
Performance Indicator D1 :
average number of yearly detected leaks per km of
mains on Distribution system (mains and services) in
2011

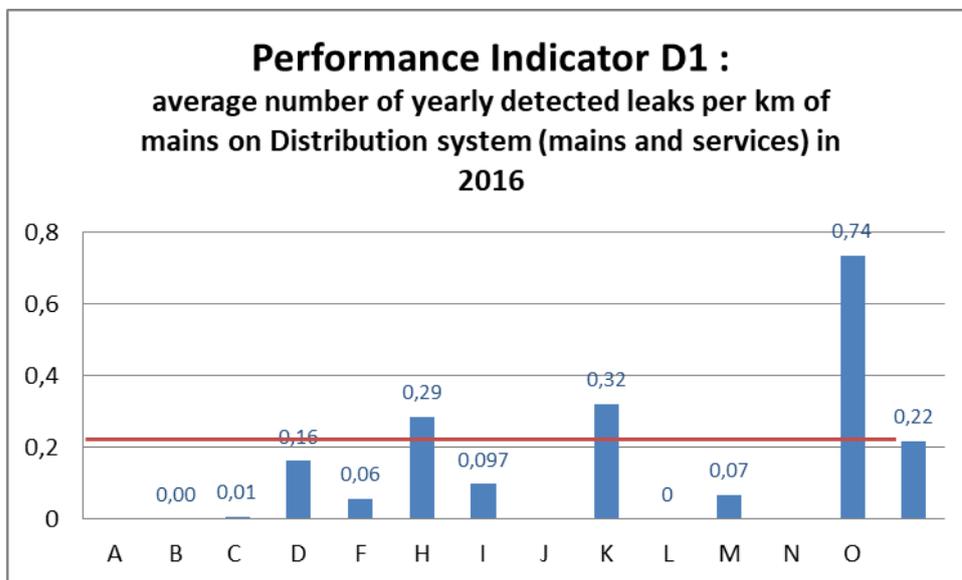


Performance Indicator D1 :
average number of yearly detected leaks per km of
mains on Distribution system (mains and services) in
2014



Performance Indicator D1 :
average number of yearly detected leaks per km of
mains on Distribution system (mains and services) in
2015

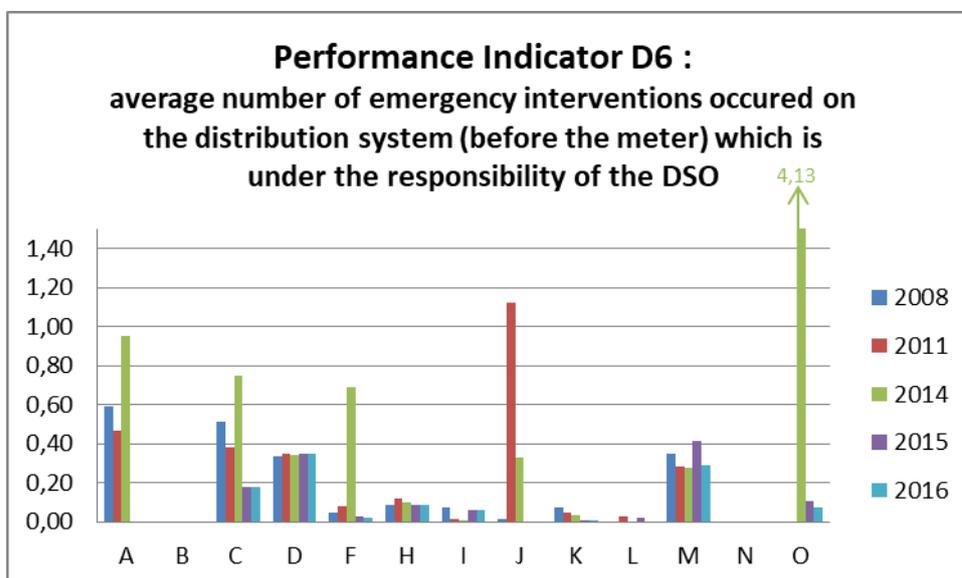




Most of the countries have a rate around the average of about 0,2 without a very sensitive trend, except two countries, where leak rates are above other countries. In one of them, the number of leaks per km was reduced by third during the period 2008-2011 then it was multiplied by two during the period 2011-2014. This country has a higher cast iron population than other countries which, as a consequence, contributes toward a higher figure.

4.4.2. Emergency interventions

The graph shows variations between 2008 and 2016 in the number of emergency interventions per year per km, occurring on the distribution system which is under the responsibility of the DSO (i.e. before the meter).

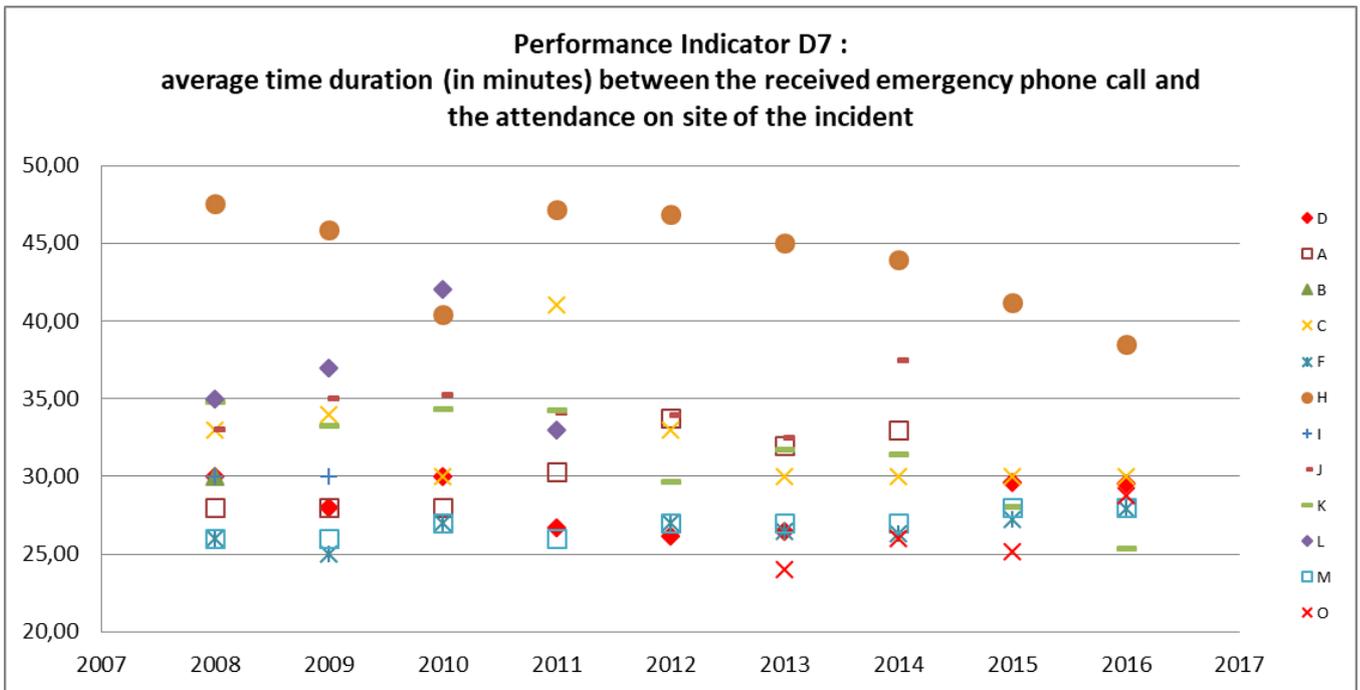


The graph shows a large disparity between the Countries. The total number of emergency interventions is much higher than the number of intervention for leaks (3 times higher). Explosion, fire, lack of gas, pressure drop or excess of pressure are the main reasons for interventions.

In 2014, two countries are above the average, one of the reasons could relate to the structure and age of installations inside buildings (but before the meter).

In 2016 the disparity between countries is lower.

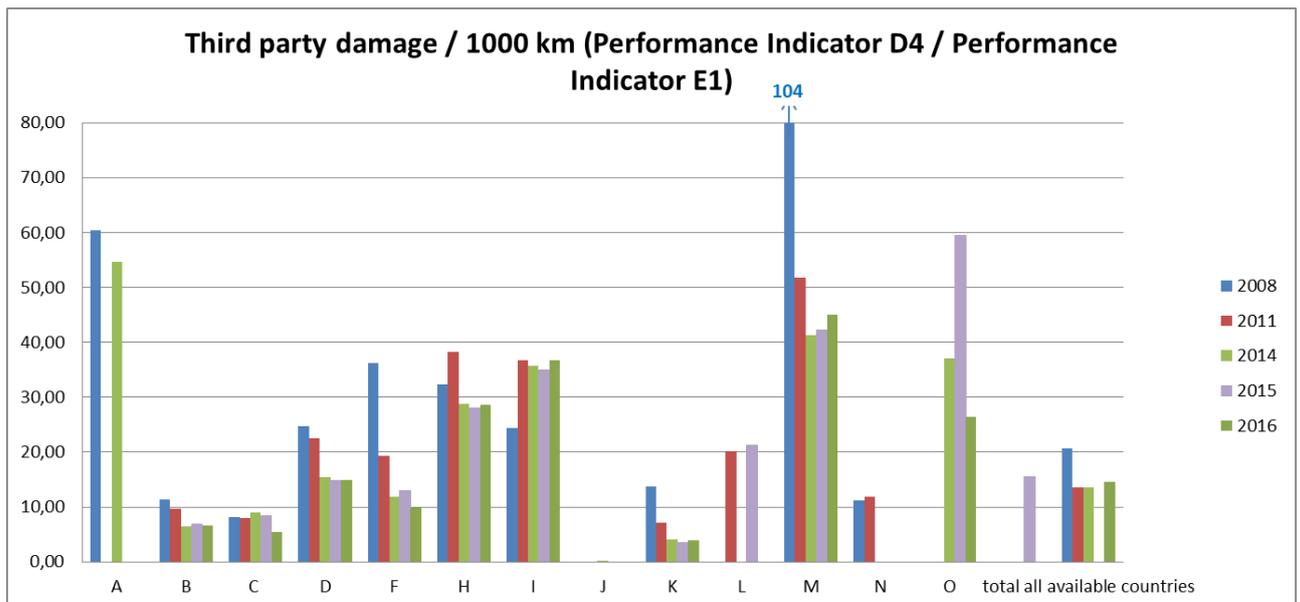
4.4.3. Time duration



This average time duration between the received emergency phone calls and attendance on site to the incident has remained stable over the last 8 years. It is between 26 and 44 minutes, with an average being around 32 minutes.

4.4.4. Third party damage

The graph shows a general downward trend for third party damage. In most of the countries, measures were taken to reduce third party damage.



In some countries, figures were historically low, and it remains low. In most of the countries where the figures were higher, a decrease is observed.

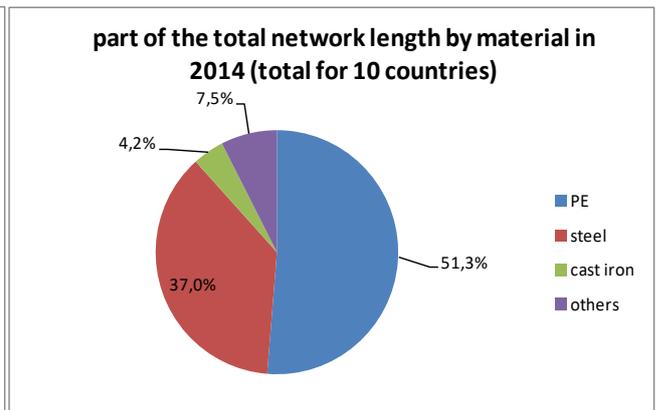
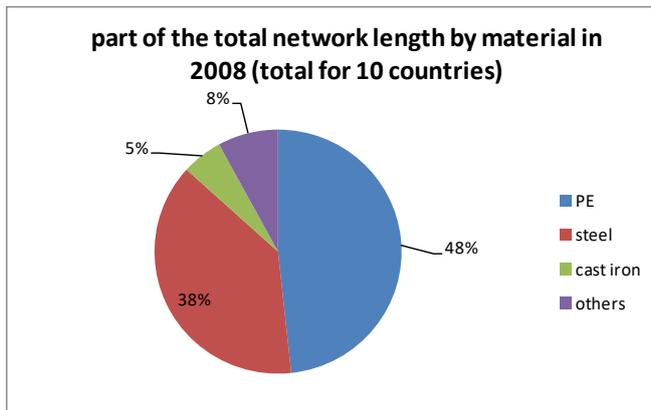
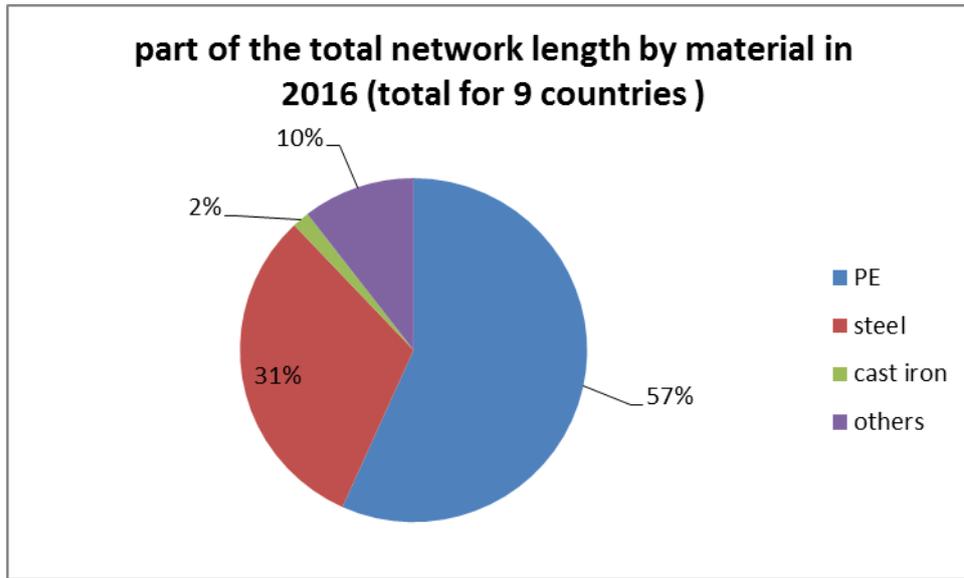
In 2008 figures for some countries include a high proportion of service interference damages (compared to overall main network length comparisons), higher figures due to a high

proportion of high density urban environments or PE services located in gardens / driveways subject to ground levels changing over time.

Good practices are implemented in most countries to reduce 3rd party damages (training, awareness, etc.).

The total for all countries with available data also follows the same lowering trend. The total seems stable between 2011 and 2016 but it might be due to the absence of data for some countries in 2011.

4.5. Aspects on network characteristics



PE and steel are the main materials for the majority of countries.

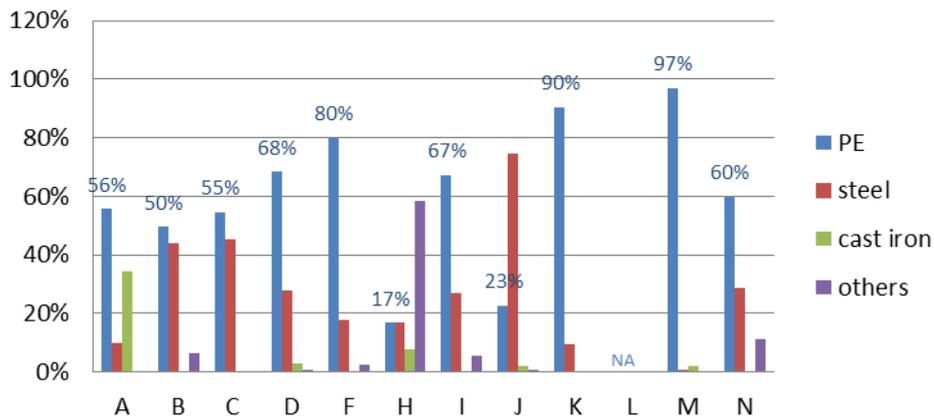
Polyethylene (PE) is predominantly the main material used in the gas networks (there was an increase of 73 000 km between 2008 and 2016 for 8 Countries).

There is a prevalence for PE (90% for new pipelines) and a significant decrease of cast iron, which has been progressively taken out of commission across the networks.

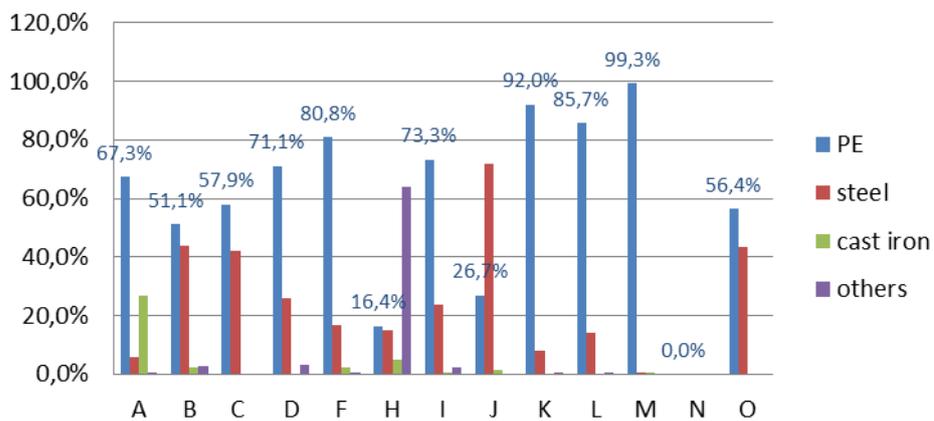
In one country, the gas network is almost exclusively constructed of PE pipes. One country has 64% of other materials within its total length (type = others).

One country has most of its network in steel and a lower part of PE pipes.

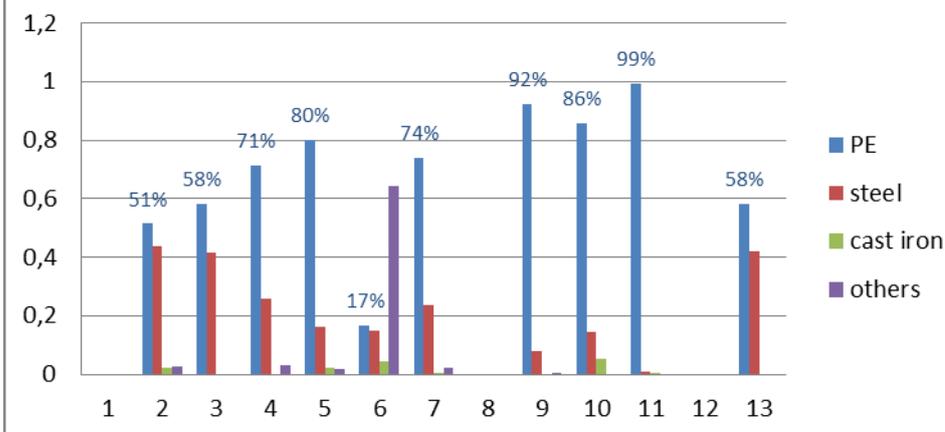
part of the total network length by material, in 2008

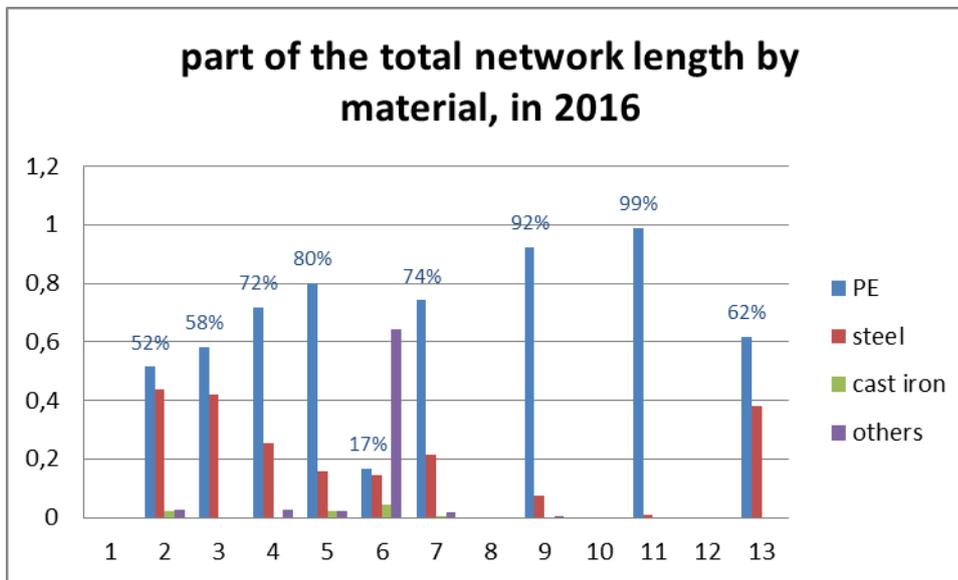


part of the total network length by material, in 2014



part of the total network length by material, in 2015





5. CONCLUSIONS

This report is the result of an intensive cooperation among DSOs (participating in Marcogaz Distribution working group), regarding performance and an exercise to merge key indicators between gas Distribution System Operators which will serve as a good source for benchmarking.

In summary, of the 5 different areas covered we can conclude:

- **Opening of the gas market:** The opening of the market between 2008 and 2016 varies between countries and remains dependent on several factors (prices, bonus etc.) concerning suppliers' competition and not specifically related to DSOs activities.
- **Aspect on continuity of supply:** A low number of customers are disconnected per year. For the majority of the countries, only 5 customers from 1000 have an interruption per year. This means that on average, a customer has an interruption of supply every 200 years (one interruption every 50 years for countries with a higher rate).
- **Aspect on the quality of service:** The rate of complaints is very small and they are dealt with in time. One reason for this is good management by DSOs, as demonstrated by the Indicator within this report.
- **Aspects on safety:** There are many similarities on the level of safety indicators. For example, an average time duration per year (min) between the received emergency call and the arrival on site of the incident around 32 minutes is consistently achieved.
There is a general downward trend regarding third-party damage and leaks per km.
- **Aspects on networks characteristics:** Older material, like for example cast iron, used on the network is progressively disappearing, replaced most of the time by PE which as a consequence results in the number of leaks on network decreasing.

6. APPENDIX : DEFINITIONS FOR THE PERFORMANCE INDICATORS DATA BASE

A1: Number of existing DSOs	Number of Distribution System Operators legally authorized to exercise this activity functioning within the Country.
A2: Recorded distributed gas quantity (gross value)	Recorded information of distributed gas quantities (volume or energy). Total quantity of gas which flows on the grid of the DSO.
A3: Switching rate by customer group (per year)	Recorded information about the number of customers that have switched from one gas supplier to another.
B1: Number of yearly unplanned end-users' interruptions of gas supply	Total number of customers having an unplanned interruption during the year; an unplanned interruption of gas supply means that the gas pressure is lower than the contracted one.
B2: Average unplanned interruption duration per year (in minutes)	Average cut-off time by customer who has been interrupted.
B3: Unplanned interruption Frequency per year	Total number of interrupted customers (B1) / Total number of customers (E4).
C1: Indicator on Complaints per year	Number of annual complaints regarding the DSO responsibilities / total number of customers connected to the distribution system.
C2: Indicator on processed Complaints per year	Number of annual processed complaints / total number of complaints.
C3: Ratio of cut-offs asked by the supplier and realized by the DSO (for interruptions per year following a lack of payment)	It is the ratio of realized gas supply cut-offs / requested cut offs by the supplier, completed on time.
D1: Number of yearly detected leaks per km of mains on the Distribution system (mains and services)	Number of emergency repairs (not detected by planned inspections) + Number of planned repairs (detected by planned inspections). Leaks on mains and services (connections).
D2: Number of emergency (unplanned) repairs per year	Number of emergency repairs (not detected by planned inspections). Leaks on mains and services (connections).
D3: Number of planned repairs per year	Number of planned (detected by planned inspections) repairs. Leaks on mains and services (connections).
D4: Number of annual third-party interference or damage with leaks	Number of annual third-party interference or damage, with leaks, occurring on the distribution system which is under the responsibility of the DSO.

D5: Number of accidents per year	Number of accidents per year = number of events related to natural gas which has caused physical injuries (hospital > 24 h) or fatalities or big material damage (> 100 000 EUR). Accidents under responsibilities of the DSO (occurred before the meter). Data of fatalities and injuries of internal personal/contractors are excluded.
D6: Number of emergency interventions per year per km, occurred on the distribution system 12(before the meter) which is under the responsibility of the DSO.	Emergency intervention = explosion, fire, leak of gas, lack of gas, excess of pressure, pressure drop.
D7: Average time duration per year between the received emergency phone call and attendance on site of the incident.	
E1: Total main network length in the annual report (in km)	Figures at national level
E2: Main network length per material in the annual report (in km)	Figures at national level
E3: Number of total metering points in the annual report	Figures at national level
E4 : total number of customers	Figures at national level