POLICY GUIDELINES

by the Energy Community Secretariat

on measurement in the natural gas distribution network

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Contents

1. Background

The purpose of these Guidelines[1] is to support distribution system operators in the Energy Community Contracting Parties in transferring experience and improving knowledge in the implementation of the EU acquis as adapted for the Energy Community.

In the early years of the Energy Community, stakeholders included in the implementation processes were mainly institutions of the Contracting Parties: ministries and regulatory authorities. With the Community maturing, more and more stakeholders moved to the centre – producers, suppliers and transmission system operators. More recently, distribution system operators received the necessary attention and their own coordination platform with the creation first ECDSO-e in 2014 and, for gas, **ECDSO-g** in 2016.

The gas distribution system operators, meeting regularly in the ECDSO-g Platform, have identified measurement of gas deliveries as one of the most important and most debatable issues. Thus, a measurement Task Force was established in October 2017 to discuss the relevant aspects in more details.

The DSO Platform tasked the Task Force to develop Guidelines on measurement in the gas distribution network under the Secretariat's lead.

The Task Force discussed the different practices in collecting data of measured and non-measured deliveries and also created questionnaires on this topic. The DSOs have replied to the questionnaires, the findings of which were discussed during the meetings, as well as other related issues. Eurogas and Marcogaz have contributed significantly to these discussions, bringing EU best practices on gas measurement, in particular on applied units, consumption profiles and introduction of smart metering.

The Secretariat has structured these Guidelines following the relevant Energy Community acquis and taking into account the work within the ECDSO-g Coordination Platform during the last few years.

[1] *The Guidelines are non-exclusive in any way, they cover particular issues with the aim to support the Contracting Parties in the implementation of mandatory legislation and EU best practice related to the measurement in gas distribution networks.*

2. Introduction

Measurement of gas volumes is one of the essential activities needed for the secure and reliable operation of the system. Measured inputs to and outputs from the transmission and distribution systems constitute the data needed for system management and technical preconditions for capacity allocations and delivery to the customers.

Responsibilities, rights and obligations in regards to the measurement are defined by national legislation, in line with the relevant EU acquis. This has to include the responsibility for the metering activity and metering equipment – such as its ownership, installation, calibration, maintenance, replacement and reading. The rights of different entities to be present at the reading and the related dispute procedures also have to be defined by legislative acts and relevant contracts.

The common practice is that transmission system operators have the responsibility to measure exit from the transmission system to the distribution systems, while distribution system operators have the responsibility to measure exits from the distribution systems to final customers.

The responsibilities regarding measurement are naturally linked to the responsibilities for the operation of the system, which is based on the actual flow and pressure data, regardless of the ownership of the meters and the contractual relations for capacities and deliveries.

Mirroring the situation, a system operator must have access to the meter device, regardless of its ownership.

The meter devices shall be installed, calibrated, replaced and maintained in line with relevant technical rules and standards.

Chemical and physical characteristics of the gas transported have to be taken into account when considering the measurement of gas delivery. The basic issues to be considered in this respect are the impact of pressure and temperature on the volume values. The composition of gas determines the energy content and the physical flow influences the choice of metering equipment.

The Guidelines focus on the issues which were underlined as important within the work of the ECDSO-g platform, such as the required conversions, the legal basis for individual meters and smart metering, and access to metering and billing data.

3. Legal basis

There are two basic directives in place, mandatory for the Contracting Parties, which set the framework for measurement of gas delivery at the distribution level.

Directive 2009/73/EC concerning common rules for the internal market in natural gas[2] (the Gas Directive) does not explicitly determine the metering requirements, but related obligations stem from the provisions defining tasks and responsibilities of distribution system operators, principles of retail markets and scope of customer protection.

The provisions on retail markets stipulate the need for clear rules. Article 45 reads, "subject to review by the regulatory authorities or other relevant national authorities" in regards "the roles and responsibilities of …. distribution system operators…with respect to *contractual arrangements, commitment to customers, data exchange and settlement rules, data ownership and* ***metering responsibility***".

Directive 2012/27/EU on energy efficiency[3]*, (the Energy Efficiency Directive)* in particular Article 9, defines in a more concrete manner the obligations related to metering, including of natural gas.

Article 9 stipulates that the "Contracting Parties shall ensure that, in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings, **final customers** for electricity, **natural gas**, district heating, district cooling and domestic hot water are provided with **competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use**."

Such a competitively priced individual meter shall always be provided when "an existing meter is replaced, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term" and when "a new connection is made in a new building or a building undergoes major renovations"

[2] As adopted for the Energy Community by Ministerial Council Decision 2011/02/MC-EnC on 6 October 2011, with **the general implementation deadline by 1 January 2015 (31 December 2020 for Georgia)**

[3] As adopted for the Energy Community by Ministerial Council Decision 2015/08/MC-EnC on 16 October 2015, with **the general implementation deadline by 15 October 2017 (31 December 2018 for Georgia)**

4. Measurement units and conditions

Neither Directive 2009/73/EC nor Directive 2012/27/EU prescribe explicitly the measurement and billing units to be used at the distribution level. The concrete mandatory requirements are prescribed only for transmission system operators.

Annex I of ***Regulation (EC) 715/2009*** on conditions for access to the natural gas transmission networks[4] prescribes that transmission system operators shall provide all information about their systems and services and for all relevant points, including **exit points to the distribution systems**, in consistent units, namely:

> in **kWh** (with a combustion reference temperature of 298,15 K, i.e. 25 ºC)
>
> as the unit for **energy content**
>
> and in **m³** (at 273,15 K i.e. 0 ºC and 1,01325 bar)
>
> as the **unit for volume**.
>
> A constant conversion factor to energy content shall be provided.

Regulation (EC) 703/2015 establishing a ***Network Code on interoperability and data exchange rules***[5] prescribes that the transmission system operators shall use the following units:

> (a) pressure: bar
>
> (b) temperature: °C (degree Celsius)
>
> (c) volume: m^3
>
> (d) gross calorific value (GCV): kWh/m^3
>
> (e) energy: kWh (based on GCV)
>
> (f) Wobbe-index: kWh/m^3 (based on GCV)
>
> For pressure, the transmission system operators shall indicate whether it refers to absolute pressure (bar (a)) or gauge pressure (bar (g)).
>
> The reference conditions for volume shall be 0 °C and 1,01325 bar(a). For GCV, energy and Wobbe-index, the default combustion reference temperature shall be 25 °C.

[4] As adopted for the Energy Community by Ministerial Council Decision 2011/02/MC-EnC (with the implementation deadline by 1 January 2015) and by Permanent High Level Group Decision 2018/01/PHLG-EnC (whereas the implementation deadline by 1 October 2018 is relevant for point 2 of the Annex I)

[5] As adopted for the Energy Community by Permanent High Level Group Decision 2018/02/PHLG-EnC with the implementation deadline by 1 October 2018

However, point 2 of Annex I of the Gas Directive stipulates that the Contracting Parties "shall ensure the ***interoperability of …metering systems*** to be implemented within their territories and shall have due regard to the ***use of appropriate standards and best practice*** and the importance of the development of the internal market in natural gas".

EASEE Gas[6]'s Common Business Practice, CBP 2003-001/02[7] in general promotes the use of the same units for pressure, energy, volume and calorific value by all organisations involved in the delivery of gas from the producer to the client, i.e. promoting measurement principles applicable for the gas system as a whole, thus mandatory units for transmission systems should be taken into consideration when defining the applicable units for distribution systems.

Best practice in the European Union shows that ***gas delivery is measured in*** m^3, but the conditions of pressure and temperature differ among the countries, as well as the reference conditions at which m^3 are expressed.

However, in most cases, ***the unit used for billing purposes is kWh***, i.e. the energy content of delivered gas is charged, not the volume.

5. Required conversions on the way from meter to bill

5.1. Conversions due to actual measurement conditions and location

The thermodynamics of fluids, and natural gas is among them, has to be taken into account when defining measurement values. The flow of gas is measured in volume: in m^3. However, the volume of fluids is always a function of pressure and temperature.

In very simplified words, volume increases with an increase of temperature and decreases with an increase of pressure.

$$p_1V_1/T_1 = p_2V_2/T_2$$

p = pressure, V = volume, T = temperature

In practical terms, it means that the same quantity of natural gas will fill a different volume under different pressure levels and/or temperature conditions, and this will be shown on a volumetric meter device. Thus, to have reliable and consistent data on flows through the system, flows have to be shown under the same conditions of pressure and temperature. Thus, it is essential to acknowledge and define measurement conditions, and consequently to convert a gas volume measured in actual, atmospheric conditions to a volume in reference conditions.

[6] EASEE-gas is a not-for-profit association with the main purpose of developing and promoting common business practices (CBPs) to simplify and streamline the business processes between all the gas industry players, leading to a more efficient and effective European gas market, *https://easee-gas.eu/*

[7] Included into the List of Generally Applicable Standards as adopted for the Energy Community by the Permanent High Level Group in 2007

This can be done ***mechanically***, by using additional equipment installed together with the meter device, or ***mathematically***, by converting the actual meter reading.

EU Member States have set up different methods for conversions to compensate measurement conditions and to bring the volume readings to reference conditions.

For the time being, many countries still use standard conditions [temperature as of 288,15 K (15°C) and pressure 1,01325 bar(a)] instead of mandatory normal conditions [temperature as of 273,15 K (0 °C) and pressure 1,01325 bar(a)].

Some countries prescribe the mandatory installation of volumetric correctors, as permanent mechanical conversion of pressure and temperature. Where this is done, it is defined according to different customer types, thresholds of delivery pressure or installed capacity.

Delivery points to households are usually not equipped with correctors and conversion has to be done by calculation.

In most cases, the conversion is an obligation of the distribution system operator, but in specific cases it can also be the supplier or the owner of the measurement equipment.

As a general practice, the conversion to reference conditions is done before billing, i.e. once per reading/billing period, being it monthly, quarterly, seasonally or yearly, as the case might be in different countries.

Across the European Union, a metered volume is converted from actual measurement conditions to reference conditions for system operation and billing purposes. There is no practice that the differences between the reading in actual atmospheric conditions and the required conversion to the volume in reference conditions are included in losses of the gas distribution network. Consequently, such practices, where in place in the Contracting Parties, should be abandoned.

5.1.1. Conversion due to the pressure

As explained above, volume is a function of pressure and temperature. Delivery to customers is usually done at very low pressure, in the range 0,1 – 5 bar. The distribution system operator can and shall control the pressure within its network, till the point of delivery and measurement. Thus, the actual delivery pressure is known and is usually stable, and the conversion factor to the pressure in reference conditions [1,01325 bar(a)] is also constant for a particular delivery point, part of the network and type of customers.

$$\mathbf{V}_{\text{reference conditions}}\,[\text{m}^3] = \mathbf{V}_{\text{measurment conditions}}\,[\text{m}^3] \times \mathbf{p}_{\text{measurement conditions}}\,[\text{bar}]\ /\mathbf{1{,}01325}$$

(Considering equal temperature)

5.1.2. Conversion due to the temperature

The temperature at which measurement to customers is done within the distribution network completely depends on the location of the meter device. When it is installed within the object, temperature variations are not so wide, but still exist, and depend on the exact room where the meter is placed, the air temperature in the space and the season of the year. In case the meter device is placed on the outside wall, which is a very common practice in the Contracting Parties, temperature variations are very wide and depend heavily on the seasonal temperature. In such cases, a meter located outside will show less m^3 during the winter and more m^3 during the summer then the real delivered volume defined by reference conditions. In practical terms, it means that a volumetric meter for households shows less volume delivered to customers when consumption is higher and more when consumption is low. Thus, it is crucial to make a conversion to reference conditions to have correct data on the delivery and flows in the distribution network and in the entire gas system. Temperature conversion factors are defined according to the location of the meter (inside or outside the object), the average daily (if applicable), monthly or seasonal temperature and regional climate characteristics. In a few countries with extreme weather conditions, some meters are equipped with a mechanical temperature conversion device.

$$\mathbf{V}_{\text{reference conditions}}\,[m^3] = \mathbf{V}_{\text{measurment conditions}}\,[m^3] \times \mathbf{273{,}15} \,/\mathbf{T}_{\text{measurement conditions}}\,[K]$$

(Considering equal pressure)

5.1.3. Conversion due to altitude

Some conversion methods include an altitude of measurement point in the pressure conversion, taking pressure factor as[8]:

$$\frac{1013.25 + (M - A)}{1013.25}$$

Whereas M is the pressure of gas [in milibars] at the meter device and A is the pressure [in milibars] to be deducted from M on the account of the altitude of the meter's location. The value of A increases by approximately 0,3 milibars for each 2,5 m of altitude.

5.2. Conversion to energy units

Conversion to energy units means a transformation of volumetric units (m^3 in reference conditions) to energy units (kWh). This is a necessary conversion step if the flow and delivery have to be expressed as energy, not only as a volume.

As shown in the previous pages, for the conversion to energy units, the ***gross calorific value (GCV) of natural gas has to be used*** and shall be based on ***actual gas composition***.

The responsibility for gas quality at the injection to the system lies with system users (i.e. suppliers and producers), whereas at the system exits, the system operator bears this responsibility. Each country defines the minimum requirements in regards gas quality and

[8] The Gas (Calculation of Thermal Energy) Regulations No. 439/ 1996 (UK)

composition which can be injected into the gas system. There are recommendations and common business practices related to gas quality on the EU level, without mandatory common requirements.

As for units, there are no specific provisions related to defining the gas composition on the distribution level.

Mandatory legislation for the Energy Community, Regulation (EC) 703/2015 in the first place, requires a frequency of gas quality publication of once per hour for the transmission interconnection points, but also allows publication only once per day at interconnection points without adequate equipment, provided that the required equipment will be installed within 2 years. The Regulation extends the obligation for transmission system operators to inform on gas quality variation the distribution system operators directly connected to the transmission system operator's network, with connected final customers whose operational processes are adversely affected by the gas quality changes. Whereas the Regulation does not stipulate an obligation to the transmission system operator to install additional equipment at the exit to the distribution system, the regulatory authority has the right to impose this obligation, when reasonable and necessary.

When entry points to the distribution systems are not equipped with chromatographs, the gas composition is determined by taking gas samples and analysing them by authorised institutions. The sampling of gas is done regularly, in an adequate frequency at predefined points of the transmission system and if this case might be, of the distribution system. The location of the predefined points, their number and linkage to exits to the concrete distribution system depend on locations of the gas injection to the system and the actual physical flow through the transmission and distribution systems. The frequency of sampling and analysis is usually defined by network codes and arranged between gas entities.

6. Standard measuring equipment

The measuring instrument can be composed only of a ***gas meter*** as a basic device, an instrument designed to measure, memorise and display the quantity of gas (volume or mass) that has passed through it.

If there is added pressure and a temperature transducer and a conversion device, that automatically converts the quantity measured at metering conditions into a quantity at reference conditions, t a ***measuring system*** is in place.

The usual decisive parameters defining the basic device are the expected flowrate range (i.e. the required minimum and maximum capacity), the working pressure and the maximum allowed measurement uncertainty.[9]

[9] Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments

The flowrate range shall fulfil at least the following requirements:

Class	Q_{max}/Q_{min}	Q_{max}/Q_t	Q_r/Q_{max}
1,5	≥ 150	≥ 10	1,2
1,0	≥ 20	≥ 5	1,2

Q_{max} and Q_{min} are the highest and respectively the lowest flowrate at which the gas meter provides indications that satisfy the requirements regarding maximum permissible error (MPE.)
Q_r is the highest overload flowrate at which the meter operates for a short period of time without deteriorating.
Qt is the transitional flowrate, occurring between the maximum and minimum flowrates at which the flowrate range is divided into two zones, the 'upper zone' and the 'lower zone' and each of them has a characteristic MPE.

Maximum permissible error (MPE) is defined in accordance with the class of gas meter and actual flow:

Class	1,5	1,0
$Q_{min} \leq Q < Q_t$	3 %	2 %
$Q_t \leq Q \leq Q_{max}$	1,5 %	1 %

When the errors between Qt and Qmax all have the same sign, they shall all not exceed 1 % for class 1,5 and 0,5 % for Class 1,0.
For a gas meter with temperature conversion, which only indicates the converted volume, the MPE of the meter is increased by 0,5 % in a range of 30 °C extending symmetrically around the temperature specified by the manufacturer that lies between 15 °C and 25 °C. Outside this range, an additional increase of 0,5 % is permitted in each interval of 10 °C.

In EU Member States, gas meters of class 1,5 and 1,0 are used for residential customers, while industry measurement is performed by meters of class 1,5.

Different types of measurement devices are used for measurement of gas volume at entries to and exits from the distribution systems.

For interfaces between the transmission and the distribution network, the typical metering equipment consists of a turbine meter (or rotary meters in a few cases, and ultrasonic meters only extraordinarily), volumetric convertors, flow computers and chromatographs or water dew point meters, if needed.

Diaphragm meters are mostly used for household customers, while rotary and turbine meters are installed for industrial customers at the distribution network. Some countries prescribe the mandatory installation of volume correction devices, linked with a threshold of certain capacity, level of consumption or a particular consumer type.

Directive 2004/22/EC, not mandatory for the Contracting Parties, but framing the EU practice, defines that an electronic conversion device shall be capable of detecting when it is operating outside the operating range(s) stated by the manufacturer for parameters that are relevant for measurement accuracy. In such a case, the conversion device must stop integrating the converted quantity, and may totalise separately the converted quantity for the time it is operating outside the operating range(s). It shall also be capable of displaying all relevant data for measurement without additional equipment.

Regular monitoring checks of meter instruments are prescribed by national legislation and usually done on a yearly basis. Meteorological verifications are in practice performed on average once in 5 years, in accordance with the type of meter and related technical rules.

7. Smart metering

Neither the Gas Directive nor the Energy Efficiency Directive define the notion of smart metering for gas supply.

The reasons for such an approach lie in the characteristics of gas as an energy carrier and the purpose of gas usage by customers.

First of all, gas networks store huge amounts of energy and therefore react slowly over time to changes in demand. This is in contrast to electricity networks which require real-time responses, and where smart meters provide immediate benefits.

Further, gas is used for cooking, hot water and heating which does not provide much flexibility in consumption optimisation; reduction of consumption is limited to the level of building insulation and appliance efficiency.

Yet there are other aspects in the gas sector where smart metering might bring benefits to customers, suppliers and distribution system operators:

- Consumer management in regards supply switching, prepayment, disconnections, helping retail market opening
- Remote reading allowing more frequent reading and thus bringing improvements in the system and payment control
- Communication of information, to support the customer in managing their energy consumption and energy cost

Annex I to the Gas Directive stipulates, “Contracting Parties shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the gas supply market”.

Despite this provision, the installation of intelligent metering systems is not compulsory. Point 2 of Annex I reads that smart metering “**may be subject to an economic assessment of all the long-term costs and benefits to the market and the individual consumer or which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their distribution**”. The Contracting Parties were obliged to make such assessments by 1 January 2014 and to prepare accordingly a timetable for the implementation of intelligent metering systems.

To the Secretariat's knowledge, smart gas meters have been systematically introduced by a big distribution company in Moldova resulting in individual metering and improved readings, thus having an impact on loss reduction. There is also a pilot project of installing smart meters in Ukraine driven by the national regulatory authority and voluntarily implemented by a few companies. The plan is to cover almost 2000 industrial customers and more than 130000 household customers by 2025 in Ukraine.

Upon assessment in line with the Gas Directive and according to the Energy Efficiency Directive, when the Contracting Parties implement intelligent metering systems, they have to establish the minimum functionalities of the meters and impose relevant obligations on market participants. As Article 9.2 of the Gas Directive reads "They shall ensure that the metering systems provide to final customers information on actual time of use and that the objectives of energy efficiency and benefits for final customers are fully taken into account".

The security of smart meters and data communication, as well as the privacy of final customers, shall be ensured in compliance with relevant data protection and privacy legislation. Further, the same Article defines that "appropriate advice and information [shall] be given to customers at the time of installation of smart meters, in particular about their full potential with regard to meter reading management and the monitoring of energy consumption''.

8. *Non-measured delivery*

Both, the legislation and best European Union Member States practice, stipulate that delivery to all customers at the distribution network has to be measured by individual meters. However, there are still practices of not having individual gas meters, like for more than 20% of household customers in Ukraine. Most of them are placed in big cities, in multistore buildings and use gas only for cooking purposes.

There are many reasons, not only legal obligations, for introducing individual meters. Without metering data, the balancing rules cannot be applied fully, which causes problems to system operators and network users. The costs of unmeasured delivery are transferred to others, and are cross-subsidized by suppliers, system operators or other customers. Further, unmeasured gas delivery does not promote the need for managing consumption nor energy efficiency.

These Guidelines, while recognising that such practices must stop, include recommendations on how the non-measured deliveries can be defined during a transitory period until meter devices are installed.

For assessment of non-measured quantities, it is always important to use data from reference customers as a basis.

The consumption of small consumers with a standard profile can be estimated. Gas usage for cooking and hot water production are examples. For the estimate, certain consumer data has to be known, e.g. the number of hot water boilers, cooking devices, etc.

For customers using gas for heating purposes, load profiles should be used for the consumption estimation. Depending on the type of consumer, various load profiles can be used taking into account the installed capacity of the heating, size of the house/apartment, number of heaters and radiators. Since heating is the main driver of gas consumption, and heating is driven by outside temperature, the relevant seasonal temperature and forecasts have to be well defined when using load consumption profiles. It is also important to take into account the geographical location, climatic region and other uses. In Germany, load profiles depend only on temperature. In Italy, usage of gas for cooling is included into the profiles. In Ukraine, customers are divided in groups according to the installed devices, consumption (cooking/hot water/heating) and region.

The right mixture between temperature related heating consumption and non-temperature related hot water consumption has to be found depending on the climatic region.

The management of load profiles needs a well-designed IT system as a large amount of consumer data and weather data are involved.

It is also important to underline that profiling requires continuous improvements in choosing the right temperature and the right load profile according to the type of customer, adjustment of daily normalized consumption after regular readings for referent customers with meters, correction in mapping of consumer to supplier and balancing group and utilization of correction factors in case the grid imbalance account does not improve.

9. Billing and right to access consumption and metering data

Both directives, covering the gas market and energy efficiency, stipulate that access to metering data and billing information for energy, i.e. gas consumption has to be enabled in an appropriate way and free of charge.

Directive 2012/27/EU requires that, where final customers do not have smart meters, accurate **billing information has to be based on actual consumption by 30 November 2017.** This is relevant for electricity, ***gas***, district heating and cooling and hot water supply, including energy distributors, distribution system operators and retail energy sales companies, <u>where this is technically possible and economically justified</u>.

According to Annex I to Directive 73/2009/EC on consumer protection measures, **each customer has the right, free of charge**, to "have at [its] disposal [own] consumption data…and **access to its metering data**". Each customer also has the right, free of charge, to be "properly informed of actual gas consumption and costs frequently enough to be able to regulate own gas consumption". That information shall be given in a sufficient timeframe and take into account not just the capabilities of the customer's metering equipment but also the cost-efficiency of such measures.

Billing frequency

There are differences in applied billing frequency – monthly, quarterly, biyearly, yearly, but it always corresponds to the meter's reading frequency.

Directive 2012/27/EU stipulates that the billing shall take place **at least once per year**, and data are made available at least quarterly and on request. Gas used only for cooking purposes may be exempted from this requirement.

This obligation may be fulfilled by a system of regular self-reading by the final customers whereby they communicate readings from their meter to the energy supplier. Only when the final customer has not provided a meter reading for a given billing interval, billing shall be based on estimated consumption or a flat rate.

With regard to billing, Annex I to Directive 73/2009/EC requires that the contract with the gas service provider has to include provisions on "any compensation and the refund arrangements which apply if contracted service quality levels are not met including inaccurate and delayed billing" which is strongly related to an inaccurate metering and/or reading. The contract shall include also "information relating to consumer rights, including on the complaint handling" whereas all the information has to be "clearly communicated through billing or the natural gas undertaking's website".

According to Directive 2012/27/EU, the final customer has to be provided, on request, with a clear and understandable explanation of how its bill was derived, especially where bills are not based on actual consumption.

Further, the final customer has to have the possibility of easy access to complementary information on historical consumption allowing detailed self-checks. Information and estimates for energy costs have to be provided to consumers on demand in a timely manner and in an easily understandable format. Such information has to enable consumers to compare deals on a like-for-like basis and shall ensure that appropriate information is made available via the bill to provide final customers with a comprehensive account of current energy costs.

Complementary information on historical consumption shall include cumulative data for at least the three previous years (or the period since the start of the supply contract if this is shorter) and detailed data according to the time of use for any day, week, month and year.

The cumulative data shall correspond to the intervals for which frequent billing information has been produced; and detailed data shall be made available to the final customer via the internet or the meter interface for the period of at least the previous 24 months or the period since the start of the supply contract if this is shorter.

Article 25 of the Gas Directive stipulates obligations to each distribution system operator to provide information to system users for efficient access to and usage of the system, as well as an obligation to provide sufficient information to operators of the interconnected systems in order to enable secure and efficient operation of the interconnected system in its entirety. The information on actual, i.e. measured, flows and deliveries are an important part of the mandatory information relevant to the usage and functioning of the systems, being shared with other operators and final customers. The metering information has an additional importance “where a distribution system operator is responsible for balancing the distribution system” as optional within the Gas Directive.

10. Recommendations

It is recommended that the practice in all Contracting Parties should be aligned with EU Member States best practice, taking into account the legislative requirements, although not all of which is mandatory for the Contracting Parties yet.

According to arguments listed in this paper, the Secretariat gives the following recommendations:

1. Reading conversions to normal reference conditions [temperature as of 273,15 K (0 °C) and pressure 1,01325 bar(a)] should be performed by expressing volume as required by Regulation (EC) 715/2009 and terminating the usage of standard conditions (i.e. 288,15 K (15 ºC), which is still to be abandoned fully in the EU). This also means expressing the energy content of gas by using gross calorific value (GCV), instead of the present practice in some Contracting Parties, which still use net calorific value (NCV).

2. The reasons for conversions and for the switch to normal reference conditions and to energy units, as the case may be, should be explained duly to the customers in advance. Customers should have a reasonable period for the transition between the two practices (for example a few months prior to the heating season, as it was the case in the EU Member States) available.

3. When defining the measurement equipment, decisive parameters are the expected flowrate range, the working pressure and the maximum allowed measurement uncertainty.

4. When technically and economically feasible, the conversion to the reference conditions and to energy units should be done by instruments, be it volume correctors or smart meters at the exits from the distribution systems or chromatographs at the entry to the distribution systems.

5. When considering the installation of smart meters, the interests of different stakeholders should be taken into account, as follows:

    - The network operators are looking for a standard and durable solution, which should last at least 15 to 20 years with minimum maintenance and where the investment is guaranteed for the long term.

* The suppliers are looking for a measurement system, which is easy to customise giving reliable results and accessible information, and not making impact on metering charges. Suppliers would also like to have a system where the financial parameters can be easily changed (prepayment to credit, managing debts more effectively, etc.).
* Customers are interested in accurate billing (including all conversions), no additional meter charges, minimum visits to their premises and in systems that can help with consumption management.

6. Delivery without measurement should be avoided. Until individual meters are installed, non-measured delivery has to be assessed using load consumption profiles. It is always important to use data from reference customers as a foundation, and find a right mixture between non-temperature hot water consumption and temperature related heating consumption depending on the climatic region.

7. Billing frequency should always correspond to the reading frequency, being at least once per year or at shorter intervals.

8. Each customer should have a right, free of charge, to be properly informed about the actual gas consumption and costs, frequently enough to be able to reflect and regulate own gas consumption.

Vienna, 8 June 2020

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