This project is funded by the European Union

Annual Action Programme for Turkey for the Year 2015 under the Instrument for Pre-accession Assistance (IPA II)

Technical Assistance for Improvement of Performance-Based Tariff Regulation of EMRA for Turkish Energy Markets through Introducing an Enhanced Monitoring System

Project Identification No: EuropeAid /139125/IH/SER/TR

Contract No: TR2015/EN/07/A3-01/001

Task-2: Improvement of Energy Market Monitoring System that will Enhance Monitoring for Turkish Electricity and Gas Markets

Activity 2.1 Report

Prepared: 28 August 2020

This project is funded by the European Union

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Abbreviations

₺/TL	Turkish Liras (in 2019, 1 Euro costs 6.3477 TL)
ACER	Agency for the Cooperation of Energy Regulators
AIT	Average Interruption Time
AMR	Automatic meter reading
API	Application Programming Interface
ARERA	Autorità di Regolazione per EnergiaReti e Ambiente (Italian regulator)
ARIS	Agency's REMIT Information System (at ACER)
ASIDI	Average System Interruption Duration Index
ASIFI	Average System Interruption Frequency Index
BEIS	Business, Energy and Industrial Strategy
BMCS	Broad Measure of Customer Satisfaction
BNetzA	Bundesnetzagentur (German regulator)
BOTAS	Turkish Petroleum and Gas Transmission Pipeline Company
BPDT	Business Plan Data Template
CAF	Cyber AssessmentFramework
CAPEX	Capital Expenditures
CAPM	Capital Asset Pricing Model
CENS	Cost of Energy not Supplied
CI	Customer Interruption
CML	Customer Minutes Lost
CNG	Compressed Natural Gas
CNMC	Comisión Nacional de los Mercados y la Competencia, Spanish Competition Authority
CSV	Comma-separated values
CVAT	Compra e Venda do Acesso à Rede de Transporte - Access to Transmission Network
DCC	Data and Communications Company
DEA	Data Envelopment Analysis
DEE	Distribuição de EnergiaEléctrica - Electricity Distribution
DNO	Electricity Distribution Network Operators
DSO	Distribution System Operator
DTR	Distribution Transformer
EBIS	Electronic Notification System
EBIT	Earnings Before Interest and Taxes
EBT	Electronic Bulletin Board
EDTF	Energy Data Taskforce
EML	Electricity Market Law
EMOS	European Master in Official Statistics
EMRA	Energy Market Regulatory Authority
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSOG	European Network of Transmission System Operators for Natural Gas
EPIAS	Market Operator
ERSE	Portuguese regulator
EU	European Union
EXIST	Exchange Istanbul
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDN	Gas Distribution Network (in the UK)
GIS	Geographic Information System
HP	High pressure
IDNOs	Independent Distribution Network Operators
IT	Information Technology
kW	kilo Watt
LI	Load Index
LNG	Liquified Natural Gas
LP	Low Pressure

LV	Low Voltage
MAR	Market to Asset Ratios
MaStR	Central register of the energy industry (in Germany)
MENR	Ministry of Energy and Natural Resources
ML	Liberal Market
MonEDa	Online platform (in Germany)
MR	Regulated Market
MV	Medium Voltage
MW	Mega Watt
MWh	Mega Watt hour
MP	Medium pressure
NCSC	National Cyber Security Centre
NGGT	National Grid Natural Gas Transmission Plc (UK)
NIS	Network and Information Systems
NRA	National Regulatory Authority
NVE	Norwegian Water Resources and Energy Directorate
O&M	Operations and Maintenance
Ofgem	Office of Gas and Electricity Markets (in the UK)
OIZ	Organised Industrial Zone
OLS	Ordinary Least Square
OPEX	Operational Expenses
OSOS	Automatic Meter Reading System
OT	Operational Technology
OUG	Own Use of Gas
PCFM	Price Control Financial Model
PTZ	Pressure, temperature, and compressibility
Q&A	Questions and Answers
QoS	Quality of Supply
R&D	Research and Development
RAB	Regulatory Asset Base
RAV	Regulatory Asset Value
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
RIG	Regulatory Instructions and Guidance
RIIO	Revenue=Incentive + Innovation + Output
RoA	Return on Assets
RQS	Quality of Service Regulation (in Portugal)
RRM	Registered Reporting Mechanisms
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCT	Special Consumption Tax
SGL	Centralized data management system (in Portugal)
SII	Integrated information system (in Italy)
STP	Continuous Trading Platform
TCAT	TEIAS Capacity Allocation Tendering
TEDAS	Turkish Electricity Distribution Co.
TEIAS	Turkish Electricity Transmission Co.
TEK	Weighting system for regional networks (in Norway)
TIM	TOTEX Incentive Mechanism
TOTEX	Total Expenditures
TPYS	TEIAS Market Management
TSO	Transmission System Operator
UAG	Unaccounted for *Gas*
UECM	Settlement aggregation withdrawal amount
UEVM	Settlement aggregation uploading amount
VAT	Value Added Tax

VoLL	Value of Loss Load
WACC	Weighted Average Cost of Capital
XML	Extensible Markup Language
YTBC	Load Dispatching Information System

1 Introduction

In order to provide sustainability in energy markets, to prevent incorrect usage behavior and for more competitive electricity markets, monitoring activities plays a key role. Access to networks and infrastructures, network security, quality of supply, competition on wholesale and retail markets, prices and consumer protection measures are some of the areas monitored in electricity and natural gas sector.

Designing an effective data collection process for monitoring is theoretically based on the following simple five principles in respectable approaches:

1. **Get the right data**: collect data which are relevant to the specific topic or issue. For example, to better understand gender disparity in school, one must collect data on students separately for boys and girls.
2. **Get the data right**: collect data with precise definition and appropriate method of measurement. For example, data on new entrants in Grade 1 must not include those who actually attended another school, dropped out, then enrolled in this school for the first time.
3. **Get the data right away**: get current and timely data. For example, school censuses should be organized as close to the start of the school year as possible, once enrolment is complete and attendance has stabilized.
4. **Get the data the right way**: get data through a rigorous process which can guarantee data quality and ensure consistency. Instructions about methods and data standards must be explained clearly. The people involved in data collection should be trained.
5. **Get the right data management:** collect reliable data which is guaranteed by good quality control conducted by relevant stakeholders. It is important to involve all the stakeholders at different levels of the supply chain to check that the collected data are reliable and complete before they are processed, analyzed and used.[1]

The significance of the data and its consequent reliability will be essential in achieving the objectives set. Ultimate goal of employing a methodology such as Statistical Process Control is obtaining effective support for the understanding of a process with the aim of predicting its progress and intervening on it in real time according to the perspective of continuous improvement.

On the other hand, an effective monitoring of the markets not only ensures compliance with the regulation, but also allows the regulation to evolve in an orderly and coherent manner on the basis of the progressive development of the markets, promptly identifying any need for adaptation of the regulation itself (also for the purpose of system security) as well as for any reports on market competitiveness in the context of collaboration protocols with the competent authorities. As per this principle, market monitoring activities are implemented within an interactive approach between national regulatory and European institutions. Continuous market consultations are principal element of development of market monitoring regulations.

For data and analysis DG Energy relies on the Market Observatory for Energy which maintains and operates the Energy Market Observation System (EMOS).EMOS provides the necessary data input from institutional and commercial sources which are further analysed by the Observatory. EMOS contains a considerable part of data relating to the EU and its Member States, the candidate countries and other European countries which are fundamental for policymaking at EU level. EMOS data features different reporting time frames (such as daily, monthly, and quarterly, yearly) depending on policy purposes. Where available and deemed appropriate, EMOS contains historical data series.

[1] Source: https://www.right-to-education.org/monitoring/content/further-guidance-5-right-principles%E2%80%99-data-collection

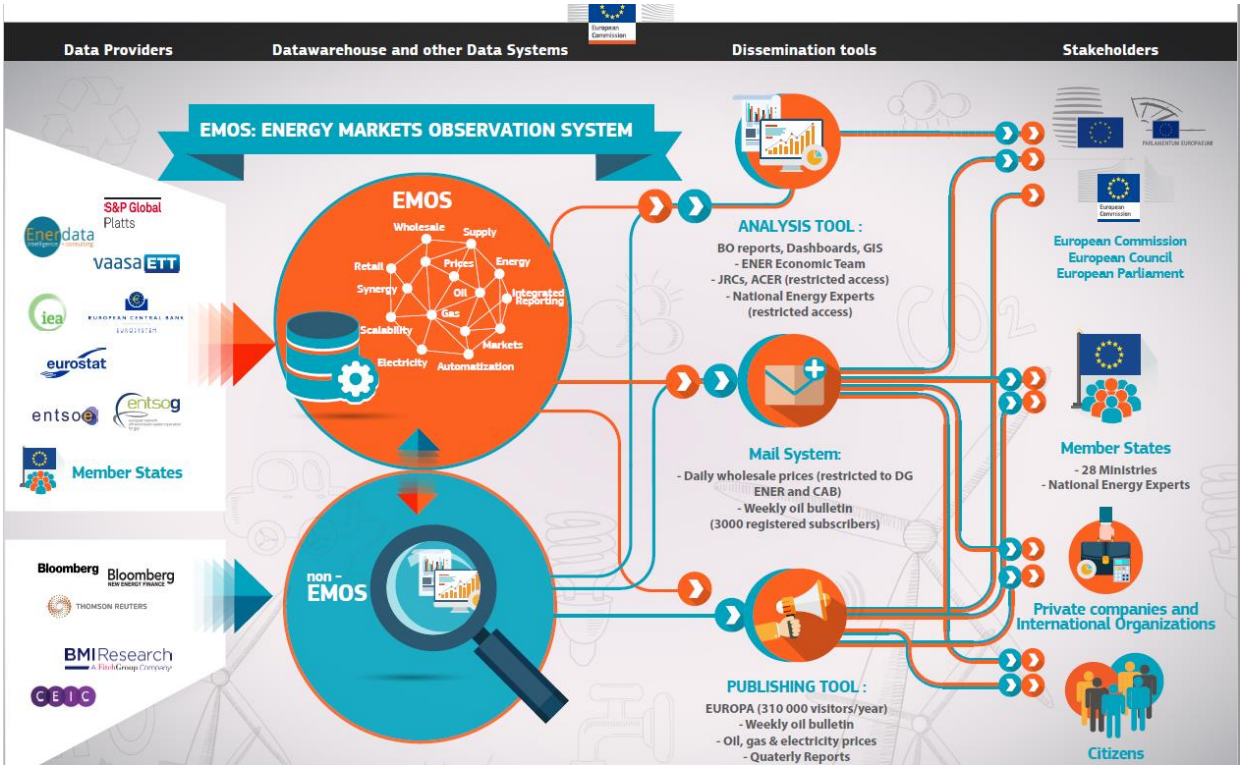


Figure 1.1–Energy Markets Observation System of European Commission[2]

Within the scope of this report, data monitored and information gathered, mainly about electricity and gas distribution and transmission activities with the aim of maintaining sustainability in the electricity and gas markets, protecting customers, increasing competitiveness etc. are analysed in some selected countries as well as in Turkey. Additionally, gaps between European Countries and Turkey regarding electricity and gas market monitoring activities are assessed and recommendations for monitoring are provided.

[2]Source: https://ec.europa.eu/energy/sites/ener/files/documents/emos_june2018_final.pdf

2 Electricity Distribution

Directive 2009/72/EC of the European Parliament and the Council of 13thJuly 2009 concerning Common Rules for the Internal Market in Electricity and Repealing Directive 2003/54/EC states that "*To create a level playing field at retail level, the activities of DSOs should be monitored so that they are prevented from taking advantage of their vertical integration as regards their competitive position on the market, in particular in relation to household and small non-household customers.*" Directive contains the following articles related to monitoring of electricity distribution and retail segments:

- Monitoring compliance and reviewing the past performance of network security and reliability rules and setting or approving standards and requirements for quality of service and supply or contributing thereto together with other competent authorities,
- Monitoring the level of transparency, including of wholesale prices, and ensuring compliance of electricity undertakings with transparency obligations,
- Monitoring the level and effectiveness of market opening and competition at wholesale and retail levels, including on electricity exchanges, prices for household customers including prepayment systems, switching rates, disconnection rates, charges for and the execution of maintenance services, and complaints by household customers, as well as any distortion or restriction of competition, including providing any relevant information, and bringing any relevant cases to the relevant competition authorities,
- Monitoring the occurrence of restrictive contractual practices, including exclusivity clauses which may prevent large non-household customers from contracting simultaneously with more than one supplier or restrict their choice to do so, and, where appropriate, informing the national competition authorities of such practices,
- Monitoring the time taken by DSO to make connections and repairs,
- Helping to ensure, together with other relevant authorities, that the consumer protection measures are effective and enforced,
- Publishing recommendations, at least annually, in relation to compliance of supply prices, and providing these to the competition authorities, where appropriate,
- Ensuring access to customer consumption data, the provision, for optional use, of an easily understandable harmonised format at national level for consumption data, and prompt access for all customers to such data under point,
- Monitoring the implementation of rules relating to the roles and responsibilities of transmission system operators, distribution system operators, suppliers and customers and other market parties,
- Contributing to the compatibility of data exchange processes for the most important market processes at regional level.

Additionally, the legal unbundling issue has reached a certain level in European electricity and gas markets and there is no need to periodically prepare reports every year. Necessary arrangements have been made to ensure that monitoring can be done through requesting information from the companies only if needed.

Similar to EU Member Countries, electricity market data is monitored in Turkey taking into account some market and customer related measures. Energy Market Regulatory Authority (EMRA) as the regulatory body is the main responsible of monitoring activities. In the electricity marketEMRA:

- Grants and renews licenses defining the rights and liabilities of the legal persons pertaining to their authorized activities,
- Prepares the existing contracts within the scope of the transfer of operational rights,
- Establishes performance standards by monitoring the market performances,
- Prepares, improves and executes the secondary legislation, audit the license holding legal persons, prepare, modify and execute regulated tariffs,
- Ensures that the market activities are in compliance with the Electricity Market Law and Natural Gas Market Law.

Details of the market monitoring activities in electricity distribution market will be introduced within the scope of this subsection.

2.1 Germany

German Energy Industry Act (EnWG) and the Law against Restraints of Competition (GWB) mandates the Federal Network Agency (Bundesnetzagentur or BNetzA in short) and the Federal Cartel Office to monitor electricity and gas in Germany. The BNetzA(the Federal Network Agency) has undertaken duties relating to the Network Development Plan determining a need for expansion on the extra-high voltage level. The BNetzAalso controls implementation policies with respect to planning and approval procedures.The Federal Government's monitoring process "Energy of the Future" has been set up to track the energy transition on a continuous basis. The main task of the monitoring process is to analyse the statistical information on energy that have been collected and then condense it and make it easy to understand.

The Federal Ministry for Economic Affairs and Energy has been appointed lead ministry for the monitoring process for the energy transition. The Monitoring Report for each year is approved by the Federal Cabinet and transmitted to the Bundestag and the Bundesrat.

In line with the Industry Act, theagency shall carry out monitoring of the following activities mainly for the purpose of establishing market transparency:

- rules regarding management and allocation of connection capacities; in coordination with the regulatory authorities of the Member States with which a network exists,
- mechanisms for addressing capacity bottlenecks in the national electricity and gas supply network and interconnectors,
- time required by operators of transmission, transmission and distribution networks to make connections and maintenance,
- publication of appropriate information on interconnections, network use and capacity allocation to interested parties by the transmission and distribution system operators taking into account the need to treat non-statistically isolated data as trade secrets,
- technical cooperation between transmission system operators inside and outside the European Community,
- the conditions and tariffs for the connection of new electricity producers with particular regard to the costs and benefits of the different renewable electricity generation, decentralized generation and combined heat and power technologies,
- the conditions for access to storage facilities, in particular, changes in the situation on the storage market, with the aim of enabling the Federal Ministry of Economic Affairs and Energy to review the arrangements with regard to access to storage facilities,
- the extent to which the operators of transmission and distribution networks perform their duties under the related Law
- fulfillment of the obligations under electricity labeling, transparency of electricity bills,
- prices for household customers, including prepayment systems, supplier and product changes, interruption of supply in accordance with related articles of the Electricity Supply Ordinance or Gas Basic Supply Ordinance, complaints from household customers, the effectiveness and enforcement of consumer protection measures in the electricity or gas sector, maintenance services at the building connection or measuring equipment and the quality of service provided by the networks,
- stock and planned closures of generation capacity, the capacity available for a fuel change to safeguard the output of generating capacity, investment in generation capacity in terms of security of supply, and stock, the service provided, the volume of electricity delivered and the expected date the decommissioning of storage facilities with a nominal capacity of more than 10 megawatts,
- degree of transparency, including wholesale prices, and the degree and effectiveness of market opening and the extent of competition at wholesale, retail and electricity and gas exchanges, unless that function has been delegated by law to another entity,
- development of tenders for interruptible loads by transmission system operators.

Within the framework of the monitoring, the Bundeskartellamt (Federal Cartel Office) is responsible for the degree of transparency, including wholesale prices, as well as for the degree and effectiveness of market opening. It monitors the scope of wholesale and retail competition in the electricity and gas markets, as well as on the electricity and gas exchanges.

The Federal Network Agency, in cooperation with the Federal Ministry for Economic Affairs and Energy (BMWi), monitors the contribution of load management to security of supply.

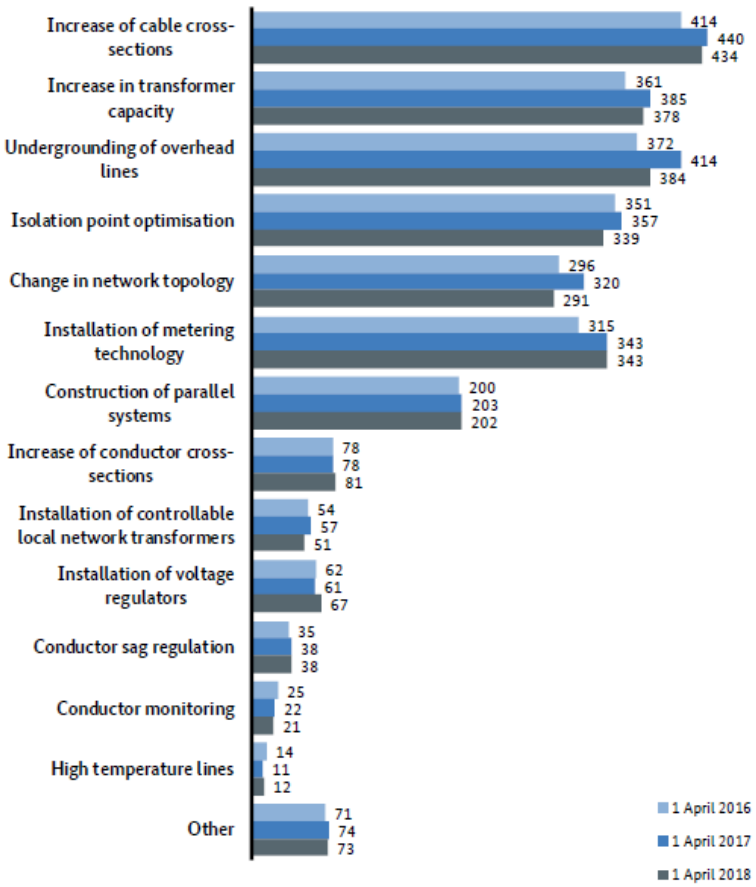
Additionally, Federal Network Agency and Federal Cartel Office work together in preparation of the report to be submitted to the European Commission and the European Agency for the Cooperation of Energy Regulators (ACER) regarding outcome of its monitoring activities. Each annual report also provides an overview of the energy transition and the level of the country regarding energy transition. An independent commission of four renowned energy experts is also involved in the process, who provide advice for the drafting process and a scientific opinion on the Monitoring Report.

Secondly, every three years, the Federal Government publishes a Progress Report on the energy transition where the first version was published on 3 December 2014. This report provides a wide overview of the energy transition, thus allowing for deeper analysis over a longer period of time. The report also looks at whether the country is on track to reach the goals and targets set out in the Energy Concept, and at what additional measures might need to be taken.

2.1.1 Network and Supply Security

2.1.1.1 Network Development and Investments

The distribution grid supplies power directly to consumers and is operated under the responsibility of a large number ofregional and municipal Distribution System Operators (around 850). The distribution grid operates at three different voltage levels; i.e. high voltage grid (voltage level btw 60 kV and 220 kV), the medium voltage grid (voltage level btw 6 kV and 60 kV), and the low voltage grid (voltage level at 230 V or 400 V). Distribution voltage levels differentiated with respect to the consumer types fed and their power requirements. Approximately 80 percent of the power distribution lines are installed as underground.



Distribution System Operators (DSOs) are required to optimise, reinforce and expand their networks to ensure electricity distribution. They shall also provide information about the extent to which they had taken actionconsidering these purposes.

Figure 2.1shows overview of network optimisation and reinforcement measures implemented by DSOs (number of DSOs) and these numbers are monitored by the Agency.

DSOs are required to draw up and submit to the regulatory authority a report on the status of their grids and their grid expansion plans within two months following the request from the authority.

The forecasted grid expansion measures are necessary for the Agency not only because of the growth in renewable energy and embedded generation, but to a large extent also because of restructuring and age-related replacement investments.

Figure 2.1 –Overview of network optimisation and reinforcement measures

Within the scope of the annual monitoring report prepared for ACER[3], investments are defined as the gross additions to fixed assets capitalised in related year and the value of new fixed assets newly rented and hired in that year. Expenditure arises from the combination of all technical or administrative measures taken during the life cycle of an asset to maintain or restore working order so that the asset can perform the function required.

The new Incentive Regulation Ordinance gives DSOs the opportunity to get a budget above the level approved in the revenue caps for expansion and restructuring investment costs in the network charges.As of 1 January 2019, DSOs can claim all planned investment costs directly in the revenue cap and thus price them into network charges. The regulatory authorities subsequently carry out a check of the actual outgoings. The previously applicable ex-ante examination of external factors justifying an expansion investment is no longer carried out.

2.1.1.2 Quality of Supply

DSOs are required under section 52 of the Energy Industry Act to submit a report detailing all interruptions in supply that occurred in their networks in the previous calendar year to the BNetzA by 30 April of each year. This report states the time, duration, extent and cause of each supply interruption lasting longer than three minutes. The network operator must provide information on the measures to be taken to avoid supply interruptions in the future.Furthermore, the report must state the average supply interruption in minutes per connected consumer for the last calendar year.

2.1.1.3 System Security Measures

Network operators are legally entitled and obliged to take certain measures to maintain the security and reliability of the electricity supply system.These network and system security measuresare at the disposal of all network operators and are reported to the BNetzA.Some of the possible measures and data collected regarding measures, mostly for TSOs and DSOs are shown in the figure.

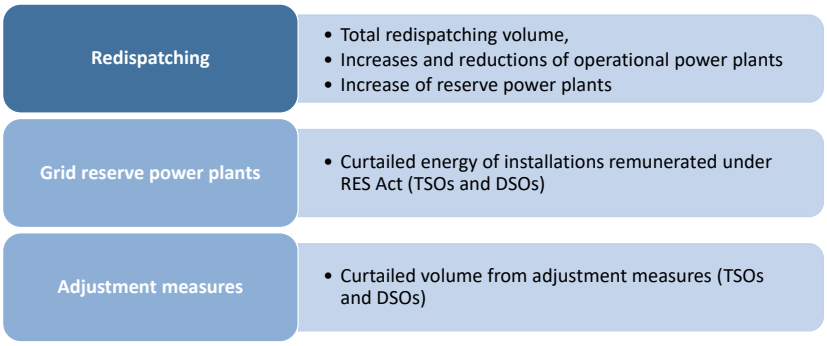


Figure 2.2 – Network and system security measures

Redispatching: reducing and increasing electricity feed-in from power plants according to a contractual arrangement with a network operator or with a statutory obligation towards the network operator with costs being reimbursed.

Grid reserve power plants: deploying grid reserve plant capacity to compensate for a deficit of redispatch capacity according to a contractual arrangement with costs being reimbursed.

Adjustment measures: adjusting electricity feed-in and/or offtake at the network operator's request without compensation, where other measures are insufficient.

[3]Source (Figure 2.2): Bundesnetzagentur(2018), Annual Monitoring Report.

2.1.2 Electric Vehicles and Charging Stations

BNetzA publishes in its website information about the location and type of recharging points for electricity vehicles in Germany. The interactive map of charging stations shows all notified normal and high-power recharging points.

Key information is shown, such as the location of the charging station, the type of plug with its power and the operator. It is also possible to visualise the regional distribution of charging infrastructure using a heat map.

This information is provided to Agency by operators of recharging points accessible to the public. Charging points are assessed for compliance with interoperability requirements, ensuring that users can find the plug they need on any recharging point.

The BNetzA has been recording the notifications from operators of normal and high-power recharging points since July 2016 because of the assessment of compliance with the technical safety specifications and interoperability requirements of recharging points pursuant to the Charging Station Ordinance (Ladensäulenverordnung). All recharging points accessible to the public and that have been taken into operation when the ordinance entered into force are subject to the notification obligation. In addition, recharging points accessible to the public that are not subject to the notification obligation may be voluntarily notified to the BNetzA.

2.1.3 Retail Market

Main items monitored regarding retail market are competitiveness, prices and supplier switching.The following table shows indicators published within the scope of yearly monitoring reports.

Table 2.1– Information/Data monitored on electricity retail market

Subject	Explanation	Indicator
Supplier Structure and Number of Suppliers	The number of suppliers reflects the diversity of companies that are active in the market. Not every supplier offers contracts in all network areas. However, there has been a steady increase in the number of companies active at regional level and this increases the possibility for consumers to switch supplier.	○ Number of suppliers ○ Number of network areas in which suppliers supply electricity to end-users ○ Number of meter points to which electricity is supplied
Contract Structure and Supplier Switching	Switching rates and processes are important indicators of the level of competition. End-users of electricity can be grouped, according to their meter profile (customers with and without interval metering). For customers without interval metering, consumption over a set period of time is estimated using a standard load profile. Consumers can also be divided as household, commercial and industrial customers. Household customers are defined in the German Energy Industry Act (EnWG) primarily according to qualitative characteristics. Non-household customers are also referred to in the monitoring report as commercial and industrial customers. There is not a recognised definition of commercial customers on the one hand and industrial customers on the other. For monitoring purposes as well, a strict separation of these two customer groups is not undertaken.	○ Number of household customers that switched supplier or adjusted their supply contract • Household customers switching supplier without moving home • Household customers who switched to a supplier other than the default supplier when moving (in their network area) ○ Supplier switching for non-household customers • Large industrial customers typically fall into the >2 GWh/year category • 10 MWh/year to 2 GWh/year category where a wide range of non-household customers such as restaurants, office buildings, hospitals and small companies, fall into. ○ Volume of electricity sold to various final consumer groups, broken down into the following three contract categories: • default supply contract, • contract with a default supplier outside of default supply contracts and • contract with a supplier who is not the local default supplier.

Subject	Explanation	Indicator
Disconnection of Suppliers and Termination	BNetzA might question network operators and electricity suppliers about disconnection of suppliers. Since 1 January 2016, the rights and obligations that are in effect between network operator and network user are regulated in the network usage contract/supplier framework agreement for electricity, which is specified by the BNetzA and regulates the possibility to disconnect supply at the request of any supplier.	○ Disconnection notices and disconnection requests • number of actual disconnections carried out • associated costs • disconnections under default supply • disconnections under non-default supply contract • disconnections carried out by DSOs on behalf of a supplier other than the local default supplier • how often in a year, the suppliers had issued disconnection notices to customers who had failed to meet payment obligations • how often they had requested the network operator responsible to disconnect supply • how much do suppliers charge household customers for issuing a reminder because of arrears in payment
Prepayment System	Metering operators and suppliers are surveyed on prepayment systems	○ prepayment systems • number of cash meters • number of smart card readers
Tariffs and Billing Cycles	Suppliers are required to offer load-based tariffs or time-of-use tariffs to end-users of electricity.However, load-based and time-variable tariffs are not very widespread in Germany.Dynamic prices that are oriented to electricity prices at the exchange are still a niche product. By contrast, there seems to be an increase in so-called online tariffs, especially among large suppliers. The online component, however, refers to the tariff billing and not to the contract.	○ Whether suppliers provide online tariffs and tariffs with dynamic pricing ○ Whether suppliers offer final consumers monthly, quarterly or semi-annual bills
Price Level	The companies give the overall price in cents/kWh, including the non-variable price components such as the service price, base price and internal price in the overall price. The final price is broken down into individual price components. This includes components that the suppliers cannot control but that may vary from one network area to another, such as network charges, concession fees and charges for meter operations. Furthermore, the state-controlled surcharges and taxes are taken into account as well as surcharges for offshore liability and interruptible loads. After deducting these transitory items from the overall price, the amount remaining is the amount controlled by the supplier, which includes the energy and supply costs and the margin. For non-household customers data was collected only from suppliers with at leastan annual consumption between 10 GWh and 50 GWh.	○ Retail prices charged for various consumption levels • For household customers, data on the individual price components for the six consumption bands: • band I (DA105106): annual electricity consumption below 1,000 kWh • band II (DB): annual electricity consumption between 1,000 and 2,500 kWh • band III (DC): annual electricity consumption between 2,500 and 5,000 kWh • band IV: annual electricity consumption between 5,000 and 10,000 kWh • band V: annual electricity consumption between 10,000 and 15,000 kWh • band VI (DE): annual electricity consumption above 15,000 kWh and three contract types: • default supply contract, • non-default contract with a default supplier (after switch of contract) • contract with a supplier who is not the local default supplier (after switch of supplier)

Subject	Explanation	Indicator
		○ Price data for 24 GWh/year consumption category (“industrial customers”): • Price components outside of supplier's control (net network charge, metering, meter operation, concession fee, EEG surcharge, other surcharges, electricity tax, • price component controlled by thesupplier (remaining balance) ○ 50 MWh/year consumption category (“commercial customers”) – data requested is same as above

2.1.4 Metering

Metering operations are generally carried out by network operators as default meter operators, although this default operation may also be outsourced to another company, either in a transfer or an in-house process.Companies wishing to take over the default metering operations and not already is a network operator must obtain approval from the BNetzAwithin the scope of the Metering Act.

Connection user can choose which company will be responsible for the installation, operation, maintenance of metering equipment and systems, and metering. A competing third party can be responsible instead of the default meter operator as defined. Data regarding the number of independent operators that take on the activity of metering operations in network areas is collected.

Table 2.2 – Information/Data monitored on metering

Subject	Indicator
Meter Operator’s roles within the meaning of the Metering Act (MsbG)	– Number of meter operators for conventional and modern metering operations: ○ Network operator as default meter operator within the meaning of the MsbG ○ Network operator as non-default meter operator offering its (meter) services on the market ○ Supplier acting as meter operator ○ Third-party, independent meter operator – Number of DSOs with number of independent meter operators in their network – Number of meter points per DSO operated by independent meter operators
Meter Points Requiring Smart Meters	– Number of metering points ○ of which have been equipped with metering systems ○ of which have been equipped with modern metering devices ○ of which have been equipped with smart metering systems
Type of Activities related to Meter Operations	– Installation of metering devices – Operation of meters – Maintenance of meters – Billing of meter points – Smart meter gateway administration
Other	– Is combined electricity supply and meter operation products offered? – How are customers billed for meter operation?
Additional Services for Smart Metering Systems	– Provision of current transformers and voltage converters – Use of smart metering systems as prepayment system – Enabling control via the smart metering system – Performing control via the smart metering system – Provision of technical operation of smart meter gateways for value-added services
Meter Technology Employed for Standard	– Electromechanical metering systems (with current transformers and three phase meters based on the Ferraris principle)

Subject	Indicator
Load Profile (SLP) Customers	– of which two-tariff and multiple-tariff meters – Electronic meter device (basic meter not connected to a communication network) – Modern measuring device (not connected to a communication network – Metering systems that are not smart metering systems – Smart metering – Transmission technologies for remotely read meters for SLP customers
Metering Technology used for Interval-Metered Customers	– Meter technology employed for interval-metered customers – Transmission technologies for remotely read meters for interval-metered customers
Metering Investment and Expenditure	– Investment in new installations, upgrades and expansion – Investment in maintenance and renewal – Expenditure
Final Consumer Prices for Metering Equipment	– Prices for standard services for carrying out metering operations ○ Final consumers with different annual power consumption levels ○ Different installed capacities at plant operators – Prices for voluntary installation

2.1.5 Data Collection and Analysis

Data collection is mainly performed via surveys and questionnaires. In 2018, survey included areas such as generation, storage, grid operation, metering point operation and metering services, trade, distribution, etc.. The data collection is carried out via Excel questionnaire.

In order to carry out the monitoring, the Federal Network Agency assigned companies an operating number for every market role they have performed. Separate queries are also provided to network operators and end-users regarding load management. The network operators are requested to report all end-users in their network area who have reached a power consumption of 50 GWh at least once in a year in years 2017 to 2019.

Data Transfer Platform MonEDa is used to collect data. The use of MonEDa became mandatory from 2019. This platform facilitates data exchange between the Federal Network Agency and market participants for monitoring purposes. MonEDa is a secure interface between market participants and the energy monitoring department of the Federal Network Agency.

When the survey is completed, the information provided by the market participants is handed over to the Federal Ministry of Economics and Technology, subject to observance of trade and/or business secrets. The results of the surveys are published within the scope of the report on the security of supply.

Since the incentive-based regulatory regime replaced cost-plus regulation from 2009, the Ordinance on Incentive Regulation of Energy Supply Networks regulates the requirements for tariff setting procedure. Under the Ordinance on Incentive Regulation of Energy Supply Networks, the network operators are obliged to prepare a report on their investment behavior at the request of the regulatory authority and to submit this to the regulatory authority. The report serves in particular to determine whether the incentive regulation has no adverse effects on the network operators' investment behavior with regard to the purposes specified in Energy Industry Act. The report must show the extent to which the annual investments by the network operators are commensurate with the age and condition of their plants, their annual depreciation and their quality of supply. The regulatory authority may request additions and explanations to the report.

According to the Ordinance on Incentive Regulation of Energy Supply Networks, the network operators are obliged to prepare a report on their investment behavior at the request of the regulatory authority and to submit this to the regulatory authority. The report serves in particular to determine whether the incentive regulation has no adverse effects on the network operators' investment behavior with regard to the purposes specified in Energy Industry Act. The report must show the extent to which the annual investments by the network operators are commensurate with the age and condition of their plants, their annual depreciation and their quality of supply. The regulatory authority may request additions and explanations to the report.

On the other hand The Federal Network Agency and the state regulatory authorities shall provide each other with the data necessary for performing their tasks in accordance with the provisions of the Ordinance, including personal data and trade and business secrets. In particular, the state regulatory authorities forward to the Federal Network Agency the total costs determined for carrying out the nationwide efficiency comparison. If the data are not available in time, the Federal Network Agency will carry out the nationwide efficiency comparison exclusively with the available data.

If the data necessary for determining the revenue ceiling, in particular for the application of the regulatory formula and for carrying out the efficiency comparison is not available in good time before the start of the regulatory period, the data for the last available calendar year is used. If there is no data or data that is manifestly incorrect, the regulatory authority can determine the missing data by estimation or by a reference network analysis using data available from the regulatory authority or known to it.

In particular, the regulatory authority publishes on its website in a non-anonymous form on the basis of the network operator

- the value of the annual revenue caps
- the interest-bearing balance of the regulatory account as well as the sum of the surcharges and discounts from the cancellation of the balance of the regulatory account,
- the efficiency values determined, the parameters used in the efficiency comparison and the comparison parameters used in the efficiency comparison,
- the super efficiency values as well as the efficiency bonus,
- the parameter values used and the annual adjustment amounts of the revenue ceiling for the expansion factor
- the annual capital surcharge calculated as a total value,
- the permanently non-influenceable cost shares and their annual adjustment
- the annual share of costs actually incurred as total value,
- the annual share of costs actually incurred
- the annual volatile cost shares as total value and
- the determined key figures for the quality of care.

The regulatory authority publishes in its Official Journal and on its website the general sectoral productivity factor determined, and the average efficiency value determined[4].

2.2 Norway

The Energy Regulatory Authority in Norway publishes three types of reports and analyses, related to the power market, energy consumption and production.

All sales licensees are required to submit financial and technical reporting to the Norwegian Water Resources and Energy Directorate (NVE) using the updated ***eRapp2*** service. The reporting includes activities related to power sales, power generation, power transmission, telecommunications and other activities. Information provided to NVE in terms of market monitoring activities is explained in more detail in the following subsections.

Network customers are entitled to be compensated for power outages that last more than 12 hours. NVE has made a guide to the ***USLA (Payout for very long-term interruptions)*** scheme to inform how the grid companies can meet the requirements of this scheme.

[4]Source: Ordinance on Incentive Regulation of Energy Supply Networks.

Supplier Surveys	Quarterly Reports	Financial Regulation
Quarterly surveys on supplier switching, market shares and prices. The survey currently includes: • The trend in the number of supplier changes • Price trends for household customers • Developments in the delivery obligation scheme • The market shares of power suppliers in different grid areas	Power market developments in the previous quarter and the last 12 months. Reports includes topics (but not limited to); • New power generation • Reservoir statistics • Costs in the energy sector • Technical, administrative and geographical aspects of Norwegian electricity supply • Energy system analysis (interconnections etc) • Supply & demand analysis etc.	Reports and Analyses. Those includes: • Consultation documents and summary reports - hearings regarding the revenue framework regulation • Analysis prepared by NVE including reports on key figures development and web rental projections • Consultant report prepared by others on behalf of NVE • Supervisors related to matters of financial regulation. Includes eRapp, TEK and USLA scheme

Figure 2.3 – Types of monitoring documents published by NVE

In addition, below mentioned audit reports has been published by NVE until now:

- Audit reports on environmental inspections
- Audit reports on land safety
- Audit reports on power supply readiness
- Audit reports on quality of delivery and faults analysis
- Audit reports on tariff
- Audit reports on financial and technical reporting
- Audit reports on affiliation obligation

Network operatorsmust record data on short-term and long-term interruptions in reporting points in their own network. Interruptions and planned shutdowns that result in reduced delivery capacity for end users classified in the regional or transmission network must be classified as short- or long-term interruptions.

2.2.1 Unbundling

In Norway, DSOs with more than 100,000 connected customers are legally and functionally unbundled. These companies are also subject toparticipation in a compliance program according to the Electricity Directive and Norwegian Regulation. Norwegian Water Resources and Energy Directoratemonitors the DSOs' fulfilment of the regulations regarding legal and functional unbundling and the participants of the program have to produce an annual report to NVE.In 2016, an amendment to the Energy Act that imposes legal and functional unbundling for all DSOs, irrespective of size, was approved by the Parliament, and it is expected to enter into force 1 January 2021.

On the other hand, all of the DSOs are under regulation concerning neutral and non-discriminatory behaviour when it comes to the DSO's management of the information to customers, supplier switching, metering data and billing. Related regulations are subject to supervision by NVE.

In Norway, the electricity DSOs also report annually on detailed accounts on income and expenses within the scope of unbundling.

2.2.2 Quality of Supply

2.2.2.1 Continuity of Supply

Continuity of supply is the availability of electrical energy, measured by the frequency and duration of interruptions.NVE has not set quantified requirements for the continuity of supply, but Economic Revenue Regulations take the cost of the interruptions into account when deciding the income cap for network companies.

All network companies are obliged to fully restore the power supply without undue delay after an interruption. NVE might impose network companies to limit the consequences of interruptions.

As mentioned before in Introduction part of Norway, network companies are obliged to record data on short-term and long-term interruptions in reporting points in their own network. The affected concessionaire shall report by March 1, data according to the first paragraph for the previous year. Data must be reported according to the requirements of the Energy Regulatory Authority.Network companies might use software that complies with the current FASIT requirements specification when registering and reporting data. Registered data and the supporting material for reported data are required to be kept by network companies for ten years.

NVE publishes updated statistics for interruption data every year. The statistics are based on annual, county-distributed data from 128 online companies. The statistics show interruptions due to incidents (operational disruptions and planned shutdowns) in the Norwegian power grid. The statistics have different interest groups:

- The online customers are entitled to provide information about expected delivery quality in the area. This is stated in the Energy Act.
- NVE needs information to verify that the network companies follow the intentions of the Energy Act.
- The network companies need the information to plan, build and operate the web with a quality that is tailored to the needs of the customers.

Data collected and published by NVE regarding continuity of supply is as follows:

Table 2.3 – Data collected on continuity of supply

Indicator	Data / Information reported by DSOs
Continuity of supply	○ Interruptions above 1 kV started to be reported to NVE in 1995 ○ Since 2014, interruptions on all voltage levels have been reported ○ NVE publishes an annual report where data on continuity of supply for each network company is presented. ○ The data is reported according to the following definitions: • For long (> 3 min) and short (≤ 3min) interruptions (ref reporting point + ref end user from 2005) • Duration (ref reporting point + ref end user from 2005) • Interrupted power (from 2006) • Energy not supplied (ENS) • SAIDI, SAIFI, CAIDI, CTAIDI, CAIFI (from 2005) • CENS (from 2009) • Notified and non-notified interruptions

The network operators analyse all operational disturbances above 1 kV and alsoreport this data to the TSO, Statnett SF. The TSO publishes an annual report with data from these analyses, for voltage levels above and below 33 kV. The continuity of the electrical supply is good in Norway, however, it is highly influenced by conditions in the surroundings, such as wind, snow, ice, thunderstorms, vegetation, birds/animals, etc. NVE does not exclude any exceptional events from the interruption data.

All network operatorsshall use the national interruption reporting software developed, **FASIT**for recording faults and interruptions in the power system. The FASIT system makes it possible for network companies to record information about faults on equipment (components), delivery point interruptions and restoration and repair times.

2.2.2.2 The Quality and Level of Maintenance of the Networks

In addition to the Cost of Energy not Supplied (CENS), as the main regulatory tool to ensure a proper level of maintenance of the networks, NVE carries out audits on companies regarding operation andmaintenance. The quality of the maintenance is monitored on these audits.

2.2.2.3 Voltage Quality& Technical Quality

The Norwegian quality of supply regulation includes minimum requirements for voltage frequency, supply voltage variations, rapid voltage changes, short and long-term flickering, voltage unbalance and harmonic voltages including total harmonic distortion (THD). If considered necessary, NVE may set minimum requirements for other voltage disturbances, such as voltage dips, voltage swells, transient overvoltage, inter-harmonic voltage and main signalling voltage.

Table 2.4 – Data collected on voltage quality

Indicator	Data / Information reported by DSOs
Voltage quality	– DSOs continuously register dips, swells and rapid voltage changes for high and medium voltage network since 2006. – Since 2014, they also register total harmonic distortion (THD) and flickering. – From 2014, network companies have also been obliged to report the abovementioned voltage quality parameters (except rapid voltage changes) to NVE. NVE has established a database for all the reported data.

Network operatorsare obliged to record short-term over and under voltages at one or more measuring points in their own high voltage plants. The registration shall, for each short-term overvoltage and undervoltage, at least include the number of phases affected, duration and voltage deviations stated as a percentage of rated voltage. Network operators are obliged to register maximum voltage surges greater than 3%, at one or more measuring points in their own high voltage plants. The registration shall for each voltage jump as a minimum include the number of voltage-jumps and the maximum voltage change expressed as a percentage of nominal voltage.

Network operators are obliged to record long-term intensity and short-term intensity of flicker at one or more measuring points in their own high voltage plants.

Network operators are also obliged to record total harmonic distortion (THD) of the voltage waveform as 10-minute average values, at one or more measuring points in their own high voltage systems.

Network operators are obliged to record slow variations in the voltage's effective value (U rms), measured as an average over one minute, at one or more measuring points in their own high voltage plants.The recording of voltage quality parameters must be carried out in various characteristic grid installations.

By February 1, companies started toreport data as online, and data is required to be reported in the manner determinedby the Energy Regulatory Authority.Network operatorsare obliged to keep data recorded and the supporting material for data reported under technical quality requirements for ten years.

2.2.2.4 Commercial Quality

In the event of customer complaints regarding power quality, network companies have to make the necessary investigations in order verify compliance with the requirements according to regulations.

Network companies are obliged to give information on given data for the quality of supply in their network within one month, upon request by current or potential customers. This data includes;

- results from registration of interruption data,
- analyses of operational disturbances and
- specific conditions in the network that could have an influence on the quality of supply for the customer.

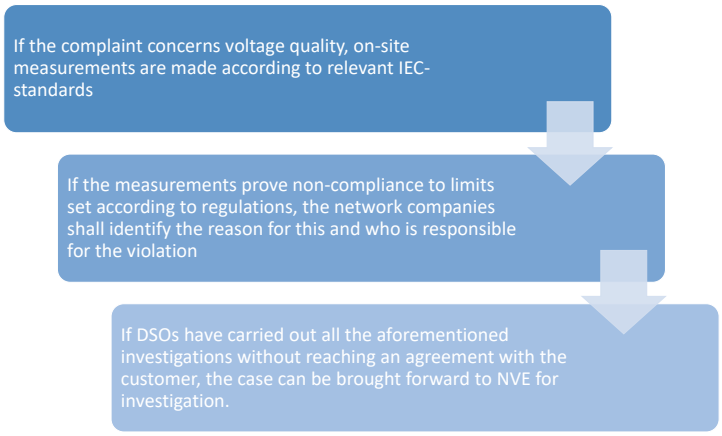


Figure 2.4 – Customer Complaints Process

2.2.3 Retail Market

In the retail market, general competition legislation (The Norwegian Competition Act and the competition rules applicable through the EEA Agreement) apply, and the Norwegian Competition Authority has full responsibility. The physical power exchange, Nord Pool AS, operates under a market place license issued by NVE pursuant to the Norwegian Energy Act. The marketing of electricity contracts are regulated by the Norwegian Consumer Ombudsman.

NVE works to ensure that the retail market is well-functioning and easy for consumers to engage with. NVE's Department of Energy Market Regulation supervises the retail market in accordance with provisions under the Energy Act and other related regulations.

There have been major developments in Norwegian retail market between since 2015. A common theme for these changes is the digitalisation and the Nordic regionalisation of the retail market. Some of the following items related to the monitoring of the retail market will be explained in more detail in the subsections.

Price Comparison Tool	• The Norwegian Consumer Council launched a new price comparison tool for the retail electricity market in 2015. NVE implemented new reporting regulations for the tool under the Energy Act, which came into force the same year.
Nordic Balance Settlement	• Together with the recommendation of NordREG, a common Nordic Balance Settlement (NBS) mechanism became into operational.
ELHUB	• The targeted implementation for Elhub is 2019. Elhub is a new centralised database for electricity meter data from smart meters, simplifying the market structure and putting consumers in control of their data. NVE has mandated the development of Elhub through regulatory amendments.
Smart Meter Roll-out	• The smart meter roll-out is set to be completed by 1 January 2019. This has been decided by NVE through regulatory amendments, which also specify requirements for the functionality of smart meters.
Supplier Centric Model	• NVE will develop new regulations for the implementation of a supplier centric model, making retailers the main point of contact for consumers in the retail market in line with the recommendation of NordREG.
Unbundling for all DSOs	• In 2021, legal and functional unbundling will apply to all DSOs irrespective of size. A new unbundling leglisation was enacted by the Norwegian Parliament in March 2016 and enters into force 1 January 2019.

Figure 2.5 – Developments regarding monitoring of retail markets

2.2.3.1 Reporting Regulation for Electricity Contracts (Price Comparison Tool)

As in many other countries, a price comparison toolis usedin Norway to enable consumers to make an active choice in the electricity market. The Norwegian Competition Authority ran the price comparison tool for electricity from 1998, to enable consumers to compare electricity contracts. However, this tool was replaced by the Norwegian Consumer Council's (Forbrukerrådet) new price comparison tool ***strompris.no*** in 2005. The new tool contains information about all offers available in the market since 1998 and it ranks contracts according to the estimated total cost of energy including network tariffs and taxes.

NVE regulates the collection of information for Forbrukerrådet's price comparison tool under the Energy Act regulations. When developing the regulations for collecting information for Forbrukerrådet's price comparison tool, a key principle for NVE was to ensure that all contracts in the market are presented in the price comparison tool.

In this regard, the new reporting tool expanded the existing obligations.Through the new price comparison tool, consumers can with greater ease compare their deal with other deals, with regard to price, terms and conditions.

2.2.3.2 Data Management – Elhub as the National Point of Data Management

NVE has mandated Statnett to develop a new IT solution for information exchange between actors in the power market. NVE has made changes in the regulation on information exchange related to supplier switching, customer change, metering, DSO neutrality, settlement of metering corrections as well as requirements for responsibilities regarding the operation of Elhub and smart metering. The solution must also handle supplier switches in the retail market. These changes are expected to enter into force when the Elhub is implemented, in 2019.

Elhubis expected to:

- standardise the exchange of hourly metering data, simplifying the communication of metering data in the chain between DSOs, suppliers and consumers.
- facilitate efficient use of smart metering through a coherent distribution of data and by performing quality control of metering values reported by DSOs
- lead to a more efficient organisation of the power market by creating an even clearer divide between monopoly regulated companies and competitive retailers
- help increase competition and innovation in the retail market by creating a neutral market structure with equal terms for competitive actors

In 2018, NVE has decided to impose fines on network companies that have not fulfilled the requirements for operator approval and data quality when migrating to Elhub. 98 companies were required to rectify nonconformities to reduce the risk of delays and cost increases in the Elhub project.

2.2.3.3 Prices and Profit

There are no regulated prices in Norway. End users are free to choose which power supplier they wish to purchase the power from. The possibility of switching power suppliers is based on price or other relevant considerations that opens up competition between power suppliers. Customers who have not yet chosen a supplier shall, in the first six weeks, be served by their local DSO (supplier of last resort).

NVE publishes an overview of the retail market prices on a weekly basis and compares the average price ofthe three standard types of contracts for the past week, and by presenting an estimation of the averageaccumulated electricity cost for the customers so far. The data are collected from the Norwegian Consumer Council and Nord Pool. The data are published in the weekly report on NVE's website. NVE also publishes similar retail market data in a quarterlyreport on the energy market.

Electricity suppliers are also required to refer to NVEs' website to inform their customers about the costsimposed by the electricity certificate obligation, where electricity suppliers and certain electricity users are obliged to purchase electricity certificates for a specified proportion of the volume of electricity they deliver or use.

2.2.3.4 Customer switching

NVE is also assessing the implementation of a customer centric supplier model for the Norwegian retailmarket, in accordance with NordREG recommendations. The implementation of a customer centric modelshould simplify the retail market for consumers and is considered a step towards the furtherharmonization of Nordic retail markets for electricity. The model under consideration by NVE includes amandatory combined billing regime, which will simplify the market structure and make it easier forconsumers to engage in the electricity market.

In general, NVE aims at identifying and reducing the barriers that keep consumers from being activelyinvolved in the retail market. By providing information about the national price comparison web site andpresenting a compilation of average retail market prices on a weekly basis, NVE encourages consumers toensure that their contracts are among the most competitive ones.

One of the investigations NVE carries out in order to monitor the efficiency of the retail market, is aquarterly survey of the number of supplier switches and the market shares of dominant suppliers in theretail market. These data are collected from a group of DSOs that represents approximately 90percent of the retail market (measured by the number of metering points). Results are published in a quarterly report on NVEs web site.

The number and % of supplier switching per year and quarter ("kvartal") for household customers is shown as an example.

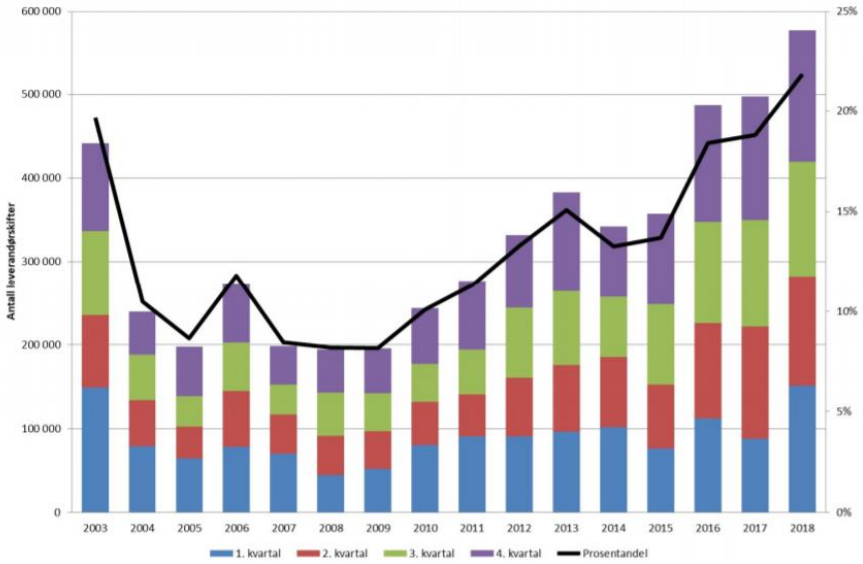


Figure 2.6– The number and % of supplier switching in a year/quarter for household customers

In order to learn more about why consumers are active or inactive in the market, NVE also commissioned areport investigating Norwegian household consumers' knowledge of the electricity market. The report wasbased on a survey, in-depth interviews and focus groups. General questions aboutrenewable energy, roles of the DSOs and the suppliers in the Norwegian marketwere asked within the scope of survey.

The report found that consumers have a varying degree of knowledge about their electricity consumptionand the electricity market. The three most common reasons why the consumers are with their currentpower supplier and on their current contract are as:

- The consumer is satisfied with their current contract
- It was the cheapest contract offer
- The consumer wanted a local power supplier.

2.2.4 Compliance Monitoring

NVE uses inspections and thematic supervision to ensure compliance with a range of Acts and Regulations.

Investigation	Thematic Supervision
• NVE's Section for Economic Regulation carries out inspections to ensure compliance with the Income and Tariff Regulation and other relevant requirements. • NVE chooses companies based on the number and gravity of the non-compliances. • NVE's focus during its investigations is to identify routines and systems that ensure that companies report correct data. • If company cannot give satisfactory answers during inspection, it must report additional information post inspection. • NVE evaluates comments and it is decided which actions to take. • Not abiding the decisions results in fines. • The inspection process is finalized when all non-compliances have been corrected.	• Topic monitoring includes all network operators, but for one topic at a time. • NVE chooses the topic based on observations and input from the industry (e.g. routines for updating the long-term asset registry for network installations/facilities that are no longer in use and handling of excess and deficit revenues). • Topic monitoring can be carried out as a survey or by NVE ordering companies to report information regarding a specific topic.

Figure 2.7 – Compliance monitoring

NVE's focus during its investigations is to identify routines and systems that ensure that companies report correct data. Areas of particular interest are rules and principles for allocating revenues, costs and assets between the different business areas – in particular, between monopoly and competitive businesses – routines and systems for updating the economic and technical registries of long-term assets and the coherence between these registries, eRapp and TEK, routines for registering grants and investment contribution from customers and updating the customer information system. Furthermore, companies must identify and explain transactions for the most relevant and significant accounts, e.g. other operating income, other operating expenses and cost of transmission services. They must also answer to any incoherence or significant annual fluctuations in the reported data, such as salaries and pensions, losses on receivables, maintenance and operational costs, depreciations and book values, grid losses, various technical data, etc. If satisfactory answers cannot be given on the day of the inspection, the company must report additional information post inspection.

NVEs's "Procedures for Control" and "Procedure for Reaction" are the basis for the authority's supervisory work. Each year Action plan for NVE's supervisory activities are published, which states areas to be inspected, responsible parties and inspection methodology.Several control methods are used, but audits, inspections, and reporting are the most common. Other control activities include document control of submitted material, online control, specific control of exhibited products, and laboratory controls. When deviations are uncovered, appropriate reaction is assessed and adopted.

Each year action plans present the topics for which there will be special attention. The range of topics for individual disciplines are based on assignments for related year, experiences and internal priorities, among others. For the action plan to have the same structure as the expected annual report, the areas are divided into three main categories of water, energy supply and energy labelling&energy use.

For each supervisory area, the supervisory objects are selected in view of the criteria:

- Risk
- Materiality
- Geographical spread
- Dispersion between enterprises of different sizes and types
- Experiences

For the year 2019, areas to be inspected included, but not limited to, the following:

- Security in AMS: Checks whether grid companies have established measures and routines that safeguard security in advanced measurement and control systems
- Progress Reporting for AMS Deployment: Mapping the deployment status and reasons for not installing AMS.
- Reporting hourly values to Elhub: follow-up migration of data to Elhub with notice and any decision.

Supervision method: Local control, reporting, written control and document control

- Obligation to connect: Control the grid companies' practices to comply with the obligation to associate with new production and new consumption of electricity, and to facilitate production and consumption increases.
- Obligation to supply: Check the network companies' practices to comply with the obligation to link to new electricity consumption and to facilitate consumption increases.

Supervision method: All sales licensees with a revenue ceiling may be relevant. NVE prioritizes a few concessionaires with many customers, large financial size and relatively high activity of affiliations, and based on experience from previous cases.

- Reporting in eRapp and TEK are in compliance with the requirements
- Quality assure that values reported in eRapp with the main focus on corporate transactions and that requirements for agreements and competition in acquisitions for corporate transactions are complied with.
- Quality assure that values reports and that values reported in TEK for 2018.

Supervision method: All sales licensees with reporting obligations are subject to supervision. For other companies, the ones with relatively high activity of group transactions, financial size, significance in comparative analyses, experience from control when the eRapp was incorporated, and/or who have not been audited in recent years are considered. Methodology for supervision is reporting, written control, audit with local control and seminars.

- Submission control: Control of reporting of interrupted data and voltage quality data. Violations of reporting obligation and incorrect reporting are followed up in writing against each company
- Audit: Control of companies' routines to comply with the requirements in the delivery of quality regulations. In addition, control of the companies' routines for compliance with the system liability regulations.
- Written supervision: Simple provisions in the delivery of quality regulations where NVE suspects breaches according to uncovered conditions

Supervision method: Submission check, audit, written supervisionare used.

- Submission control: Companies that are obliged to report according to regulations on quality of delivery in the power system.
- Revision-2019: All companies with more than 20,000 customers where NVE has not been audited before + possibly smaller companies NVE has not been supervised before if they can be combined on the same tour as supervision of a larger company that meets the first criterion.
- Written supervision: If NVE through case management etc. reveals that companies have violated individual provisions in the delivery quality regulations.

Based on the resources at hand, the number of inspections per year fluctuates between 5 and 15. Since 2007, NVE has carried out 106 inspections with a legal basis in the Income and Tariff Regulation. Each inspection takes roughly 200 man-hours to complete, but the process is usually ongoing from the beginning of the calendar year until August or September. Candidates for inspection are prioritized and chosen based on a risk assessment of probability and consequence.

No later than 5 weeks prior to the inspection date, the companies receive a formal notification of inspection and they are ordered to report additional economic and technical data. NVE consolidates all available data and customizes a questionnaire for use on the inspection day.

2.3 Portugal

Market surveillance is prime objective for the regulatory authority of Portugal, ERSEto ensure the proper functioning of markets and to increase the confidence of consumers as the main beneficiaries of supervisory activity. Within the scope of the supervision of energy markets, compliance with the general legal and regulatory framework is of great importance, namely in compliance with transparency and information obligations.

The Electricity Commercial Relations Regulation (RRC) is the main regulation that sets out the general framework as regards to market monitoring. The regulation provides that electricity traders are required to follow certain procedures for reporting electricity trading prices and the content of commercial offers. Obligations and rules for sending information relating to the reference prices, average prices and content of the offers in the retail electricity market are defined within the scope ıf Regulation.

The RRC also explains the information that market players should provide, in particular in the context of theGlobal Electric System Management Procedures Manual for Electricity to ensure transparency in the operation of the market. In this regard, the obligation to disclose information that could materially influence the functioning of the market or the formation of prices by market players or network operators is also triggered.

The RRC also establishes the procedures, deadlines and obligation to disclose information relating to the electricity supplier switching procedure. In this context a set of Switching Procedures for the Electricity Sector is published, which guarantees the right to change suppliers in a transparent and non-discriminatory manner.

2.3.1 Unbundling

In 2017, electricity sector regulations related to retail market functioning were amended with the objective of increasing competition. One of the items amended has been the branding separation and the objective has been the reinforcement of the implementation of more clear and strict rules on the branding separation of the vertically integrated undertaking operating in the electricity sector. Accordingly, in relation to the DSO's compliance programme, the yearly report which was already required in the previousregulation shall, going forward, contain an independent evaluation on the consumers' perception of theeffective branding separation in relation to other entities for the undertaking which performs other activitiesin the electricity sector.

2.3.2 Quality of Supply

The quality of service provided by the network operators and the suppliers to customers involves issues such as power outages, the quality of the power supplied or the quality of customer interaction.

ERSE annually publishes information on quality of service and analyses the performance of network operators and last resort suppliers in the following areas of quality of service:

- Continuity - Number and duration of power outages
- Voltage Wave Quality - Amplitude, frequency, voltage waveform and symmetry of the three phase system
- Quality of commercial service - Customer service, information, technical assistance and customer satisfaction assessment.

The reports are based on company information provided to ERSE.

Quality of Service Regulation (RQS) and Tariff Regulation lay down the rules to ensure a minimum level of quality of service to customers. The RQS, includes provisions on:

- Powers, responsibilities and obligations of the entities involved
- Quality of service indicators and standards
- Compensation to pay when individual indicators are not met
- Customers with special needs and priority customers

ERSE publishes the RQS and verifies compliance by publishing the annual report on the quality of technical service. An additional report on the quality of commercial service is also provided to customers in Portugal.

2.3.2.1 *Continuity of Supply*

The Regulation establishes annual indicators and standards associated with the number and duration of outages andtheir impact.

Table 2.5 – Continuity of supply indicators

General Indicator	Application			
	Transmission	Distribution		
		HV (*)	MV	LV
ENF (power not supplied)	√			
TIE (equivalent interruption time)	√			
END (undistributed energy)			√	
TIEPI (equivalent interruption time of installed power)			√	
SAIFI (average long interruption frequency)	√	√	√	√
SAIDI (average duration of long outages)	√	√	√	√
SARI (average system service replacement time)	√			
MAIFI (Average Frequency of Short Interruptions)	√	√	√	

(*) Only applies to mainland Portugal AT networks.

The individual indicators that characterize and evaluate service continuity at each of the delivery points are:

- Outage Frequency: Cumulative number of outages experienced at each customer site each year.
- Total duration of outages: Cumulative duration of outages experienced at each customer site each year.

2.3.2.2 *Voltage Quality*

In order to verify that the quality of the voltage wave at delivery points complies with the established limits, TSO and DSOs shall monitor the following voltage characteristics:

- Frequency;
- Effective voltage value;
- Tension caves;
- Swells;
- Flicker;
- Imbalance of the three-phase voltage system;
- Harmonic distortion.

2.3.3 Retail Market

Liberalization of the electricity market has reinforced the requirement of supervisory activityin order to ensurethe existence of conditions for competition and for minimization of information asymmetries between consumers and

other market players. ERSE witness the consolidation of the liberalised retail market, both in terms of the overall consumption of electricity and the number of customers.

Energy costs is an important component of the liberalization of the electricity market, since it corresponds to the freely negotiated share between the consumer and the supplier. On the other hand, the costs of using and accessing the networks shall be equal for all consumers under the same conditions.

ERSE provides, the Consumer Portal, where a set of information and charge simulation tools are shared for the consumers to be informed regarding their choices

> ***Consumer Portal***provides information such as full list of licensed or registered market electricity suppliers, what prices will be paid by consumers, what is needed to do to enter into an electricity supply contract etc. Consumers might estimate their contracted power rating via Contracted Power Simulator and know the source of the energy they consume via Electricity Labeling Simulator.

An analysis of the evolution of the retail market is available on the ERSE website in the form of a monthly report, which provides information regarding issues linked to competitive pressure on the market and on each of its segments.

One of ERSE's goals is the protection of the rights and the best interests of consumers, particularly of the economic vulnerable final clients, regarding prices, the way and quality of the services provided, promoting their information, clarification and education.

Accordingly, ERSE has a dedicated functional unit — the Energy Consumer Advice Bureau (ACE) —, which is responsible for:

- Informing and clarifying doubts of the energy consumers
- Promoting and organizing training actions intended for consumer protection entities and consumer dispute arbitration centres
- Following up of energy consumers complaints, recommending the conflict resolution with the suppliers or energy distributors (DSO's – Distribution System Operators)

2.3.3.1 Prices

In January 2011, regulated tariffs began to be terminated for end customers with Very High Voltage (MAT), High Voltage (AT), Medium Voltage (MT) and Special Low Voltage (BTE) consumptions and, for normal low voltage (BTN) customers. The transitional period of supply by last resort suppliers to BTN customers who do not exercise the right to move to the free market has been extended until 31 December 2020.

Structural factors, such as the phase-out of regulated tariffs for end-users, the adoption of transitional tariffs, the adoption of regulated risk coverage mechanisms by the suppliers, and enhanced transparency in the communication of available offers to end-consumers facilitated the increase in the number of suppliers that operate in the market, leading to greater market robustness.

The opening of the market reinforced the need for ERSE to monitor prices in the retail electricity market while seeking to ensure the existence of competitive conditions between the network operators. Another aspect has been the minimization of information asymmetries between consumers and other market players, which fosters transparency and increase market efficiency.

The collection of information on reference prices and average practiced prices in the electricity sector is performed by ERSE.

- The **reference prices** (prices of commercial offers): Suppliers send ERSE updated information on the reference electricity prices they practice or expect to practice for all Low Voltage supplies, as well as on actual prices charged to consumers in the retail market.Reference prices are the set of tariffs, tariff options, and corresponding prices and indexes per billing variable offered by suppliers to their customers, as well as the conditions for applying the tariffs, namely consumption characteristics, contract duration, and price revision conditions. Reference prices are the supplier's basic standard offer, thus not inhibiting the application of differentiated contractual conditions such as discounts or other promotional campaigns. Reference price information is sent on an annual basis at the end of

  January and whenever there is a change in prices or contractual conditions.ERSE has also started the publication of quarterly newsletters on reference market prices in low voltage.
- The **average prices** (billed prices):All suppliers of electricity market (free traders and regulated suppliers) sent quarterly average price information to ERSE to monitor and supervise the electricity retail market.The data is also used as a tool to disclose average market prices, namely by official statistical data organisations (e.g., Instituto Nacional de Estatística – INE, the Portuguese Statistics Office, and Eurostat, at the European level).

Some of the data collected and published by ERSE are listed as follows:

- standard offers sent by suppliersfor household customers,
- number of suppliers in the market
- type of offers, whether electricity-only or dual (both for electricity and for natural gas) or offers with additional energy services
- prices of market offers, as well as the values of the transitional tariffs associated with the simple and bi-hourly options

Example graph regarding price of commercial offers of electricity (electric only and dual) for consumers in 2016 and 2017 is illustrated as follows:

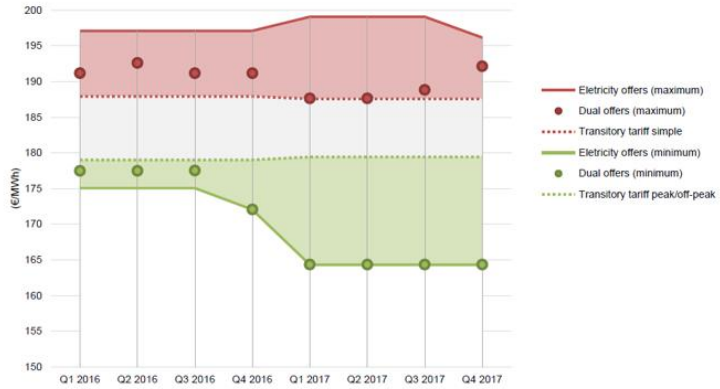


Figure 2.8–Commercial offers in 2016-2017

ERSE offers a price simulator to compare the prices of electricity and natural gas commercial offers.

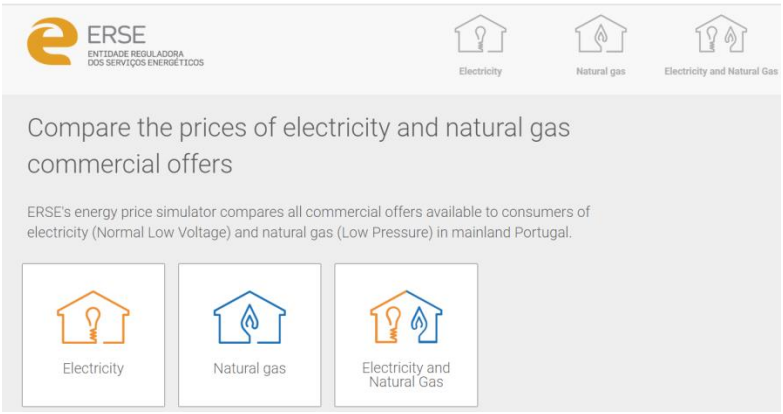


Figure 2.9 – Price simulator tool of ERSE

2.3.3.2 Customer Switching

Competition efficiency including

- number of customers,
- growth of the market,
- supplier switching rates,
- switches within the liberalised market,
- switches from the regulated market to the liberalised market) are also monitored by ERSE.

In 2017, supplier switching was marked by a significant penetration of suppliers on the liberalised market in segments such as customers with the highest consumption, large customers and industrial consumers, but also in the household consumers segment: approximately 84% of household consumers were already in the liberalised market at the end of 2017 (3% more compared to the end of 2016).

The intensity of supplier switching was still high – around 19% in 2017. The switches that occurred within the liberalised market represented, in number of customers, approximately half of the total supplier switches.

2.3.3.3 Commercial Quality

The quality of commercial service provided by the grid operators and the retailers covers a range of topics such as speed of service, response to diverse requests, reading of meters or assessment of customer satisfaction. Companies must report quarterly information to ERSE on these indicators 60 days after the end of each quarter.

General indicators verify and promote the company's performance for all of its customers. When deemed necessary minimum quality levels (defaults) are set for each general indicator, for example: at least 85% of telephone calls must have a waiting time of less than 60 seconds. The following table shows indicators used for commercial quality.

Table 2.6 – Commercial quality indicators

Indicator	Standard	Applicable
% of face-to-face calls, with waiting time up to 20 minutes	Without standard	DSO, Supplier of Last Resort (SLR), Trader (if applicable)
% of telephone calls for fault communication, with waiting times up to 60 seconds	85%	DSO, Supplier of Last Resort (SLR), Trader (if applicable)

% of commercial telephone calls, with wait times up to 60 seconds	85%	DSO, Supplier of Last Resort (SLR), Trader
% of written requests for information, answered within 15 working day	90%	DSO, Supplier of Last Resort (SLR), Trader
average response time to written requests for information	Without standard	TSO
% of readings with a break from the previous reading less than or equal to 96 days (reading frequency	92%	DSO

2.3.4 Transparency

ERSE offers online simulators on its website (market price comparison simulator for StLV supplies in mainland Portugal, simulation of contracted capacity, electricity labelling simulator)in order to help electricity consumers to make an informed choice, namely regarding the selection of the best offer in the market. These tools provide information to electricity consumers on market reference prices and help them choose a supplier.

ERSE also evaluates whether the offers provided on the companies' websites, both in terms of prices and commercial conditions, are in accordance with the reference price data sent to ERSE to ensure the transparency of information available from suppliers to consumers.In situations where there are discrepancies or gaps, ERSE reserves the right to refuse publication in its market price comparison simulator, until the issues identified are overcome.

In addition to this simulator, ERSE provides on its webpage all the information on reference prices and other contractual conditions that support the functioning of the simulator, and allows collection of historical data covering all the standard commercial offers available in the market.

Considering the increase in the number of offers available to customers in StLV, ERSE devised a mechanism to provide consumers with more effective information, with the aim of enabling them to make informed choices. Therefore, ERSE has approved rules requiring suppliers to disclose the content of pre-contractual and of contractual information, which is now harmonised, to electricity consumers in Mainland Portugal, namely, through a standardised contractual sheet. The standardised contractual sheet is a measure that ERSE believes enables the effective promotion of competition. This measure helps consumers have effective access to information and also have comparable information between different offers.

Suppliers with more than 5,000 customers are required to publicly disclose their commercial offers, as well as the general conditions of contracts for StLV customers. Additionally, when expressly requested to, the supplier must submit a proposal for the supply of electricity within 8 business days, for low voltage customers, and within 12 business days, for all the other customers, from the date on which the request was made by the customer. There are also rules in force concerning the information included in the invoices sent to the customers, namely information regarding the cost due to network access tariffs, the cost due to CIEG66, and the labelling of electricity.

Also,with regard to electricity bills, ERSE approved additional obligations on electricity suppliers in 2016, mandating them to inform standard low voltage customers of the preferred date or dates for the communication of meter readings. This implementation is expected to improve the effectiveness of that communication and allow customers to be billed without the use of consumption estimates.

2.3.5 Compliance and Investigations

ERSE can help solving questions or conflicts related with customers energy supply contract. Thereunder, ERSE:

- Informs and clarifies doubts
- May recommend a resolution for the concrete conflicts
- May also sanction the companies, if a bad practice against the law or administrative offense is identified

ERSE can not impose the resolution of concrete conflicts (for example, to determine a compensation due to damages caused in electrical devices or customer bill correction). In Portugal, there exists a National Network of

Dispute Arbitration Centres for the cases where dispute is not solved. The energy consumers may also appeal to the Justices of the Peace or to the courts of justice and obtain a conflict binding decision.

The consumers associations and the municipal consumers information and support services have also a very important role in the information and energy dispute resolution.

Yearly audits are done in EDP Distribution Company with the purpose of assessing the degree of compliance with Guide for Meter Reading and Data Availability (GMLDD), as well as the integrity of the data to be provided to the Marketplace.

Assessment covers the following aspects:

- Identification of the procedures followed by EDP Distribuição,
- Verification of the adequacy of the procedures in compliance with the provisions compliance with the deadlines for availability of data to different agents,
- The evaluation of the functioning of the data processing and availability system counting,
- Evaluation of the functioning and robustness of control, detection and error correction and anomalies,
- Verification of compliance with the criteria of transparency, non-discrimination and independence in making consumer data available,
- Verification of the procedures that ensure the protection of personal data and the confidentiality of information,
- Measuring the degree of confidence as to the reliability and integrity of data from score.

2.3.6 Recent Developments regarding Retail Market

- At the retail market monitoring level, an obligation was introduced for suppliers. Previously, there were situations in which the regulator was only aware of a supplier's beginning of activity when it gained clients through the switching process. This situation prevented retail market supervision from ensuring a correct and transparent approach to the market, for instance in the verification of the contractual conditions or of the existence of a standardised contractual sheet before the supplier started the formal contracting with customers in the market. Together with the amendment, suppliers shall make a previous communication to ERSE through a registry before beginning their activity.
- With the objective of making retail market monitoring more effective, the concept of commercial offer was clarified.Commercial offers started to be registered in ERSE through standardised contractual sheets and an autonomous definition of additional services offered by supplierswas established. The revision also introduced rules on third party services to reduce the operational risks related to third parties' performance of activities and to ensure compliance with applicable electricity supply legislation and regulation.
- The revision also changed the rules in relation to electricity labelling, with the objective to change the allocation of energy under special regimes. The new rules allow for the existence of suppliers with a 100% renewable mix and for suppliers to further differentiate their offers.
- Finally, the revision introduced changes related to the network usagecontract's guarantees management process between market agents and system operators. The new framework introduced the role of guarantees manager, who centralises the guarantees management activity of those contracts. This revision is expected to provide advantages for suppliers in having a unique entity to interact with in relation to guarantees and also on reduction of the default risk. The guarantees manager should apply evaluation risks principles that differentiate between entities with a compliance history and entities with a history of delays or defaults, the latter being penalised in the calculation of the guarantee to be provided.

2.4 UK

Each year, the transmission and distribution network owners must report to Ofgem on their performance. Where they have not performed well, Ofgem takes action. Under Ofgem's RIIO (Revenue = Incentives + Innovation + Outputs) model each distribution company has to deliver and report on a range of outputs that are:

- **Reliability**: Improve network reliability and reduce the number and duration of power interruptions.
- **Connections**: Provide a better service for customers wanting to connect to the network.
- **Customer Service**: Deliver good customer service and listen to stakeholders.
- **Social Obligations**: Do more to help vulnerable customers, particularly during power interruptions.
- **Environmental:** Reduce carbon emissions and other environmental impacts.
- **Safety**: Ensure the network remains safe and meets Health and Safety Executive standards.

Indicators about networks, customer service and retail sector are published by Ofgem for transparency and customer protection purposes. There are also other issues monitored by Ofgem such as EU requirements on unbundling, transparency, compliance etc.

As part of the performance monitoring, Ofgem also publish an annual report.

2.4.1 Unbundling

Under Article 26 of the Electricity Directive, Ofgem has an obligation to ensure that where the distribution system operator is part of a vertically integrated undertaking, it should be independent at least in its legal form, organisation and decision-making from other activities not relating to distribution. Additionally, each National Regulatory Authority (NRA) is required to ensure that there are no cross-subsidies between transmission, distribution and supply activities.

In the UK, licensed electricity distribution, gas distribution and transmission network operators (including offshore licensees) are subject to licence conditions prohibiting regulated businesses from giving cross-subsidies to, or receiving cross-subsidies from, related undertakings.

Within this scope, Distribution Network Operators (DNOs) submit information to Ofgem relating to business independence, financial reporting and output performance. Independent auditors carry out a range of procedures, agreed with the Authority, to provide assurance that obligations to avoid discrimination and cross-subsidies are being respected. Ofgem reviews the auditors' reports and may raise supplementary questions, as appropriate.

Additionally, Ofgem monitors the interpretation and application of requirements for financial transactions to be completed at arm's length and on normal commercial terms. This is especially relevant for the terms of loans made to or by the licensee, basis of recharging for services provided at a group level, justification for any management fees charged to the licensee by related parties; and the interest rates charged on intra-group loans affecting the licensee.

2.4.2 Network

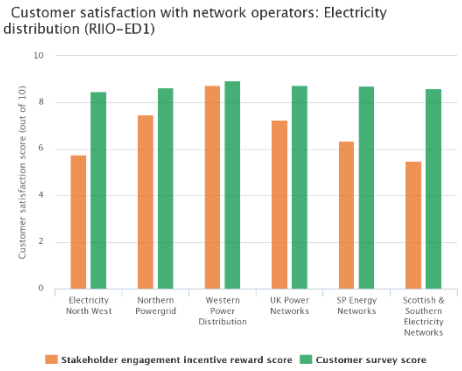
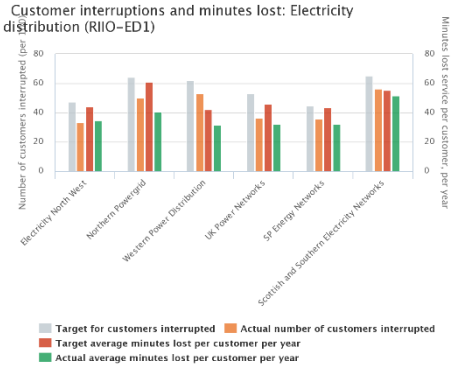
The Electricity (Standards of Performance) Regulations 2015 are the legal framework of specific minimum levels of service customers should expect from their DNO. If a company fails to meet a standard of performance, it must make a payment to the customer affected. The standards cover areas such as restoring supply during an unplanned interruption, connections, and voltage quality.

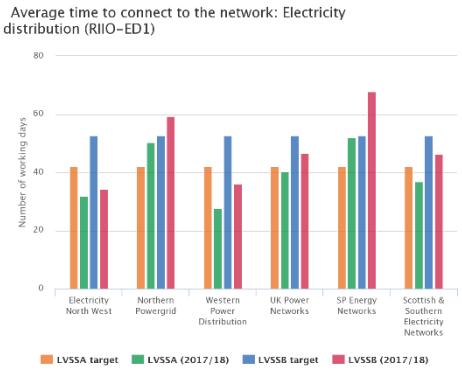
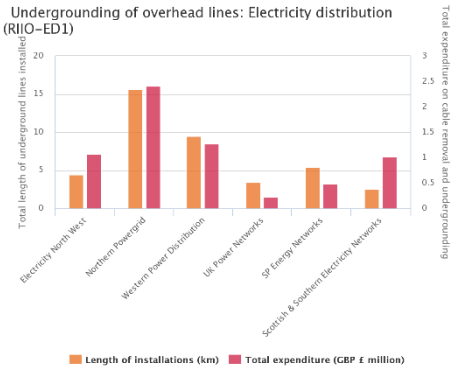
For distribution network reporting two elements considered are Time to Quote and Time to Connect. Time to quote is the difference, in working days, between the date the customer applies for a new connection and the date a quotation is issued to the customer. Time to connect is the difference between the date on which the customer accepts the quote and the final connection date (when the connection has been installed, commissioned and left safe).

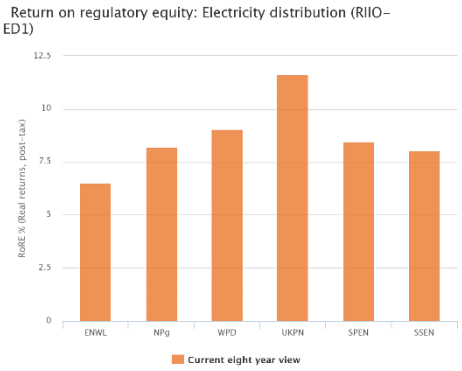
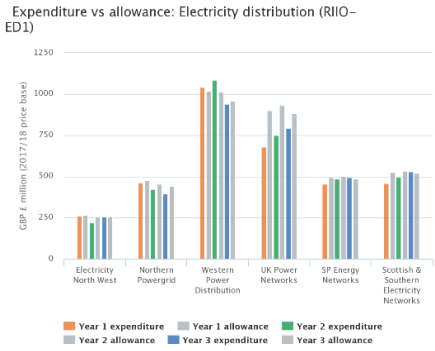
Ofgem also monitors the time taken to repair faults through the Interruptions Incentive Scheme (IIS). The time taken to repair has been incentivised as part of the 'customer minutes lost' element of the Scheme.

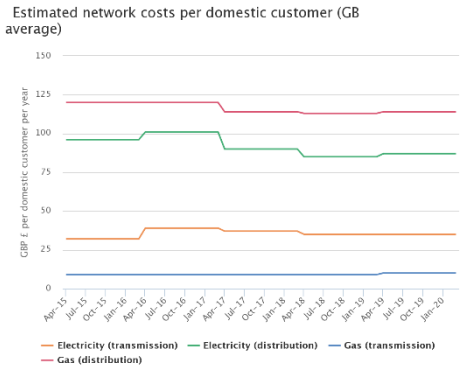
Indicators monitored and published by Ofgem about network are as follows:

Table 2.7 – Network Indicators

Indicator	Explanation	Methodology
Customer satisfaction with network operators	DNOs shall understand consumers' needs and proactively engage with them to make sure that their needs are met. There is a financial incentive that encourages DNOs to deliver good customer service. DNOs are scored against the three broad measures of customer service that are: – customer satisfaction – complaints handling – stakeholder engagement.	Ofgem sets targets, with associated penalties and rewards, for customer satisfaction and complaints. Ofgem and an independent panel of experts conduct the assessment for the stakeholder engagement incentive. The chart shows performance against two of three scores for the third year of the price control. 
Customer interruptions and minutes lost	DNOs are incentivised to improve the reliability on their network. They shall invest in their network to increase reliability and resilience against severe weather and to protect the network from the effects of climate change.	Annual targets are set for customer interruptions and customer minutes lost. Each year DNOs must report on their performance under the RIIO-ED1 price control. 
Average time to connect to the distribution network	Each year, DNOs must report on their performance under the RIIO-ED1 price control. This is one of the indicators regarding network company performance.	This chart is an indicator of network operator performance on connections to the electricity distribution network. It shows the average time to connect (TTC) for single service low voltage (LVSSA) connections and small project demand (LVSSB) connections. Targets set in 2013 are compared with realizations.

Indicator	Explanation	Methodology
		
Undergrounding of overhead lines	Undergrounding reduces the visual impact of overhead lines on the environment. This contributes towards the environment output that the distribution network operators must deliver for customers. Also, undergrounding enhances the supply continuity performance, since there exists a strong negative correlation between undergrounding and SAIDI/SAIFI indexes.	Allowances are calculated to reflect stakeholder interest in visual amenity and each network operator's funding is based on the amount of its network in Areas of Outstanding Natural Beauty and National Parks. Each year, DNOs must report on expenditure and activity related to undergrounding. This shows Ofgem whether DNOs are meeting stakeholder requirements or not. The chart shows the length of overhead lines removed in National Parks, Areas of Outstanding Natural Beauty and National Scenic Areas. In RIIO-ED1, each distribution network operator is able to recover a defined amount of funding to pay for undergrounding of network cables in these designated areas. 
Return on regulatory equiy (RoRE)	RoRE helps the regulatory body to monitor the financial performance of DNOs under the price control. RoRE should be compared to the cost of equity allowed at the start of the price control. The Western Power Distribution group was allowed 6.4% and the remaining five groups 6.0%.	Ofgem reports RoRE values for the companies compared against the assumptions they set for RIIO-ED1. RoRE includes DNOs actual and forecast financing (cost of debt) and tax performance. Ofgem's calculation assumes all outputs will be delivered. The chart is an indicator of financial performance. It shows Ofgem's estimates of DNOs' RoRE. It is the current view of an eight-year average RoRE over RIIO-ED1.

Indicator	Explanation	Methodology
		
Expenditure vs allowance	Ofgem sets the total amount each company can spend ahead of the price control (company 'allowances') and monitor their actual spend ('total expenditure') against these amounts annually. Network companies are allowed to retain a part of any savings achieved, with the rest being passed on to consumers.	Each year, distribution network operators must report on their financial performance under the RIIO-ED1 price control. The charts compares DNOs realised total expenditure for their regulated business activities against their allowance for the first year of the RIIO-ED1 network price control. 
Estimated network costs per domestic customer	The majority of network costs for a domestic customer are for the use of the gas and electricity distribution networks. Actual costs vary depending on where a customer lives, how much energy they use, and what type of meter they have. Suppliers are charged for the costs to build, maintain, improve and operate the energy networks. Most of the networks are owned by monopoly businesses. Therefore through regulation, Ofgem limits the revenue that these companies can recover from customer charges to run the networks. As well as the charges to suppliers that are considered here, electricity generators and gas producers are also charged for their use of the networks. It is	Network costs are calculated by combining charging information published by the network companies with assumptions about consumption and losses for domestic customers. All costs are calculated for medium annual typical domestic consumption values of 12,000kWh for gas and 3,100kWh of electricity, which is held fixed across the charging years. The actual network costs a supplier incurs to serve a customer will depend on how much energy is used, the timing of its use as well as the charges that apply from one year to the next. The costs shown are UK averages, calculated by taking a simple unweighted average of the tariffs that apply in different regions of the country. The costs are expressed in nominal money (i.e. the amount of money a customer 'pays over the counter'), rather than in real terms (i.e. after adjusting for inflation). For electricity, the costs reported are for a standard unrestricted meter. Balancing Services Use of System charges are not included on the chart. These charges cover the cost of services used to

Indicator	Explanation	Methodology
	important to note that trends in network costs will therefore also affect supplier costs indirectly through wholesale prices.	balance the electricity system and internal system operator operating costs. The chart shows Ofgem's estimate of trends in the annual cost of the different components of network charges for a domestic customer with a fixed amount of consumption. Balancing Services Use of System charges are not included in the chart. 

Most DNOs use the National Fault and Interruption Reporting Scheme (NaFIRS) which is administered by the Energy Networks Association (ENA). Others use an equivalent system. These systems collect information on the number of Customers interrupted and duration of interruptions to supply.

In 2019, Ofgem published a position paper to present its priorities and forward work plan which includes – asset management software, GIS packages as key enablers for DSO function to allow targeted policy development. At present, some utilities already benefit from GIS to acquire mapping and data management abilities for enhancing asset/outage management. Generally, the networks have their own SCADA systems – there are initiatives to link up the SCADA systems of electricity distribution and transmission operators on a real-time basis.

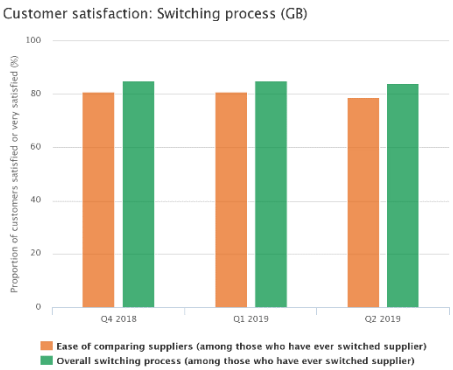
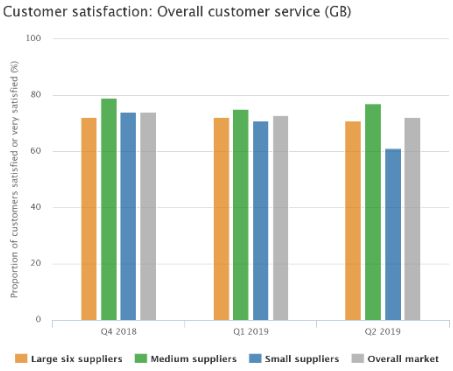
2.4.3 Customer Service

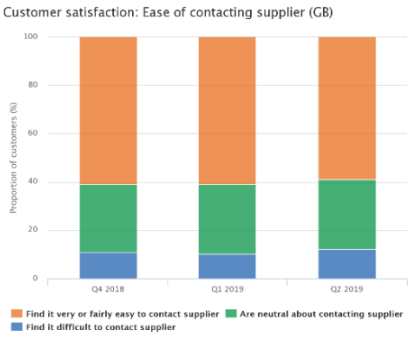
In the UK, energy suppliers offer different prices and different levels of customer service. Ofgem expects understandable bills and being able to contact to DNOs when needed. These indicators show customer satisfaction with those and other fundamental points, for the overall market and across different groups of suppliers. The data comes from a new dedicated quarterly energy satisfaction survey commissioned in 2018 by Ofgem in conjunction with Citizens Advice. The statistics show how many complaints suppliers receive, how many Citizens Advice handle, weighted by the seriousness of the complaint, and how many are accepted by the Ombudsman after failing to be resolved by the supplier.

The complaints data is provided by suppliers on a monthly and quarterly basis. DNOs shall also publish domestic complaints data on their websites, including their top five reasons for complaints and the measures they are taking to improve how they handle customer complaints. The six large suppliers have voluntarily published quarterly domestic complaints data since 1 October 2012, and many smaller suppliers have done so from 1 April 2013. Ofgem investigated Scottish Power and NPower for breaches of the Complaint Handling Standards Regulations 2008.

Indicators related to customer service are illustrated in the table:

Table 2.8 – Customer Service Indicators

Indicator	Explanation	Methodology
Customer satisfaction: Switching process	This data comes from a dedicated energy satisfaction survey commissioned by Ofgem in conjunction with Citizens Advice Bureau. It is a quarterly survey of 3,200 domestic energy consumers around UK. The survey measures consumer satisfaction with their energy supplier across different dimensions of satisfaction such as customer service, billing, contacting suppliers, and switching processes. Some consumers use different suppliers for electricity and gas, whereas some use the same supplier. If they have electricity only, then their answers regard their electricity supplier. The survey commenced in Q4 2018 and is conducted every quarter. It uses a mixed mode approach to collect data. In each wave, 300 interviews are completed face to face for those consumers with low or no internet access, while the remainder of the work is conducted via an online survey. All satisfaction metrics are answered on a five point scale: very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, and very satisfied.	The chart shows the proportion of domestic energy consumers who have ever switched suppliers, who are satisfied or very satisfied with the ease of the switching process.  Feedback from this survey is used to inform compliance engagement with individual suppliers, where appropriate. The questions asked in the survey which relates to this chart are: Please can you tell me how dissatisfied or satisfied you were with the following aspects of your switch to another supplier: • Ease of comparing suppliers and their prices • The switching process overall
Customer satisfaction: overall customer service	Same survey as above is used. Ease of contact is answered on a different five point scale, as follows: very difficult, fairly difficult, neither easy nor difficult, fairly easy, and very easy. The Q2 2019 surveys covered 64 suppliers, including licensed suppliers and white labels. The groups consist of: Large six suppliers: British Gas, E.ON, EDF Energy, npower, ScottishPower, and SSE. Medium suppliers: Bulb, Co-operative Energy, Green Star Energy, Octopus Energy, OVO Energy, Shell, Utility Warehouse, and Utilita. Small suppliers: all other 50 suppliers	The chart shows the proportion of domestic energy consumers who are satisfied or very satisfied with the level of customer service from their energy supplier. This chart is updated quarterly and is split by large six, medium and small suppliers and also shows overall market satisfaction.  The question asked in the survey which relates to this chart is:

		Overall, how dissatisfied or satisfied are you with the customer service you have received from [supplier name].
Customer satisfaction: Ease of contracting supplier	Same survey is used. The chart is updated quarterly. Ease of contact is answered on a different five point scale, as follows: very difficult, fairly difficult, neither easy nor difficult, fairly easy, and very easy.	This chart shows the proportion of domestic energy consumers who found it easy or difficult to contact their supplier as consumers who found it neither easy nor difficult.  The question asked in the survey which relates to this chart is: Thinking about the last time you tried to contact [supplier name] how easy or difficult did you find it to contact them by your preferred method?
Customer Satisfaction: Billing	Same survey defined above is used. The chart is updated quarterly. All satisfaction metrics are answered on a five point scale: very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, and very satisfied.	The chart shows the proportion of domestic energy consumers who are satisfied or very satisfied with the ease of understanding their energy bill and the accuracy of the bill from their energy supplier.  The questions asked in the survey which relates to this chart are: Please can you tell me how dissatisfied or satisfied you are with the following aspects of [supplier name]'s bills: • Ease of understanding the bill • The accuracy of your bill

2.4.4 Retail Market

Within the scope of retail market, the level of prices and the effectiveness of market opening and competition are monitored by Ofgem in order to follow how well competition is working in the interests of consumers, and how far it supports consumer outcomes such as lower bills, better quality of service, benefits for society as a whole and

reduced environmental damage. Ofgem also regularly monitors non-domestic and domestic supplier's market share.

Ofgem monitors the effectiveness of competition in retail markets, in particular through regularly collecting and analysing a vast range of market participants' data. Ofgem's data comes from sources that are either publicly available, provided by third parties or from responses to Ofgem information requests. Most of the indicators are updated quarterly.

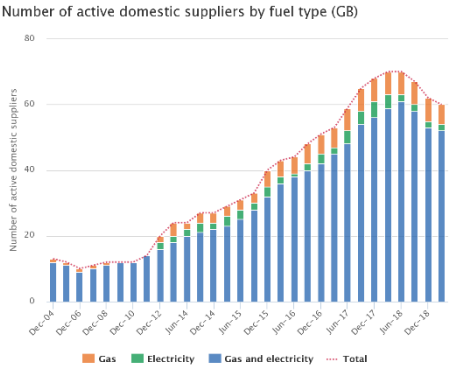
Ofgem introduced a new customer service incentive for the existing price control period; the Broad Measure of Customer Satisfaction (BMCS). This incentive aims to drive the network companies to deliver good customer service and to replicate the sorts of measures typically used by consumer-facing businesses in a competitive environment. The BMCS has three components that are:

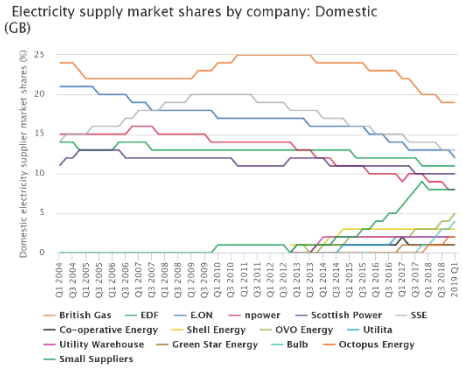
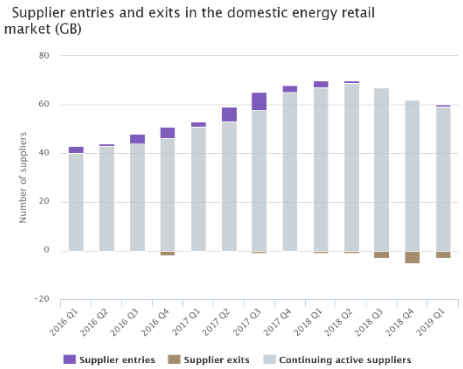
- Customer Satisfaction Survey
- Complaints Metric
- Stakeholder Engagement Incentive

2.4.4.1 Market Structure

The market structure is set out in the following table.

Table 2.9 – Market Structure Indicators

Indicator	Explanation	Methodology
Number of active domestic suppliers by fuel type	The indicator helps the Regulatory Authority to understand the dynamics of market concentration over time, as new participants enter, win customers, and some existing firms exit the market.	The number of active licensed suppliers (i.e. those with customers) is calculated from the information that both network operators and suppliers provide to Ofgem. White label suppliers, that are organisations without supply licenses that partner with an active licensed supplier to offer gas and electricity using their own brand, are not included in this number.  The chart shows the number of active licensed suppliers in the domestic gas and electricity markets. It also gives a breakdown by those supplying both gas and electricity, and those who supply only one fuel.
Electricity supply market shares by company: Domestic	The evolution of market shares is a useful measure of trends in market concentration. They help Ofgem understand the impact between market shares and competitive	Market shares are calculated from the number of meter points on the electricity distribution networks, as provided by DNOs. Ofgem periodically reviews, typically with a lag of one quarter, the group of suppliers that they define as medium and small.

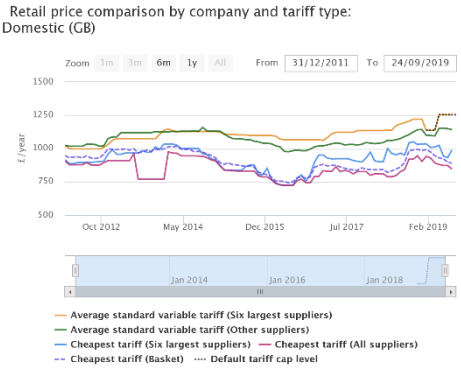
Indicator	Explanation	Methodology
	dynamics, both for the six large suppliers and other suppliers, and which companies are winning or losing customers.	 The chart shows the domestic electricity market shares for each of the six large suppliers, medium and small suppliers.
Supplier entries and exists	Indicator is useful in that it gives clue about energy market dynamics by showing the number of entries and exits that underpins the evolution in the number of active licensed suppliers over time.	The chart shows the number of licenced suppliers that have started or stopped actively supplying customers in the UK domestic gas and electricity markets in each quarter in comparison to the total number of suppliers that continued to supply the market in the same period. 

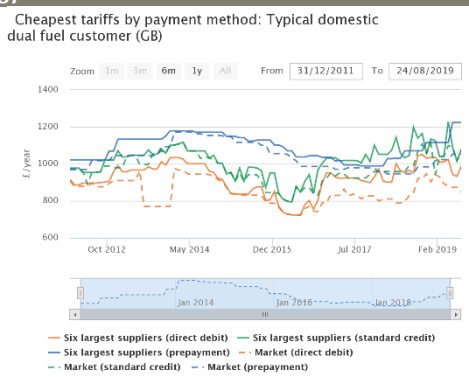
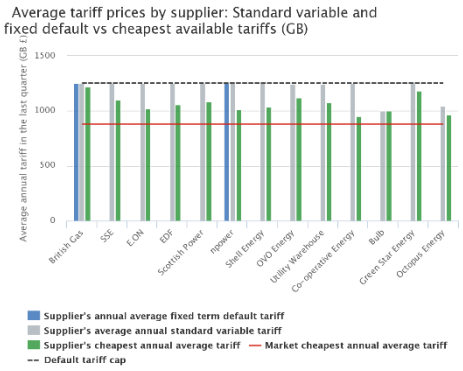
2.4.4.2 *Prices and Profits*

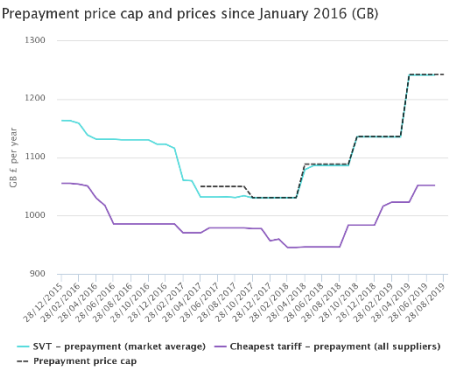
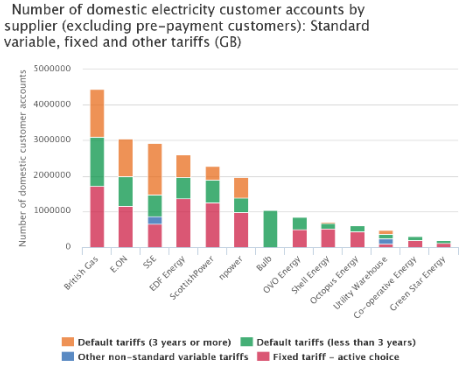
As well as monitoring domestic electricity bill levels, Ofgem also assess the extent to which particular costs have an impact on these bills.

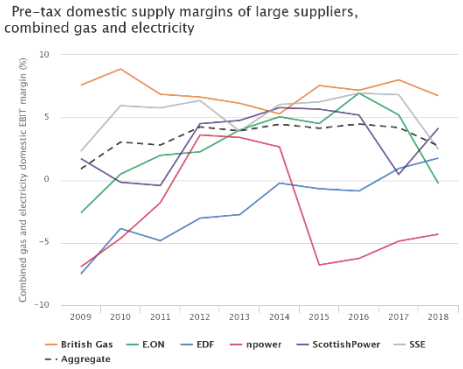
Table 2.10 – Price and Profit Indicators

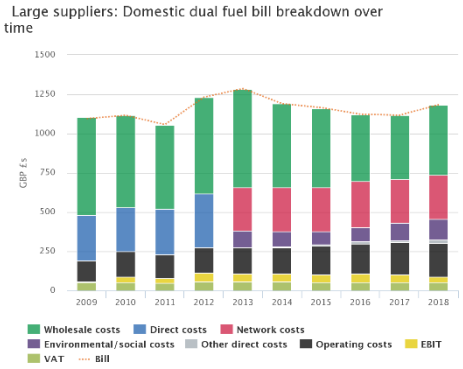
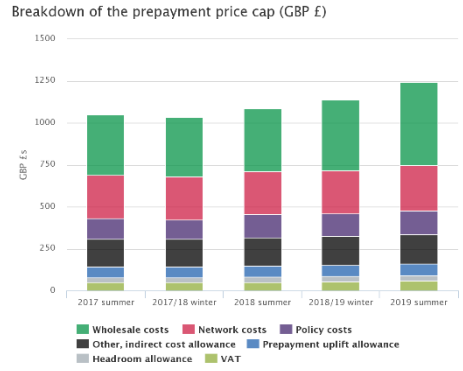
Indicator	Explanation	Methodology
Retail price comparison by company and tariff type	Tariff differentials reflect pricing in different market segments, as well as how much other suppliers are able to compete on price with the six large suppliers.	Ofgem calculates the bill values associated with the different tariff types using a typical medium domestic consumer (3,100kWh/year for electricity). The chart includes collective switching tariffs from Q1 2016. All tariffs shown in the chart are for a dual fuel, direct debit customer. Dual fuel refers to a situation where a customer takes gas and electricity from the same supplier.

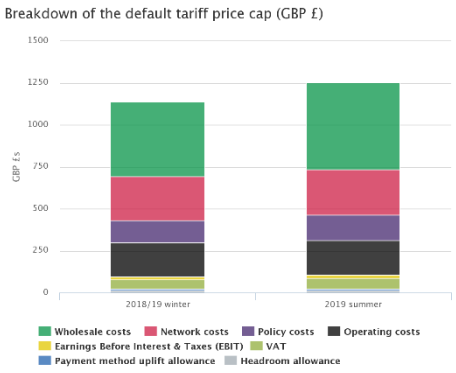
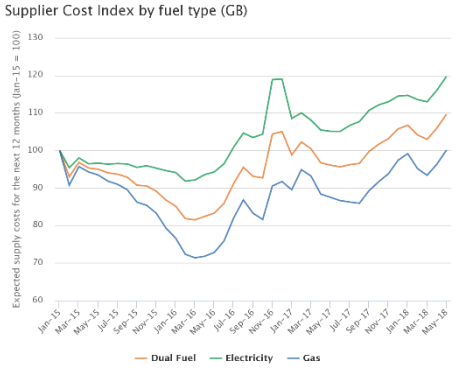
Indicator	Explanation	Methodology
		 The chart shows trends in domestic energy bills by tariff offered by the six large suppliers and other suppliers. It compares their average standard variable tariffs with the cheapest tariffs available in the market (including white label tariffs). Figures are based on a typical domestic dual fuel customer paying by direct debit. A standard variable tariff refers to a supply contract which is for a period of an indefinite length and which does not contain a fixed term period that applies to any of the terms and conditions. It's an energy supplier's basic offer. If a customer does not choose a specific energy plan, for example after their fixed tariff ends, they will be moved on a standard variable tariff until they have chosen a new one. A customer can also make an active choice to select a standard variable tariff. Tariffs with limited availability depending on customer features (for example, tariffs which are only available to new customers, also known as 'acquisition' tariffs, or tariffs restricted to certain regions) are excluded from the calculation to make sure that all tariffs considered are generally available to all customers across the UK. Tariffs available with white label suppliers are included in the calculation of the cheapest tariffs. To calculate the average of the cheapest tariffs from the 10 cheapest suppliers Ofgem took the cheapest tariff offered by each supplier in the market (i.e. one tariff per supplier) and then ranked the tariffs in order of price. Then the simple average of the 10 cheapest tariffs in this list were taken. This method is to ensure a cross section of suppliers is included in the calculation.
Cheapest tariff by payment method: typical domestic dual fuel	Direct debit customers have traditionally been offered the cheapest tariffs, followed by standard credit customers and those using prepayment meters. After the introduction of the prepayment safeguard tariff in April 2017, the overall cheapest tariffs have continued to be those for direct debit customers. However, the ranking between standard credit and prepayment cheapest tariffs has fluctuated over time. This indicator helps understand pricing by payment methods, as	The chart compares the cheapest available tariffs offered by the six large suppliers with the cheapest tariff available in the market by payment method (direct debit, standard credit and prepayment). Figures are based on a typical domestic dual fuel customer.

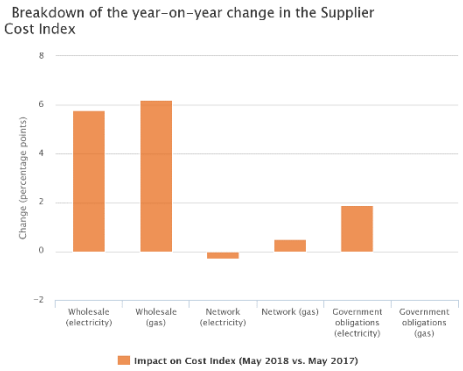
Indicator	Explanation	Methodology
	well as how much other suppliers are able to compete with the six large suppliers for each method.	 Since February 2018 the cheapest prepayment tariff has been less expensive than the cheapest standard credit tariff. A prepayment price cap was introduced on 1 April 2017, limiting the amount that suppliers can charge their prepayment customers. The default tariff price cap also came into effect on 1 January 2019, limiting the amount that suppliers can charge customers on default tariffs.
Average tariff prices by supplier	This indicator shows the savings available to customers on default tariffs if they change tariff or switch supplier. Data shows default tariffs are usually more expensive than other deals available in the market. Customers on default tariffs are potentially missing out on significant savings on their bills compared to cheaper tariffs from their existing or another supplier.	The chart shows average prices in the last quarter for each of the 13 larger suppliers in the non-prepayment segment. 
Prepayment price cap and prices	In April 2017, the prepayment price cap came into force, limiting the amount that suppliers can charge their prepayment customers. These customers tend to be unable to access the cheapest deals and are also more likely to be in vulnerable circumstances. The cheapest prepayment tariffs available in the market have remained below the average SVT for a prepayment customer following the introduction of the prepayment price cap. This differential between the average SVT and the cheapest prepayment tariff has remained	The market average standard variable tariffs (SVTs) are based on the prices of the 12 largest suppliers in the prepayment segment. Ofgem weighted the SVT of each supplier using an estimate of their total share of all prepayment accounts (for prepayment). The chart compares trends in prices since 2016 for a dual fuel customer paying prepayment. It shows both the market cheapest tariffs and average standard variable tariffs (SVT) for this payment method. The values are calculated for a customer with typical energy use.

Indicator	Explanation	Methodology
	at £189 between June and July 2019. On 1 April 2019, the level of the prepayment price cap increased from £1,136 to £1,242 for a dual fuel customer who uses a typical amount of energy. This increase was mainly due to higher wholesale energy costs and network costs.	 This chart helps track the differential between the average prepayment standart variable tariff (SVT) and the market cheapest prepayment tariff price a customer will pay if they use prepayment to pay their energy bills. Both prices are compared with the prepayment price cap that currently apply to all prepayment customers, excluding those on 'interoperable' smart meters. Customers who get the Government's Warm Home Discount (WHD) and are on a standard variable or default tariff were protected by a 'safeguard tariff' set at the level of the prepayment price cap until the end of 2018, after which they were transferred to the default tariff price cap. The default tariff price cap came into effect on 1 January 2019, limiting the amount that suppliers can charge customers on default tariffs. The default tariff cap has different levels set to reflect how customers pay, where they live and the type of energy meter they have. When transferred, WHD customers will be placed on the cheaper default cap level set for direct debit payment methods – it won't matter how they pay.
Number of domestic electricity customer accounts by supplier	The chart tracks the number of domestic electricity customer accounts on different tariff types. Data shows default tariffs are usually more expensive than other deals available in the market. The different tariff types that this chart refers to are: These tariffs are either SVT or default fixed tariffs. **Other non-standard variable tariffs** A non-standard variable tariff is a supply contract with an indefinite length that does not have a fixed-term applying to the terms and conditions and has also associated rewards schemes, bundles or added services. Any vacant properties	This is an indicator of customer engagement with the tariff choice available in the market, which excludes prepayment customer accounts. This is because the availability of different tariff types for customers on prepayment is more limited than that for customers on credit payment methods. The indicator focuses on the licensed suppliers active in the market with more than 250,000 customer accounts, excluding suppliers which primarily supply to customers on prepayment meters.  The chart shows the number of domestic electricity customer accounts for each of the six large suppliers and medium-sized suppliers,

Indicator	Explanation	Methodology
	are also included under this category. **Active Choice Fixed tariffs** A fixed tariff is a supply contract with terms and conditions which apply for a fixed period (for example, a contract offered by a supplier that has a standing and unit price that is fixed for a year). An active choice tariff is a tariff which a customer actively signs up to.	excluding those that primarily supply customers on prepayment meters. The number is broken down into four categories: accounts on default tariffs held for three years or more with a supplier, accounts on default tariffs held for less than three years with a supplier, accounts on other non-standard variable tariffs and accounts on active choice fixed tariffs. The chart is based on data provided to Ofgem by suppliers as of the snapshot date of 1 April 2019.
Pre-tax domestic supply margins of large suppliers	This chart helps to understand trends in profits in the domestic supply market and how they differ between suppliers.	The supply margins shown in this chart are the ratio between a company's Earnings Before Interest and Taxes (EBIT) - the 'pre-tax margin' - and its total revenues from supplying gas and electricity. A supplier's pre-tax margin is calculated by subtracting from a company's total revenue its total direct costs, total indirect costs (such as operating costs), depreciation and amortisation for supplying energy. Figures are calculated using information from companies' annual Consolidated Segmental Statements. They relate to the suppliers' financial years. Five of the companies (British Gas, EDF, E.ON, npower and ScottishPower) have financial years ending in December, whereas SSE's financial year runs from April to March. 
Domestic dual fuel bill breakdown over time	This indicator helps to explain the costs making up an average dual fuel bill and show the factors influencing total bills in a given year. The costs that make up a bill are wholesale costs, network costs, environmental and social obligation costs, operating costs (including depreciation and amortisation), supplier pre-tax margin and VAT.	To estimate the breakdown of an average gas and electricity bill, Ofgem takes the sum of each category of costs and pre-tax supply margins as reported by the suppliers for each fuel and then divide by the total number of customers for that fuel. VAT at 5% is added and summed the implied bill components for gas and electricity together to derive an estimate of the overall costs making up a dual fuel bill. The chart provides an estimate of the breakdown of a dual fuel bill over time for an average domestic customer of the large suppliers. It is based on information reported by the large suppliers in their annual Consolidated Segmental Statements. Earnings Before Interest and Tax (EBIT) – which also refer to as suppliers' pre-tax margins – are calculated as revenue minus costs, before accounting for taxes and interest.

Indicator	Explanation	Methodology
		
Breakdown of prepayment price cap	This chart summarises the different costs that make up the prepayment meter price cap applying to customers with prepayment meters (excluding those with fully interoperable smart meters). As the energy regulator, Ofgem administers and calculates the level for the cap. Calculations cover: Wholesale energy costs: how much a supplier has to pay to get the gas and electricity to supply households with energy (we base this on forward prices for energy to be delivered over a 12-month period) Network costs: the regional costs of building, maintaining and operating the pipes and wires that carry energy across the country to households Policy costs: the costs related to government social and environmental schemes to save energy, reduce emissions and encourage take-up of renewable energy; Other, indirect cost allowance: this includes operating costs and is inflated by the Consumer Price Index Prepayment uplift allowance: the additional costs involved in supplying prepayment customers compared to credit	This chart shows a breakdown of the costs that make up the prepayment meter price cap. It helps to explain the relationship between the level of the prepayment price cap that Ofgem set, and the different cost factors that influence it. The prepayment price cap limits how much a supplier can charge customers on prepayment meters per unit of energy. It doesn't cap the total cost of a bill. That's because the amount customers pay also depends on how much gas or electricity they've used. Suppliers can charge less than the set level of the cap, but not more. All prices shown here are for a dual fuel customer with typical energy use. Ofgem extended the prepayment price cap to a further one million vulnerable customers in receipt of the government's Warm Home Discount who were on a standard variable or default energy tariff on 2 February 2018 (under the label of a 'safeguard tariff'). These customers transferred to the broader price cap for customers on default energy tariffs when it became effective on 1 January 2019.  Ofgem calculates the bill values associated with the different tariff types using a 'typical domestic consumer' with 'medium' energy use.

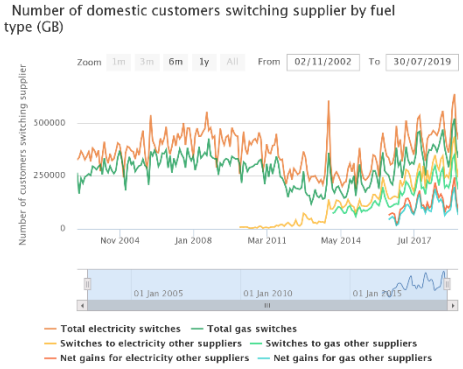
Indicator	Explanation	Methodology
	customers, which is inflated by CPI; and Headroom allowance: this allows suppliers to offer competitive deals underneath the set level of the prepayment price cap, and is calculated as a proportion of other cost elements.	
Breakdown of the tariff price cap	The level of the tariff cap is based on the underlying costs required to supply energy. The tariff level will reflect changes in the costs to supply energy. Ofgem determines how much each independent component of the cap should change by looking at external cost data. The level of the cap is updated every six months, either reflecting changes in underlying costs, or increases in inflation.	The level of the cap is based on calculations of the costs required for an efficient supplier to provide energy. It also includes some additional allowances to manage uncertainty, and ensure suppliers can finance their activities, amongst other things. This chart summarises the different costs that make up the default tariff price cap. Calculations cover the abovementioned 5 items such as wholesale energy cost, headroom allowance as well as the following; Earnings Before Interest and Taxes (EBIT): a fair rate of return allowed for suppliers, to ensure they can finance their businesses. VAT: 5% tax added to the level of the tariff. 
Supplier Cost Index	Ofgem calculates the Supplier Cost Index by estimating trends in network charges, wholesale prices and the charges to suppliers associated with government programmes. These estimates are then combined with information on the relative scale of each of these categories of cost to calculate the trend in the overall Supplier Cost Index.	 This chart is no longer being updated.

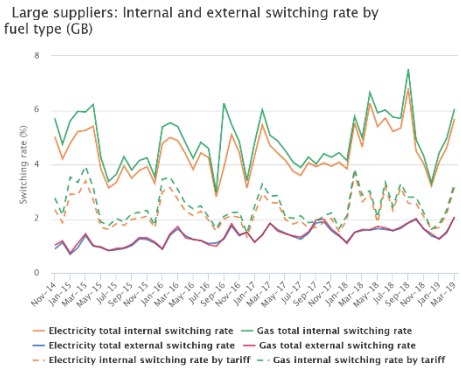
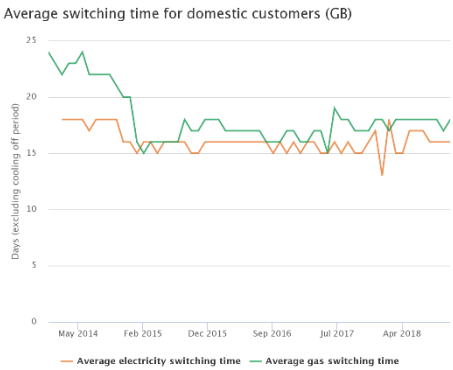
Indicator	Explanation	Methodology
Breakdown of the year-on-year change in supplier cost index	The breakdown is calculated by combining the % change in each category of expected costs, with an estimate of the importance of that cost to suppliers' total costs. For instance, trends in network charges to electricity generators are not included in the 'network charges' component of the breakdown, as they are not paid directly by suppliers – and will instead affect wholesale electricity prices. For this reason, the contribution of different types of costs to the index cannot be interpreted as showing the totality of the impact of government policies or network charges on consumers' bills.	 The weights given to each category of costs are based on financial statements from the six large suppliers, and are as follows: - wholesale electricity: 26.7% - wholesale gas: 35.9% - networks electricity: 15.4% - networks gas: 14.4% - government obligations electricity: 6.7% - government obligations gas: 1.0%. This chart is no longer being updated.

2.4.4.3 Switching

Ofgem looks at trends in external switching between suppliers and internal switching with the same supplier to understand levels of consumer engagement. Average switching times as an indicator of process quality is also monitored and trends in overall consumer satisfaction with suppliers is considered by Ofgem.

Table 2.11 – Switching Indicators

Indicator	Explanation	Methodology
Number of domestic customers switching supplier	External switching, from one supplier to another, is one measure of consumer engagement with the market. The number of switches to small and medium sized suppliers show how these suppliers are attracting customers over time.	The chart shows the total number of domestic customers switching gas and electricity supplier each month. It also shows, in dotted lines, the number of switches going to medium/small suppliers, as well as the net gains made by these suppliers. 

Indicator	Explanation	Methodology
		The net gains for small and medium suppliers is calculated by subtracting from the gross meter point gains these suppliers achieve over the month the gross number of meter points these suppliers lose over the same period.
Large suppliers: Internal and external switching rates	Together, internal and external switching rates provide a more comprehensive indicator of how engaged consumers are in the domestic retail energy market.	Internal total switching refers to a customer changing tariff, payment method or account management (online/offline) with their existing supplier. The chart shows the proportion of monthly internal switches for domestic gas and electricity customer accounts for the six large suppliers. As a benchmark, the chart also shows monthly external switching rates (ie to another supplier) for the whole market. 
Average switching time for domestic suppliers	The average switching time is a useful indicator of how long a switch takes to complete. This affects a customer's incentive and ability to take advantage of the best offers available in the market.	Supply licences require licensees to take all reasonable steps to complete a transfer 21 days after the end of the 14 day cooling-off period (or after an earlier date during the cooling-off if agreed with the customer). Switching time is measured by the number of calendar days it takes from when a supplier submits a switching request to the transfer taking place. Ofgem sources the data from DNOs, so their analysis does not reflect the time taken by the supplier to submit a switching request, which may happen at the end or during the cooling-off period, nor the additional time to process the contract with the customer. 

2.4.5 Regulatory Financial Performance[5]

[5]Ofgem, March 2019, Regulatory financial performance annex to RIIO-1 Annual Reports - 2017-18.

Ofgem has established financial regulation rules and strategies for the electricity sector, andespecially regarding the financial health of distribution utilities. One of the main goals of Ofgem is to protect the interestsof consumers of gas and electricity, in case the regulated companies experience financial problems that canimpact the continuity and quality of service. Thereare standards designed to reduce the financial risks for the utilities while assuring the continuity of service to consumers. Within the scope of the regulatory framework, the utilities have the obligation to provide to Ofgem financialinformation, and as the first signs of financial problems appear, Ofgem can choose appropriate actionsto address the situation.

DNOs reportsome information in order to provide an insight into the impacts of each company's level of gearing, its cost of debt, and actual tax payments on its returns under the price controls, using the new regulatory financial performance reporting (RFPR) process. For the period 2018, Ofgem asked companies to report Enduring Value adjustments to reflectthe true value of the regulated business over the course of the price control. Mostcompanies provided limited or no Enduring Value adjustments in their November 2018submissions. Some examples of Enduring Value adjustments are estimates of:

- future uncertainty mechanism claims
- close out mechanism (e.g. NARMs incentive)
- timing differences of delivery of outputs (e.g. volume drivers)
- known changes to future output delivery (e.g. volume drivers) and
- known adjustments not yet made as part of the AIP (e.g. mid-period review decisions, voluntary returns).

Analysed financial indicators are as follows:

Return on Equity: Ofgem assess the overall financial performance on regulated equity of network companies using a measure called the Return on Regulatory Equity (RoRE). RoRE is an estimate of the financial return achieved by shareholders during a price control period from the licensee's forecast out-turn performance under the price control. It is a useful way to gain an overall picture of how regulated equity is performing under the price control compared to the assumed return used in setting allowed revenues.

Allowed Revenue and the Annual Iteration Process: At the beginning of the price control period, Ofgem set an assumption for the level of Allowed Revenue for each network company, known as the Opening Base Revenue. During the course of the price control, this assumption is updated through the Annual Iteration Process ("AIP"), wherein Ofgem calculates the annual modification (the "MOD") to Opening Base Revenues. The MOD reflect updated allowances based on actual delivery of outputs; actual expenditure and resulting TOTEX Incentive Mechanism ("TIM") performance; updating the cost of debt allowance, and changes in tax rates.

The MOD term represents the difference between Opening Base Revenue asassumed at the start of the price control and the annual recalculated Base Revenue and isapplied to future revenues. Actual expenditure data is reported by each licensee at the endof the regulatory year and customer tariffs are set one regulatory year in advance,hence there is a two-year lag between the calculation of the MOD term and its impact onallowed.

A negative MOD reduces future Allowed Revenue for the network companies andtherefore provides a saving to consumers through lower bill impact than were originallyenvisaged; the reverse is true where the MOD is a positive value.

The sum of Opening Base Revenue and the MOD gives the Recalculated BaseRevenue, which along with a number of other adjustments gives the total Allowed Revenuefor each network company.

Gearing and Financing: The RIIO-1 price control allowances were set using notional gearing assumptions for each licensee (generally based on the sector with some exceptions). However, each licensee is free to determine its own financing structure without intervention from Ofgem, assuming it still meets all of its licence obligations. One licence condition is that licensees maintain an investment grade credit rating. Some licensees elect to raise a higher proportion of their financing as debt (higher gearing) and some elect to raise a lower proportion as debt (lower gearing) than the notional level. All else being equal a licensee that has higher gearing than the notional company

will boost their equity return in percentage terms. It is important to note that this does not impact the amount charged to consumers.

Ofgem's gearing calculation is based on their regulatory definition of net debt, which may differ from rating agency or other party definitions used for gearing calculations. In addition gearing calculation ignores any additional debt at holding company levels and that a number of groups include additional gearing at holding company level and that this would have an impact on ultimate shareholder return.

Company decisions on the level of gearing to include in their company structure often go hand in hand with an assessment of the cost of that debt and the ability for the company to service the debt and maintain their target credit rating (which may be different for different licensees, but would be expected to be investment grade given the licence requirement). Rating agencies typically consider not only the serviceability of debt in any particular year but also the sustainability and resilience of debt serviceability. These are factors that any licensee would be likely to consider in assessing financeability and gearing levels.

Through the RFPR, Ofgem have sought to assess licensees' actual debt costs compared to their cost of debt allowance, calculating the impact on RoRE on both a notional gearing and actual gearing basis. During RIIO-1 the cost of debt allowance has been set with reference to the trailing average of a derived index (a combination of the published iBoxx A 10yr+ non-financial index and the iBoxx BBB 10yr + non-financial index, converted to real using breakeven inflation). This means that the allowance varies each year with movements in the underlying indices and/or movements in breakeven inflation.

The cost of debt allowance is provided on a real basis (because inflation is taken into account in RAV inflation) but company interest costs are generally on a nominal basis (even where their debt is inflation linked the interest expense is reported on a nominal basis including inflation accretion), so any cost of debt performance assessment either needs to adjust the cost of debt allowance to a nominal equivalent or strip inflation from the interest expense reported by companies.

Ofgem has taken the second approach and stripped inflation from the interest charge using average outturn inflation. Financing performance is therefore not an assessment of cash flow performance but of the economic cost of debt compared to the cost of debt allowance and inflation applied to the RAV.

Actual cost of debt can vary from allowances due to a number of factors, including timing of debt raising and cost of debt relative to the index on the day of issue. The cost of debt can also be influenced by licensee decisions relating to maturity of debt raised and type of debt raised (fixed rate, floating rated or inflation linked) and any derivatives used to adjust the mix of interest payment type. Ofgem's analysis indicates there is significant variation between licensees relating to the type of debt raised and use of derivatives.

Regulatory Asset Value (RAV): It is a financial balance representing the capitalised (on a regulatory basis) component of total expenditure. The licensee receives a return and depreciation on its RAV in its price control allowed revenues.

2.4.6 Transparency and Financial Monitoring

Under Article 37(1)(i) of the Directive, Ofgem is committed to ensuring the energy market is transparent to the benefit of consumers. In line with the articles of the Directive, Ofgem put in place measures to make suppliers' revenues, costs and profits more transparent*(financial transparency)*. Since 2009, vertically integrated suppliers publish annual Consolidated Segmental Statements (CSS) on their websites. These statements break down suppliers' revenues, costs and profits and are reconcilable to audited accounts. Ofgem now requires companies to audit their statements, to publish them within four months of their financial year end, to provide a detailed cost breakdown, and insight into their trading activities.

In terms of financial issues, Ofgem analysed the positions of the DNOs in terms of their credit ratings within the scope of RIIO-ED1 process. Financial metrics used related to credit rating is as follows[6]:

Table 2.12 – Financial metrics related to credit rating

Financial metric	Threshold
FFO interest cover ratio	2.5 min
Adjusted interest cover ratio, or PMICR	1.4 min
FFO / Net Debt	8% min
RCF / Net Debt	5% min
Net Debt / RAV	80% max
RCF / Capex	0.5 min
Regulated equity / EBITDA	5.5
max Regulated equity / PAT	18
max Dividend cover ratio	1.0 min

In addition, DNOs' actual embedded debt and the relationship between its forecast debt costs and cost of debt allowances were considered under a wide range of possible future interest rate scenarios. An independent consultant reviewed the analysis of Ofgem and provided opinions during tis process.

Regarding the principal financial risks and financial resilience of DNOs, Ofgem also calculated PMICRG across the RIIO-ED1 period for all DNO groups on an actual embedded debt basis and under a wide range of future interest rate scenarios for both the cost of debt index and the costs of new debt.

As defined in previous sections, other measures such as RoRE is analysed too.

2.4.7 Compliance and Investigations

Ofgem monitors the energy market to ensure fair treatment of consumers, good service and to secure compliance with legislation. The Regulatory Authority uses enforcement guidelines and a financial penalties and consumer redress policy to guide their work.Ofgem investigates energy companies when it thinks that they may be breaching the obligations of their supply licences, or competition and consumer protection law. Ofgem generally focus on systemic weaknesses, including where those weaknesses adversely affect particular groups of consumers such as customers in vulnerable situations and they do not prioritise enforcement action for isolated issues affecting small numbers of consumers, unless any harm they have suffered is significant.As part of their compliance monitoringthey are collaborating with Citizens Advice and Ombudsman Services to work together with suppliers to better protect consumers.

Ofgem does not directly investigate domestic customer complaints. If a complaint is raised, suppliers are required to meet the complaints handling standards set by Ofgem. If a complaint is not resolved to the consumer's satisfaction, and either eight weeks have passed since the complaint was made or it has reached a point of deadlock (where the energy company says it can do no more to resolve the complaint) the supplier must write to the consumer to tell them they can seek redress through the Ombudsman. All domestic suppliers publish their complaints data on their websites in a common format agreed with Ofgem.

Items where investigation is required might be defined as follows:

Self-reporting: Ofgem may open an investigation because a company reports itself. For example, if they realise when carrying out internal checks that they may have breached a licence condition, code or relevant legislation.

[6]Source: RIIO-ED1: Draft determinations for the slow-track electricity distribution companies Financial Issues.

Whistleblowing: Ofgem may open an investigation if someone raises a concern about wrongdoing and 'blows the whistle' on potential breaches of regulations or legislation.

Alternative action: When deciding how best to deal with a concern, Ofgem may engage in 'alternative action' to make a company compliant. Ofgem can use alternative action in place of opening an investigation to address any ongoing concerns, when closing an investigation or during an investigation.

Market investigation references: Ofgem may make a market investigation reference to the Competition and Markets Authority where they have reasonable grounds to suspect that any feature or combination of features prevents, restricts or distorts competition in the gas and electricity markets.

Ofgem monitor compliance by:

- routinely collecting information from energy suppliers, such as information on the level and nature of complaints they receive
- working closely with Citizens Advice, Citizens Advice Scotland and the Energy Ombudsman to identify systemic issues and emerging trends
- conducting targeted consumer research and monitoring wider consumer sentiment on social media and
- reviewing information from whistleblowers within the industry.

In order to prevent harm to consumers in retail segment, Ofgem:

- assigns a dedicated account manager to most suppliers, to provide a clear point of contact between suppliers and the Ofgem retail compliance team,
- engages with new suppliers to ensure they are aware of their regulatory obligations to customers, and works closely with existing suppliers to get to know their business, including site visits and regular telephone contact,
- publishes resources to explain what they expect from suppliers, including guides to the supply licences,
- publicise ongoing compliance work to confirm when Ofgem is aware of an issue and works with a supplier to resolve it; and
- publicise the outcomes of completed compliance work. This includes individual compliance Decision Notices and the twice-yearly Retail Compliance and Enforcement Report, which provides a round-up of our compliance activities over the preceding six months.

Ofgem expect suppliers to tell them about issues that arise, why they have happened and to show, within a reasonable timeline, how they are putting things right and how they will ensure it doesn't happen again (when incompliance occurs). Where potential breaches are serious or indicate repeated instances of non-compliance, or where a supplier is unwilling or unable to co-operate with us to put things right, Ofgem is more likely to open an enforcement investigation.

2.4.8 Compatibility of Data Exchange Processes

New data assurance licence conditions for all network Licensees were introduced together with the RIIO in the UK. These conditions require Licensees to undertake processes and Data Assurance Activities for the purpose of reducing and managing the Risk of any inaccurate or incomplete reporting, or any misreporting, of information to the Authority. Ofgem relies on the Data submitted by the regulatedcompanies to be accurate and reliable and therefore takes misreporting veryseriously.

It is imperative that companies take full responsibility for the integrity of the data they collect, analyse and submit to Ofgem.Any Licensee that has not employed reasonable measures to ensure its data submissions are accurate, complete, and on time faces the risk that Ofgem may take action against it. The tools available to Ofgem range from warning letters and investigations (which may involve an Ofgem audit) to full licence enforcement action and the imposition of fines. In extreme circumstances, this may involve licence revocation.

Considering all these topics, Ofgem issued Data Assurance Guideline (DAG), to help companies to maintain compliance and to deliver corrective action where appropriate; it can also help deter future non-compliant behaviour.

Ofgem's approach to Data assurance is based on Risk. There should be a clear link between the materiality of Risk of a submission and the level of Data assurance employed for that submission.

Access to consumption data from smart meters is managed centrally, through the Data and Communications Company (DCC), which is licensed and regulated by Ofgem.

2.5 Other Examples for Financial Regulation

2.5.1 Brazil

The Brazilian Electricity Regulatory Agency (ANEEL) stated the development of regulatory rules for financial supervision of distribution companies in 2007. The distribution sector operates in the form of a natural monopoly, and its efficiency is conducted and organized by the standards and parameters set by ANEEL. ANEEL's Superintendency of Financial Supervision (SFF) has a consolidated role in gathering economic financial information from distributors. A distribution company is responsible for the quality and continuity of the supply of electricity, and the renovation and expansion of its assets by making investments and incurring in operating expenses. The company must also cover other obligations, such as debt service payment to lenders and financial institutions, taxes and the return on equity capital and dividends. If it cannot generate funds to honor all its commitments, the company requires external resources, which can imply increasing in its leverage. [7]

To guarantee the security and quality of the supply, the regulator should monitor the financial situation of the concessionaires, such as its ability to keep up with growing demand, expand their capacity to maintain the operation of the service, and still honor their commitments and applicable taxes, signaling its financial health. ANEEL intends to use accounting and financial methodologies to form a framework applicable to risk supervision of companies in the distribution segment.

Regarding the economic-financial analysis, ANEEL has established economic and financial standards to be met in the first five years of the concession, based on the following milestones:

- investment to replace depreciated assets,
- investment expansion and improvement of quality of service,
- payment of interest on debt,
- working capital,
- taxes on profiti
- remuneration of corporate capital,
- Amortization of principal, among other obligations.

It was defined by decree that in the first and second years of a concession, the utilities must achieve positive EBITDA, that is, recurrent expenditures below operating income; in the third year, a positive cash flow after deduction of investment, that is, part of the company's revenue should at least restore the CAPEX; and at the end of fifth year, positive cash flow after deduction of investment and cost of debt.

[7] Source: Financial Regulation of the Electricity Distributors: Necessity and Feasibility, Energy Procedia, Volume 106, 2016, *Kesia Braga, Carlos Rufin, Roberto Brandão, Ernani Torres*

2.5.2 Ontario, Canada

The Ontario Energy Board regulates the distribution of electricity in the province of Ontario, with the goal of combining the interests of distributors and consumers. The new regulation, based on the performance of companies, aims to stimulate the development, productivity and innovation. The regulation by incentives works according to a scorecard for the Ontario electricity distributors, which includes various aspects of the performance of the utilities, generating evaluations and comparisons between companies, that is: costumer focus, operational effectiveness, public policy and financial performance.

The purpose of the regulator is to inspect and maintain the financial sustainability of the companies, with the use of financial accounting parameters, such as current ratio, debt service coverage, interest coverage, costs of operation, maintenance and administration costs by customer, and return on equity. The methodology of calculation was developed in the form of financial ratios: liquidity (current ratio), leverage (short-and long-term debt) and profitability (included in the rate review and actually realized).

2.6 Turkey

In Turkey data that will be collected from market stakeholders and monitoring is mainly defined within the scope of the Regulation on Notifications in the Energy Market. The purpose of the Regulation is to regulate procedures and principles with respect to the collection of data required by Energy Market Regulatory Authority (EMRA) for surveillance, analysis and reporting procedure of market activities. The Regulation sets principles and procedures such as making and amending notifications, collecting notice, authorization and confidentially.The following table shows the information requested from DSOs and retail companies under the Regulation.

Table 2.13 – Data requested within the scope of Regulation on Notifications in the Energy Market

Responsible	Notification Name	Notification Period
Distribution Company	DSO Outages	Monthly
	DSO Commercial Quality	Yearly
	DSO Network Quality Indicators	Yearly
	DSO Network Quality Indicators (Monthly)	Monthly
	DSO Commercial Quality Indicators	Yearly
	DSO Quality Indicators	Yearly
	DSO Technical Quality Equipment	Yearly
	DSO Technical Quality Equipment Measurement	3 Months
	Information about Distribution Region	3 Months
	Yearly Revenue Correction	Yearly
	6 Months Income	6 Months
	Meter - Install and Uninstall	Yearly
	Distribution System Investment Forecast	Yearly/3 Months (In case revision is requested)
	Distribution System Investment Realized	Yearly
	Projects not Completed during the Distribution System Investment Implementation Period	5 years
	Distribution System Investment Plan	5 Years
	Distribution System Demand Forecast	Yearly
	Unlicensed Generation Network (Monthly)	Monthly
	Consumption	Monthly
	DSO Call Center	Monthly
	Industrial Control System (ICS) Risk Reduction Activity Follow-up	6 Months

Responsible	Notification Name	Notification Period
	ICS Diagnosis and Risk Assessment	Yearly
	ICS Inventory	Yearly
	DSO R&D	-
	DSO Connection-Disconnection and Accrual	3 Months
	Financial Notification	6 Months
	Credit Usage Notification	6 Months
	Payment Obligation Notification	Monthly
	Yearly License Fee	Yearly
Incumbent Retail Company	Incumbent Retailer Commercial Quality Realization	Yearly
	Incumbent Retailer Commercial Quality Notifications	Yearly
	Unlicensed Generation Payment Information	Monthly
	Unlicensed Generation Demand Forecast	Yearly
	Retail Sales Offer	3 Months
	Yearly Revenue Correction	Yearly
	Incumbent Retailer Call Center	Monthly
	Unlicensed Generation Overdue Payments	3 Months
	Credit Usage Notification	6 Months
	Payment Obligation Notification	6 Months
	Yearly License Fee	Monthly
	6 Months Income	6 Months
Organized Industrial Zones (OIZ) Distribution Licensees	Unlicensed Generation Network (Monthly)	Monthly
	OIZ Distribution License Tariff	Yearly
	Yearly License Fee	Yearly
Suppliers (inc. Incumbent Retailers)	Electricity Price	6 Months
	Realization related to complaints	Monthly
	Yearly License Fee	Yearly
DSO, Supplier, Generation License or Prelicense holder that has license for over 100 MWm installed capacity	Independent audit report	Yearly

At present there are two systems used by EMRA related to data gathering and monitoring of electricity distribution and retail sales companies. The first system is EBIS (Energy Market Notification System). The system is used to manage energy (electricity, natural gas, oil and LPG) data centrally considering the system security, to gather required data from the market players, to get license applications in electronic format and to provide input to statistical analysis and decision support systems.

Secondly, together with the Board Decision dated 02/11/2017, Principles and Procedures regarding Remote Access to Information Systems of Electricity Distribution Companies was published. Within this context, EDVARS (Electricity Distribution Data Warehouse and Reporting System) is defined as the web interface, by which EMRA would be able to monitor related data in real time.

2.7 Gap Analysis and Recommendations

Within the scope of this section gaps between the countries analysed and Turkey are stated and related recommendations are provided. To summarize;

- Indicators to follow the performance of distribution and retail sales companies are similar in Europe and Turkey.
- Data is mostly collected via surveys and questionnaires in Europe.
- Especially, competitiveness in retail segment, prices and supplier switching are monitored since eligible customer limit is 0 in Europe. In this regard, price comparison tools are provided by the NRAs to customers in some countries.
- NRAs has their own platforms to collect data (e.g. meter consumer info etc.) and share information with the customers/companies.

Table 0.1 – Overview of gap analysis and recommendations

	EU Practices	Turkey Practice	Recommendation
Responsibilities	- National Regulatory Authorities (NRAs) have the duties to exercise monitoring activities of the wholesale and retail electricity markets as well as distribution segment. These duties include at least monitoring the level of transparency of the prices, the level and effectiveness of market opening and competition at wholesale and retail levels to the benefits of all energy consumers. - As part of RIIO mechanism in the UK, each year, DSOs report to Ofgem on their performance and Ofgem publish annual report.	- EMRA is responsible from monitoring activities. EMRA publishes monthly and annual reports on the development of electricity markets.	- Same as EU countries.
Unbundling	- In line with the Electricity Directive, legal unbundling issue has reached a certain level. Generally, annual follow-up is done, anddetailed information is requested from the companies only if needed. In some country's targets have to be achieved regarding branding.	- Legal unbundling has been completed in Turkey in 2013.Studies related to information unbundling is done. In addition,Turkish Competition Authority, has been monitoring issues related to competition.	- Same as EU countries.
Network Development	- In Germany, network optimisation and reinforcement measures implemented by DSOs are monitored by NRA, to followthe growth in renewable energy and embedded generation as well as tariff related issues. - In Norway, NVE publishes an annual report on development in the network industry. The report looks at fluctuations over the past 10 years in revenues, costs, investments and regulatory asset base, rate of return, grid losses, CENS, etc. - In the UK, customer satisfaction with network operators, average time to connect to the distribution network, undergrounding of overhead lines, Return on Regulatory Equity (RoRE), expenditure vs allowance and estimated network costs per domestic customer are some measures followed by Ofgem regarding network.	- Network quality indicators as well as development of the network (especially for tariff) is monitored by EMRA.	- Together with the new developments such as increased unlicensed generation, storage facilities, EV charging station etc. monitoring of network development would be more significant. In this regard, new monitoring measures might be developed.
Quality of Supply – Continuity of Supply	- DSOs monitor and report mainly thefrequency and duration of interruptionsand they provide measures to be taken to avoid supply interruptions in the future. - In Norway, DSOs use the national interruption reporting software FASIT, developed for recording faults and interruptions in the power system. The	- SAIDI and SAIFI are used to monitor quality.	- ASIDI, ASIFI (average interruption time weighted by the rated power) and improvement for worst served customers might also be added as indicators.

	EU Practices	Turkey Practice	Recommendation
	FASIT system makes it possible for network companies to record information about faults on equipment (components), delivery point interruptions and restoration and repair times. - In Portugal, NRA (ERSE) annually publishes information on quality of service and analyses the performance of network operators and last resort suppliers regarding continuity of supply, voltage wave quality and quality of commercial service. The reports are based on company information provided to ERSE.		- Monitoring infrastructure shall also be developed by DSOs. Existing Supply Continuity Registration System assists the perfect connection model in MV, on the other hand, LV outages and affected consumer data are calculated mostly via customer complaints derived from call centre statistics. Most of DSOs have already integrated call centre statistics with Supply Continuity Registration System, still the integrated data and LV connection model needs to be maturated. Therefore, firstly, the reliability of the GIS LV data should be maintained. Number of customers fed from each transformer, connection model of each meter, and related DTR (distribution transformer) or MV feeder (for MV meters) should be confirmed by DSO's GIS data. Audit of connection model of LV consumption points is thought to be performed by EMRA, or by an authorized body on behalf of EMRA.
Quality and Level of Maintenance of the Networks	- In Norway, Cost of Energy not Supplied (CENS) is monitored and used to ensure a proper level of maintenance of the networks. NVE carries out audits on companies regarding operation and maintenance. The quality of the maintenance is monitored on these audits. - In the UK, Ofgem also monitors the time taken to repair faults through the Interruptions Incentive Scheme (IIS). The time taken to repair has been incentivised as part of the 'customer minutes lost' element of the Scheme.	- VOLL is not monitored regularly.	- According to value of lost energy calculations (VOLL) additional bonus might be provided to those DSOs with highest VOLL figures who reduce their loss ratios. Therefore, not only loss reduction ratio, actual loss energy amount needs to be included in the process.
Voltage Quality	- DSOs continuously register dips, swells and rapid voltage changes for MV and HV as well as total harmonic distortion (THD) and flickering. - DSOsare also obliged to report these voltage quality parameters (except rapid voltage changes) to NVE in Norway.	- Quality of supply regulation includes minimum requirements for voltage quality. Nominal voltage levels and voltage fluctuation limits are also defined for different levels and DSOs are required to install power analyzers when required by the customer and correct the issue.	- Same as EU countries.
Customer Services	- In the UK, a quarterly energy satisfaction survey (face to face and online)is performed by Ofgem. The statistics show how many complaints suppliers receive, how many Citizens Advice handle, weighted by the seriousness of the	- Indicators such as response time to customer claims, call center response time limits, time for connecting new customers to the network, time for giving information	- Indicators used are similar in general. On the other hand, customer satisfaction should be monitored by proper independent

	EU Practices	Turkey Practice	Recommendation
	complaint, and how many are accepted by the Ombudsman after failing to be resolved by the supplier. - DNOs shall also publish domestic complaints data on their websites, including their top five reasons for complaints and the measures they are taking to improve how they handle customer complaints.	in advance of a planned interruption are used.	surveys instead of the number of letters arriving to EMRA.
Commercial Quality	- In Norway, in case of an event, DSOs are obliged to give information on given data for the quality of supply in their network.This data includes; results from registration of interruption data, analyses of operational disturbances and specific conditions in the network that could have an influence on the quality of supply for the customer. - In Portugal commercial quality indicators reported include % of face-to-face calls, with different waiting times, % of telephone calls for fault communication, % of written requests for information, average response time to written requests for information etc.	- Same as above	- Same as above
EV and Charging Stations	- In Germany, operators of recharging points provide the Agency, information regarding location and type of recharging points. Charging points are assessed for compliance with interoperability requirements, ensuring that users can find the plug they need on any recharging point.	- EV and Charging Stations issue is relatively new in Turkey.	- Especially, as for their effect to electricity network, development of charging stations shall be monitored.
Metering	- Data collected regarding metering includes; meter points requiring smart meters, type of activities related to meter operations, additional services for smart metering systems, meter technology employed, metering investment and expenditure, final consumer prices for metering equipment	- Meter data is only aggregated by EPIAS for settlement purposes.	- Following deployment of smart meters at a certain level, meter data shall be monitored and analyzed in more detail (including mentioned data in EU practices)
Data Collection and Analysis	- In Germany, data collection is mainly via surveys and questionnaires. Data Transfer Platform MonEDa is used to collect data. The use of MonEDa became mandatory from 2019. This platform facilitates data exchange between the Federal Network Agency and market participants for monitoring purposes.The results of the surveys are published within the scope of the report on the security of supply. - In Norway, a new IT solution for information exchange between actors (Elhub) in the power market is being developed. Data collected and exchanged will be related to supplier switching, customer change, metering, settlement of metering corrections and smart metering. - In the UK, access to consumption data from smart meters is managed centrally, through the Data and Communications Company (DCC), which is licensed and regulated by Ofgem. - ERSE established Consumer Portal in Portugal to provide information such as full list of licensed or registered market electricity suppliers, what prices will be paid by consumers, what is needed	- Data collection is via EBIS and EDVARS.	- New data collection and analysis systems for smart meters, information exchange between customers might be developed.

	EU Practices	Turkey Practice	Recommendation
	to do to enter into an electricity supply contract etc.		
Retail Market – Prices & Profit	- In retail markets competitiveness, prices, payment methods and supplier switching are the main activities monitored. - Offers sent by suppliers for household customers, number of suppliers in the market, type of offers, whether electricity-only or dual (both for electricity and for natural gas) or offers with additional energy services, prices of market offers are monitored and reports are published in weekly, monthly or yearly basis by NRAs	- Indicators such as customer switching rates, number of eligible customers are published in EMRA's periodic reports.	- Transparency in retail market might be increased with new indicators such as prices and types of offers etc.
Price Comparison Tool	- In many countries, a price comparison tool is used to enable consumers to make an active choice in the electricity market. - In Norway, Norwegian Consumer Council's (Forbrukerrådet) price comparison tool **strompris.no** is used. The tool contains information about all offers available in the market since 1998 and it ranks contracts according to the estimated total cost of energy including network tariffs and taxes. NVE regulates the collection of information for the tool under the Energy Act regulations. - ERSE offers a price simulator to market participants in order to compare prices in retail market	- Price comparison tools developed by private companies are available.	- Public tool might be developed as in most of the EU countries.
Retail Market – Customer Switching	- In terms of customer switching, number of customers, growth of the market, supplier switching rates, switches within the liberalised market and switches from the regulated market to the liberalised market are monitored.	- Switches within the liberalised market and switches from the regulated market to the liberalised market are monitored.	- Same as EU countries.
Transparency	- Nearly in all of the countries, transparency regarding retail market prices and choices for suppliers is at a desired level.Supplier companies publish annual Consolidated Statements on their websites that break down suppliers' revenues, costs and profits and are reconcilable to audited accounts. - Ofgem requires companies to audit their statements, to publish them within four months of their financial year end, to provide a detailed cost breakdown, and insight into their trading activities. - NVE publishes audit reports on various issues such as environmental inspections, land safety, power supply readiness, quality of delivery and faults analysis, tariff, financial and technical reporting, affiliation obligation	- Transparency of wholesale electricity market reached a better level, compared to retail sales and distribution segments, together with REMIT.	- Same as EU countries. - Transparency regarding retail market prices and choices for suppliers might be increased.
Compliance and Supervision	- In most of the countries, DSOs are not directly audited and they are only investigated when there are complaints not being solved. - On the other hand, NVE publishes each year an action plan that defines areas to be inspected for that year and determines the companies to be inspected based on defined priorities for that year such as the size of the company. - In the UK, Ofgem monitor compliance by routinely collecting information from energy suppliers, such as information on the level and	- Companies are audited/investigated in case of complaints not solved. - EDVARDS is expected to be used to be able to access data of companies directly.	

	EU Practices	Turkey Practice	Recommendation
	nature of complaints they receive or reviewing information from whistleblowers within the industry. In terms of collection of data,Ofgem issued Data Assurance Guideline (DAG) to support DNOs on data submission and compliance.		
Financial Regulation	- In some of the countries such as the UK, Canada and Brazil, DSOs are monitored financially so that they could be sustainable, and they could provide desired services at the desired quality level. In the UK, Allowed Revenue and the Annual Iteration Process, Gearing and Financing, Return on Equity and Regulatory Asset Value (RAV) are used as financial indicators. In Ontario, current ratio, debt service coverage, interest coverage, costs of operation, maintenance and administration costs by customer, and return on equity are used.	- Currently, EMRA is gathering the necessary parameters to calculate WACC – i.e. one of the most necessary financial parameter for DSO business - from Public Disclosure Platform and public financial parameters of DSOs running their business with initial public offering (IPO).	- Main drivers for WACC calculations of DSOs – i.e. borrowing cost, equity cost, gearing ratio – might be gathered from DSOs in annual base to estimate their cost dependents. In addition, ROE (Return on Equity) and ROA (Return on Assets) metrics as well as debt and equity ratio values might be requested to monitor financial strength of DSOs.

3 Electricity Transmission

EC Regulation No 714/2009 on "conditions for access to the network for cross-border exchanges in electricity" and EU Regulation No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets" are guidelines on the management and allocation of available transfer capacity of interconnections between national systems and set out requirements for Transmission System Operators (TSOs) to publish data on the availability of networks, capacities of cross-border interconnectors and generation, load and network outages.

3.1 Analysis of Market Monitoring for EU-Relevant Electricity Transmission Regulations

Energy policy is a competency shared between the EU and its Member States. The EU has responsibility under the Treaties to ensure security of supply, Member States are responsible for determining the structure of their energy supply and their choice of energy sources.

The strategy of the Energy Union has following five dimensions[8] to bring greater energy security, sustainability and competitiveness:

Energy security, solidarity and trust- diversifying Europe's sources of energy and ensuring energy security through solidarity and cooperation between EU countries

A fully integrated internal energy market - enabling the free flow of energy through the EU through adequate infrastructure and without technical or regulatory barriers

Energy efficiency contributing to moderation of demand- improved energy efficiency will reduce dependence on energy imports, lower emissions, and drive jobs and growth.

Decarbonising the economy- the EU is committed to a quick ratification of the Paris Agreement and to retaining its leadership in the area of renewable energy.

Research, innovation and competitiveness - supporting breakthroughs in low-carbon and clean energy technologies by prioritising research and innovation to drive the energy transition and improve competitiveness.

In order to ensurethe unbundling of energy production and supply from energy-transmission networks, reinforced consumer protection, and strengthened regulatory surveillance,the internal energy market in the EU was established by three market liberalisation packages, which are adopted in the 1990s, 2003 and 2009. The European Commission is currently monitoring and enforcing the application of the 'third energy package' across the Member States, which wasadopted all its provisions into national law by 2011.

During 2014-2019 period, the EU institutions reached agreement on a revised regulation on security of electricity supply, a revised decision on intergovernmental agreements in the energy field, new targets for energy efficiency and renewables by 2030. Meanwhile, EU projects of common interest (PCIs) finance electricity energy infrastructure that improves interconnection and supports security of supply. The EU will retain a key role in monitoring security of supply throughout the energy transition from the old system of centralised generation dominated by fossil fuels

[8]Source: https://ec.europa.eu/energy/en/topics/energy-strategy/energy-union-0

in national markets, towards a new system characterised by a high share of renewables, more decentralised production and cross-border markets.

EU legislation on security of supply focuses on electricity markets, reflecting the particular cross-border challenges associated with security of supply in these sectors.The other important challenge in electricity sector is the need for grid modernisation to accommodate a growing share of renewable energy sources and distributed power generation into national electricity markets with growing cross-border capacity. Furthermore, the most of the renewable energy sources such as solar and wind have a variable production and not fully predictable supply. Therefore, it is absolutely necessary for national authorities and EU to properly coordinate their electricity policies in order to avoid sudden fluctuation of power flows, cascaded power losses and consequently system black-out. In order to ensure security of supplyfor households, businesses and social services always maintained, monitoring of electricity markets is vital.

3.1.1 Existing submitted data lists with frequencies per each data set and functionalities of data transferring infrastructure

In compliance with EU Regulation No. 543/2013 on submission and publication of data in electricity markets, the ENTSO-E Transparency Platform was launched on 5 January 2015in an efficient and cost-effective manner. The platform is operated by ENTSO-E and gathered and arranged fundamental market dataas minimum common set of data relating to pan-European electricitygeneration, cross-border transportation and consumption of electricity to be made available to market participants.

EU Member State TSOs' submit all data defined in regulation.The ENTSO-E publish them on the transparency platform in accordance with this Regulation. The transparency platform is available to the public free of charge through the internet, as in English.

The data is always up to date, easily accessible, downloadable and available for at least five years. Data updates are with time- stamped, archived and made available to the public.

TSOs, and where relevant data providers, must process the data they receive and provide them to the ENTSO for Electricity in due time for publication according to the regulation, as it is seen in the following table.

Table 3.1– Data to be published at the transparency platform in compliance withEU Regulation No. 543/2013

Subject	Data to be published	Publication time
Total Load	The total load per market time unit;	No later than one hour after the operating period;
	A day-ahead forecast of the total load per market time unit;	No later than two hours before the gate closure of the day-ahead market in the bidding zone and be updated when significant changes occur;
	A week-ahead forecast of the total load for every day of the following week, which shall for each day include a maximum and a minimum load value;	Each Friday no later than two hours before the gate closure of the day- ahead market in the bidding zone and be updated when significant changes occur;

Subject	Data to be published	Publication time
	A month-ahead forecast of the total load for every week of the following month, which shall include, for a given week, a maximum and a minimum load value;	No later than one week before the delivery month and be updated when significant changes occur;
	A year-ahead forecast of the total load for every week of the following year, which shall for a given week include a maximum and a minimum load value.	No later than the 15th calendar day of the month before the year to which the data relates.
Total Generation	Generation units located within a TSO's control area shall provide that TSO with all the relevant information required to calculate	No later than one hour after the operating period;
DSOs Data	Distribution system operators (DSO), located within a TSO's control area shall provide that TSO with all the relevant information required to calculate the day ahead data	No later than two hours before the gate closure of the day-ahead market in the bidding zone and be updated when significant changes occur;
	Distribution system operators (DSO), located within a TSO's control area shall provide that TSO with all the relevant information required to calculate the week ahead data	Each Friday no later than two hours before the gate closure of the day- ahead market in the bidding zone and be updated when significant changes occur;
	Distribution system operators (DSO), located within a TSO's control area shall provide that TSO with all the relevant information required to calculate the month ahead data	No later than one week before the delivery month and be updated when significant changes occur;
	Distribution system operators (DSO), located within a TSO's control area shall provide that TSO with all the relevant information required to calculate the year ahead data	No later than the 15th calendar day of the month before the year to which the data relates.
Unavailability of Consumption Units	The planned unavailability of 100 MW or more of a consumption unit, including changes of 100 MW or more in the planned unavailability of consumption units, lasting at least one market time unit, specifying: bidding zone, available capacity per market time unit during the event, reason for the unavailability, the estimated start and end date (day, hour) of the change in availability;	As soon as possible but no later than one hourafter the decision regarding the planned unavailability is made.
	Changes in actual availability of a consumption unit with a power rating of 100 MW or more, specifying: bidding zone, available capacity per market time unit during the event, reason for the unavailability,the start date and the estimated end date (day, hour) of the change in availability.	As soon as possible but no later than one hour after the change in actual availability.

Subject	Data to be published	Publication time
Transmission infrastructure	The planned unavailability, including changes in the planned unavailability of interconnections and in the transmission grid that reduce cross zonal capacities between bidding zones by 100 MW or more during at least one market time unit, specifying: the identification of the assets concerned, the location, the type of asset, the estimated impact on cross zonal capacity per direction between bidding zones, reasons for the unavailability, the estimated start and end date (day, hour) of the change in availability;	As soon as possible, but no later than one hour after the decision regarding the planned unavailability is made.
	Changes in the actual availability of interconnections and in the transmission grid that reduce cross zonal capacities between bidding zones by 100 MW or more during at least one market time unit, specifying: the identification of the assets concerned, he location, the type of asset, the estimated impact on cross zonal capacity per direction between bidding zones, reasons for the unavailability, the start and estimated end date (day, hour) of the change in availability;	As soon as possible but no later than one hour after the change in actual availability.
	Changes in the actual availability of off-shore grid infrastructure that reduce wind power feed-in by 100 MW or more during at least one market time unit, specifying: the identification of the assets concerned, the location, the type of asset, the installed wind power generation capacity (MW) connected to the asset, wind power fed in (MW) at the time of the change in the availability, reasons for the unavailability, the start and estimated end date (day, hour) of the change in availability.	As soon as possible but no later than one hour after the change in actual availability.
The use of cross zonal capacities	İn case of explicit allocations, for every market time unit and per direction between bidding zones: the capacity (MW) requested by the market, capacity (MW) allocated to the market, the price of the capacity (Currency/MW), the auction revenue (in Currency) per border between bidding zones;	No later than one hour after each capacity allocation;
	For every market time unit and per direction between bidding zones the total capacity nominated;	No later than one hour after each round of nomination;
	Prior to each capacity allocation the total capacity already allocated through previous allocation procedures per market time unit and per direction;	At the latest when publication of offered capacity figures become due***.
	For every market time unit the day-ahead prices in each bidding zone (Currency/mwh);	No later than one hour after gate closure;
	In case of implicit allocations, for every market time unit the net positions of each bidding zone (MW) and the congestion income (in Currency) per border between bidding zones;	No later than one hour after each capacity allocation;

Subject	Data to be published	Publication time
	Scheduled day-ahead commercial exchanges in aggregated form between bidding zones per direction and market time unit;	every day no later than one hour after the last cut-off time and, if applicable, shall be updated no later than two hours after each intra-day nomination process;
	Physical flows between bidding zones per market time unit;	each market time unit as closely as possible to real time but no later than one hour after the operational period;
	Cross zonal capacities allocated between bidding zones in Member States and third countries per direction, per allocated product and period.	No later than one hour after the allocation.
Congestion management measures	Redispatching per market time unit, specifying: the action taken (that is to say production increase or decrease, load increase or decrease), the identification, location and type of network elements concerned by the action, the reason for the action, capacity affected by the action taken (MW);	As soon as possible but no later than one hour after the operating period, except for the reasons which shall be published as soon as possible but not later than one day after the operating period;
	Countertrading per market time unit, specifying:the action taken (that is to say cross-zonal exchange increase or decrease), the bidding zones concerned, the reason for the action, change in cross-zonal exchange (MW);	As soon as possible but no later than one hour after the operating period, except for the reasons which shall be published as soon as possible but not later than one day after the operating period;
	The costs incurred in a given month from actions referred to redispatching, countertrading and from any other remedial action;	No later than one month after the end of the referred month.
Forecast generation	The sum of generation capacity (MW) installed for all existing production units equalling to or exceeding 1 MW installed generation capacity, per production type;	Annually no later than one week before the end of the year;
	Production units (existing and planned) with an installed generation capacity equalling to or exceeding 100 MW. The information shall contain:the unit name, the installed generation capacity (MW), the location, the voltage connection level, the bidding zone, the production type;	Annually for the three following years no later than one week before the beginning of the first year to which the data relates;
	An estimate of the total scheduled generation (MW) per bidding zone, per each market time unit of the following day;	No later than 18.00 CET, one day before actual delivery takes place;

Subject	Data to be published	Publication time
	A forecast of wind and solar power generation (MW) per bidding zone, per each market time unit of the following day	No later than 18.00 CET, one day before actual delivery takes place. The information shall be regularly updated and published during intra-day trading with at least one update to be published at 8.00 CET on the day of actual delivery*;
Unavailability of generation and production units	The planned unavailability of 100 MW or more of a generation unit including changes of 100 MW or more in the planned unavailability of that generation unit, expected to last for at least one market time unit up to three years ahead, specifying:the name of the production unit, the name of the generation unit, location, bidding zone, installed generation capacity (MW),the production type, available capacity during the event, reason for the unavailability, start date and estimated end date (day, hour) of the change in availability;	As soon as possible, but no later than one hour after the decision regarding the planned unavailability is made.
	Changes of 100 MW or more in actual availability of a generation unit, expected to last for at least one market time unit, specifying: the name of the production unit, the name of the generation unit, location, bidding zone, installed generation capacity (MW), the production type, available capacity during the event, reason for the unavailability, and start date and estimated end date (day, hour) of the change in availability;	As soon as possible but no later than one hour after the change in actual availability.
	The planned unavailability of a production unit of 200 MW or more including changes of 100 MW or more in the planned unavailability of that production unit, expected to last for at least one market time unit up to three years ahead, specifying: the name of the production unit, location, bidding zone, installed generation capacity (MW), the production type, available capacity during the event, reason for the unavailability, start date and estimated end date (day, hour) of the change in availability;	As soon as possible, but no later than one hour after the decision regarding the planned unavailability is made.
	Changes of 100 MW or more in actual availability of a production unit with an installed generation capacity of 200 MW or more, expected to last for at least one market time unit, specifying:the name of the production unit, location, bidding zone, installed generation capacity (MW), the production type, available capacity during the event, reason for the unavailability, and start date and estimated end date (day, hour) of the change in availability.	As soon as possible but no later than one hour after the change in actual availability.

Subject	Data to be published	Publication time
Actual generation	Actual generation output (MW) per market time unit and per generation unit of 100 MW or more installed generation capacity;	Five days after the operational period;
	Aggregated generation output per market time unit and per production type;	No later than one hour after the operational period;
	Actual or estimated wind and solar power generation (MW) in each bidding zone per market time unit;	No later than one hour after the operational period and be updated on the basis of measured values as soon as they become available;
	Aggregated weekly average filling rate of all water reservoir and hydro storage plants (mwh) per bidding zone including the figure for the same week of the previous year.	On the third working day following the week to which the information relates**.
Balancing	The amount of balancing reserves under contract (MW) by the TSO, specifying:the source of reserve (generation or load), the type of reserve (e.g. Frequency Containment Reserve, Frequency Restoration Reserve, Replacement Reserve), the time period for which the reserves are contracted (e.g. Hour, day, week, month, year, etc.);	As soon as possible but no later than two hours before the next procurement process takes place
	Prices paid by the TSO per type of procured balancing reserve and per procurement period (Currency/MW/period);	As soon as possible but no later than one hour after the procurement process ends;
	Accepted aggregated offers per balancing time unit, separately for each type of balancing reserve;	As soon as possible but no later than one hour after the operating period;
	The amount of activated balancing energy (MW) per balancing time unit and per type of reserve;	As soon as possible but no later than 30 minutes after the operating period.
	Prices paid by the TSO for activated balancing energy per balancing time unit and per type of reserve; price information shall be provided separately for up and down regulation;	As soon as possible but no later than one hour after the operating period;
	İmbalance prices per balancing time unit;	As soon as possible;
	Total imbalance volume per balancing time unit;	as soon as possible but no later than 30 minutes after the operating period.
	Monthly financial balance of the control area, specifying: the expenses incurred to the TSO for procuring reserves and activating balancing energy, the net income to the TSO after settling the imbalance accounts with balance responsible parties;	No later than three months after the operational month.

Subject	Data to be published	Publication time
	Cross Control Area Balancing per balancing time unit, specifying: the volumes of exchanged bids and offers per procurement time unit, maximum and minimum prices of exchanged bids and offers per procurement time unit, volume of balancing energy activated in the control areas concerned.	No later than one hour after the operating period.

*The information shall be provided for all bidding zones only in Member States with more than 1 % feed-in of wind or solar power generation per year or for bidding zones with more than 5 % feed-in of wind or solar power generation per year.

** The information shall be provided for all bidding zones only in Member States with more than 10 % feed-in of this type of generation per year or for bidding zones with more than 30 % feed-in of this type of generation per year.

Table 3.2– Information to be Published on Cross Zonal Capacity Allocation[9]

Capacity allocation period	Forecasted cross zonal capacity to be published	Offered capacity to be published
Yearly	One week before the yearly allocation process but no later than 15 December, for all months of the following year	One week before the yearly allocation process but no later than 15 December
Monthly	Two working days before the monthly allocation process for all days of the following month	Two working days before the monthly allocation process
Weekly	Each Friday, for all days of the following week	One day before the weekly allocation process
Day-ahead		One hour before spot market gate closure, for each market time unit
Intra-day		One hour before the first intra-day allocation and then real-time, for each market time unit

TSOs or operators of balancing markets must also provide the following information on balancing market rules fortheir control areas to the ENTSO-E:

- processes for the procurement of different types of balancing reserves and of balancing energy,
- the methodology of remuneration for both the provision of reserves and activated energy for balancing,
- the methodology for calculating imbalance charges,
- if applicable, a description on how cross-border balancing between two or more control areas is carried out and the conditions for generators and load to participate.

3.1.2 Rights & responsibilities of each Stakeholders in accessing and operating the data monitoring system

ACER:

[9]Source: EU Regulation No. 543/2013 on submission and publication of data in electricity markets.

Due to the increasing cooperation and coordination needs among TSO, it was required to prepare network codes for ensuring and managing effective and transparent access to the transmission networks across borders, and sufficient coordination of planning and technical evolution of the transmission system in the EU, including the increasing interconnection capacities, as anenvironmentally friendly approach. Considering all these needs, The EU Agency for the Cooperation of Energy Regulators (ACER) was established in March 2011 by the Third Energy Package legislation,EC Regulation No 713/2009 of the European Parliamentas an independent body to ensure a more competitive and integrated market, an efficient energy infrastructure and networks to increase cross-border trade and integration of renewable energy resources for security of supply and a monitored and transparent energy market for consumers protection, cost-reflective prices and a limitation of market abusive behaviours in electricity and gas markets.

ACER encourages the cooperation among National Energy Regulatory Authorities (NRAs) to ensure the market integration and the implementation of the national legislations achieved according to the EU's energy policy objectives and regulatory frameworks.

ACER develops framework guidelines for drafting the network codes in line with EC priorities, reviews the draft of the network codesincluding their compliance with the framework guidelines, assess proposed amendments to the network codes and recommend them for adoption by the Commission. Transmission system operators operates their networks in accordance with those network codes.

ENTSO-E:

The tasks of the ENTSO-Eare carried out in compliance with EU competition rulesapplicable to the decisions of the ENTSO-E. The tasks of the ENTSO-Ewere well-defined to ensure efficiency, transparency and the representative nature of the ENTSO-E. The network codes prepared by the ENTSO-E are not intended to replace the necessary national network codes for non-cross-border issues. Given that more effective progress may be achieved through an approach at regional level, transmission system operators set up regional structures within the overall cooperation structure, whilst ensuring that results at regional level are compatible with network codes and non-binding ten-year network development plans at Community level. Member States promote cooperation and monitor the effectiveness of the network at regional level. Cooperation at regional level must be compatible with progress towards a competitive and efficient internal market in electricity.

In order to ensure greater transparency regarding the entire electricity transmission network in the EU, the ENTSO-Estraighten up, publish and regularly update a non-binding Pan European-wide ten-year network development plan. Viable electricity transmission networks and necessary regional interconnections, relevant from a commercial or security of supply point of view, should be included in that network development plan.

3.1.3 Market Monitoring

ACER was assigned to monitor the internal markets for electricity and gas within the framework of the Third Energy Package. To realize this market monitoring duties in compliance with Article 11 of EC Regulation No. 713/2009, the ACER prepares an annual market monitoring report in close cooperation with the European Commission, NRAs and other relevant organisations.

Furthermore, the main objective of the ACER's market monitoring activities is to explain how energy markets can perform more efficiently, thus making energy more affordable to the benefit of European energy consumers. For example, if barriers to market integration of the internal electricity are removed, then the level of competition should improve.

Since 2012, ACER has presented the results of its monitoring activities in the annual Market Monitoring Reports (MMRs), produced and published in cooperation with the Council of European Energy Regulators (CEER).

The main activities of market monitoring are as follows:

- Detection of attempts to exercise market power and fraudulent behavioral,
- Monitoring of market performance,
- Identification of market design imperfection,
- Transmission and generation blackout controlling,
- Market participants' behavioral monitoring (activities and transactions).

Electricity Wholesale Markets Monitoring[10]:

The ACER publishes the results of a survey conducted among wholesale market participants in the EU on the remaining barriers to electricity wholesale market trading. The results of the surveys provide input into the assessment of developments in electricity wholesale markets which the ACER performs every year for the preparation of its Market Monitoring Report (MMR).

The MMRs assess the internal markets for energy and, in particular, focuses on retail prices, including compliance with consumer rights as mentioned in the Third Package, network access including grid access for renewable energy sources, and on any barriers to the Internal Energy Market (IEM). The MMR published in 2018 consists of 4 parts: electricity wholesale, Gas wholesale, electricity and gas retail and Customer Protection.

The Electricity Wholesale Market Volume looks in depth at the present state of the EU electricity markets and their trajectory towards an IEM and provides recommendations towards the realisation of this goal.

The adoption of the Clean Energy for All Europeans Package (Clean Energy Package, CEP) legislation in June 2019 hasinitiatedaperiodofsignificantchange,aiming at encouragingthe creation of moreefficientelectricitymarkets. For example, in view of persistently low levels of electricity cross-zonal capacity, CEP requires a minimum level of capacity for cross-zonal trade. In particular, at least 70% of maximum admissibleactivepowerflow(Fmax)ofCriticalNetworkElementsconsideringContingencies(CNECs)shallbemade available for cross-zonal trade.

Following figures provide a visual representation of the average capacity made available for cross-zonal trade between 2016 and 2018 in selected countries. On most of the analysed alternate current (AC) and on some Direct Current (DC) bidding-zone borders, the margin available for cross-zonal trade was much lower than 70%, suggesting significant room for improvement. An important warning is that exchanges with non-EU countries were not considered, while these exchanges impact the Margin Available for Cross Zonal Trade(MACZT). For example, exchanges between the EU and SwitzerlandsignificantlyimpacttheMACZTonthe Italy(IT)-Northborders.

[10]Source: ACER/CEER Annual Report on the Results of Monitoring the Internal Electricity Markets In 2018.

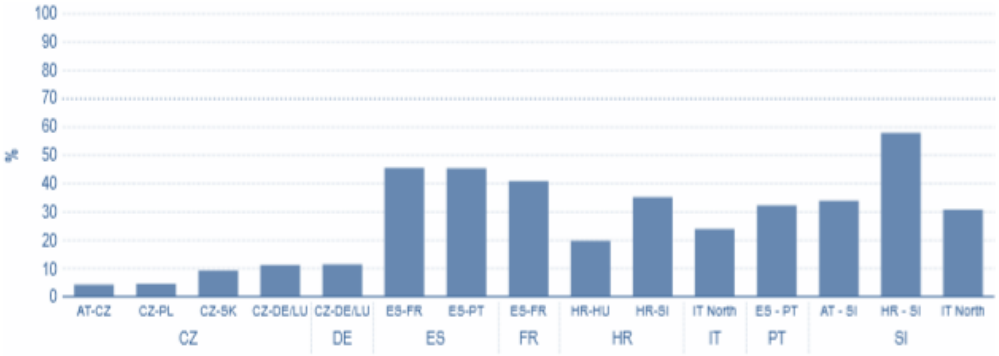


Figure 3.1–Average relative MACZT on selected AC bidding-zone borders in Europe – 2016–2018[11]

Note: The average relative MACZT is computed over all declared CNECs, taking EU bidding-zone borders into account. The coordination areas delineation required for the underlying calculations is based on the level of coordination in day-ahead capacity calculation declared by NRAs for the MMR 2017. The margin available for trade on a given border is displayed from the perspective of the two MSs at both sides of the border, subject to data confidence. EU Countries and borders are selected based on the confidence in data, i.e. only borders for which the confidence was enough are displayed.

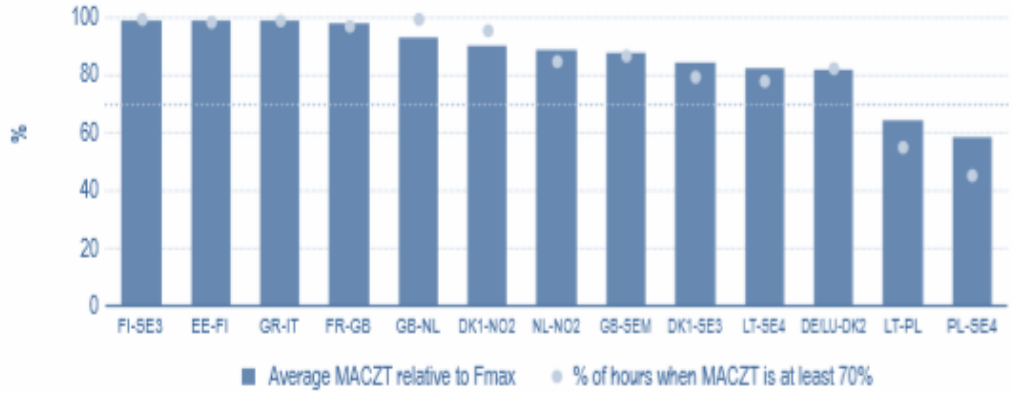


Figure 3.2–Average relative MACZT and percentage of time when the minimum 70% target is achieved on DC bidding-zone borders in Europe – 2016–2018[12]

[11]Source: ACER calculations based on ENTSO-E/TSOs and Nord-pool data.

[12]Source: ACER calculations based on ENTSO-E/TSOs and Nord-pool data.

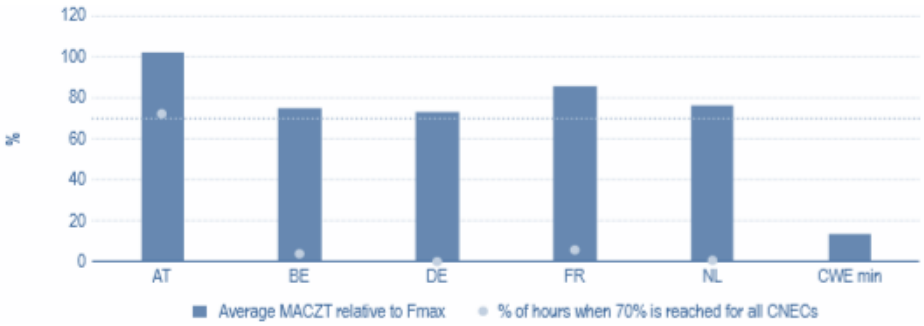


Figure 3.3– Average relative MACZT and percentage of time when 70% is reached for all CNECs in the Core (Central West Europe-CWE) region – 2016–2018[13]

The increasing impact of Capacity Mechanisms (CMs) on consumers' bills is particularly concerning in the light of the conclusions that can be derived from the ENTSO-E's 2018 Mid-term Adequacy Forecast (MAF 2018). In fact, according to the MAF 2018 results for the base-case scenario, seven EU Countries that have introduced or are planning to introduce a CM, i.e. Germany, Latvia, Lithuania, Poland, Portugal, Spain and Sweden, do not seem to face an adequacy problem in either 2020 or 2025. In Italy, the MAF results indicate that adequacy issues may arise at the Bidding Zone (BZ) level rather than at the country level. This is presented in Figure below, which illustrates both the national situation regarding CMs and whether possible adequacy concerns may arise in each EU Country based on the MAF.

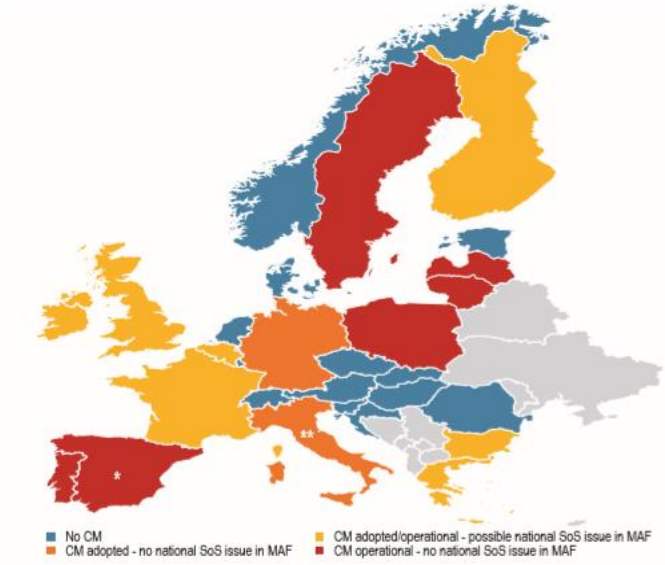


Figure 3.4–Perceived need for CMs based on MAF 2018 results[14]

Note: In Spain (*), the CM used to comprise "investment incentives" and "availability payments". The availability payments were removed in June 2018 and the investment incentives apply only to generation capacity installed before 2016. In Italy (**) the analysis suggests potential adequacy issues at the bidding zone level, in Italy-Centre-North and Italy-Sicily, rather than at the national level.

[13]Source: ACER calculations based on ENTSO-E/TSOs and Nord-pool data.

[14]Source: ACER.

Network Codes and Guidelines:

Each year, the European Commission come up with an 'annual priority list' of areas to be included in the development of network codes for electricity, with input from a public consultation.

The Commission, with further input from the ACER and ENTSO-E, adopts proposals for network codes. The proposals for network codes are checked by an Electricity cross-border committee of specialists from national energy ministries and then adopted with the approval of the Council of the European Union and the European Parliament.

Sometimes the new rules are adopted as 'guidelines' rather than 'network codes.' These are adopted under a different provision of the Electricity Regulation (EC) No 714/2009 but they have the same status – they are both legally binding regulations.

The cooperation among Transmission System Operators (TSOs) is ensured through the ENTSOs. ACER's establishment contributes to reinforcing cooperation by NRAs and to filling the regulatory gap resulting from market integration as national regulators have responsibilities over their national jurisdictions. Europeans benefit from more security of supply and better network planning. System operation and market rules have been harmonised and are more transparent. Greater stakeholders' participation was crucial in developing robust proposals.

European Stakeholder Committees (ESCs) have been established to inform and consult stakeholders about the requirements in the guidelines/network codes during the implementation period.

The European Commission, ACER and ENTSO-E involve for the drafting of Framework Guidelines and Network Codes to provide harmonized rules for cross-border exchanges of electricity.

The process for the adoption of the framework guidelines and the network codes is the following:

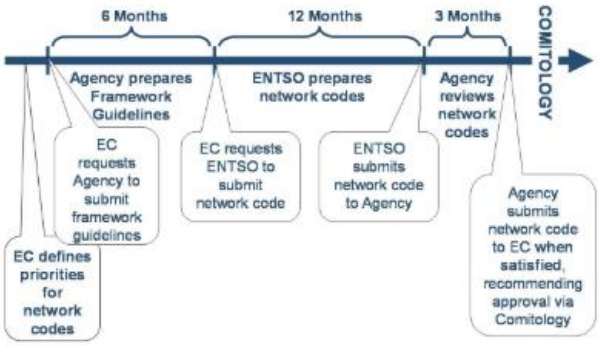


Figure 3.5–The Process for the adoption of the Framework Guidelines and Network Codes[15]

Both ACER and ENTSO-E are under strict consultations and transparency obligations in the delivery of their tasks regarding framework guidelines and network codes. Both organisations are entrusted with the duty to monitor the implementation of the network codes.

ENTSO-E Transparency Platform:

[15]Source: ACER.

An important component to the completion of the Internal Energy Market, transparency has positive effects on market competition and price formation by giving access equally to all market actors, particularly new entrants, thus levelling the playing field.

This in turn improves risk analysis and decision-making; increases competition; provides tools for market monitoring and regulation; and reduces possibilities for market manipulation, thus building trust, market stability and reducing wholesale electricity prices.

In compliance with Regulation (EU) No. 543/2013 on submission and publication of data in electricity markets, the ENTSO-E Transparency Platform was launched on 5 January 2015. The platform regroups fundamental market data into a one-stop view of pan-European electricity generation, consumption and cross-border transportation.

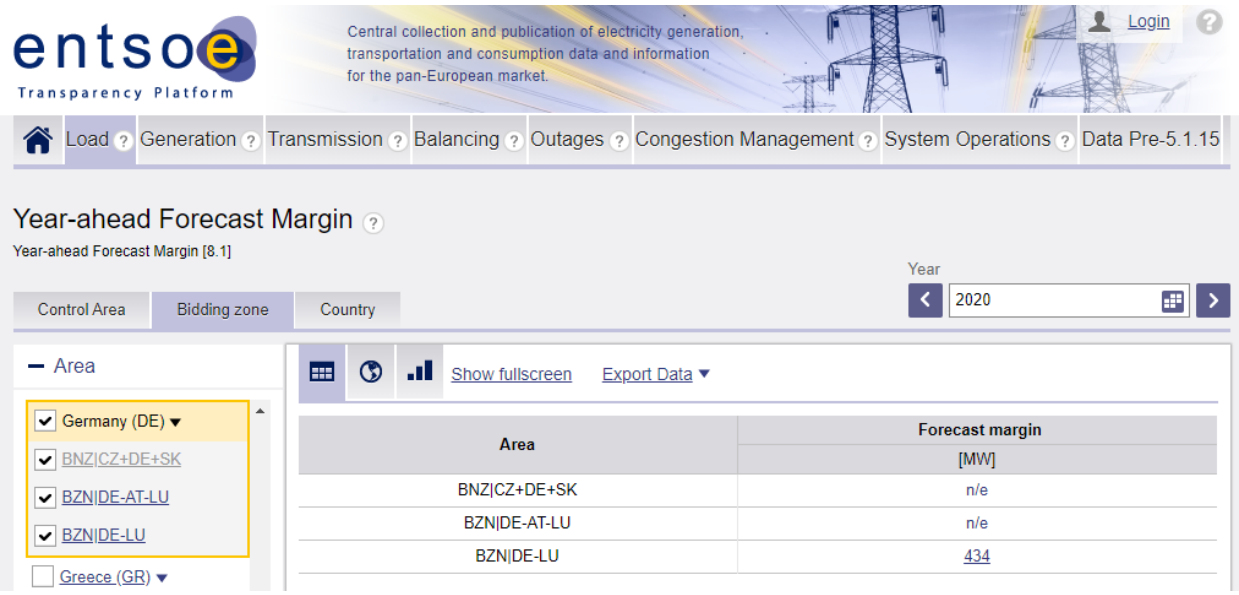


Figure 3.6–A view from ENTSO-E Transparency Platform

The ENTSO-E Transparency Platform replaces entsoe.net, which remains available for consultation, and publish as much as three times more data.

3.2 Germany

The Energy Act assigned the task of regulating Germany's electricity and gas markets to the BNetzA which was founded in 1998, and responsible for critical networks, ensuring competition, promoting investment and protecting consumers. The sectors have been undergoing constant change, so BNetzA'sduty is and will remain varied and important.

The BNetzAisresponsible to promote competition through regulation in the energy, telecommunications, postal and rail sectors and to guarantee non-discriminatory network access. Alongside regulatory measures in the energy

sector, as the national planning authority the BNetzA is also responsible for electricity transmission lines crossing national or federal state borders in the context of the energy transition.

The BNetzA has been assigned key market supervisory tasks resulting from gas and electricity network development planning, from the Market Transparency Unit for Wholesale Electricity and Gas Markets set up in 2013, and from its responsibility for safeguarding security of supply.

The BNetzA's duty to create and secure the basis for efficient competition in the electricity and gas markets. This is done in particular through unbundling and regulating non-discriminatory access to the energy networks, including rates regulation. In addition, the statutory decision in 2011 to phase out nuclear power as part of the Energiewende and the continued expansion of renewable energy require state measures with respect to the various market players, including monitoring the electricity and gas wholesale markets and intervening where necessary to safeguard security of supply. The BNetzA also monitors the development of upstream generation and import markets along with consumer markets.

One of the major tasks for the BNetzA in the context of the energy transition is the fast, large scale expansion of the electricity transmission networks. To achieve this, the BNetzA has been given wide ranging authority in network development planning and in approving network expansion measures. This includes implementing the federal sectoral planning for extra high voltage lines crossing federal state and national borders and, as of 2013, their planning approval. As part of the statutory planning process, the network development plan is constantly being updated to take account of the latest developments. This also involves network planning and connection in the offshore sector.

The BNetzA publishes the results of a survey conducted among market participants in Germany on the remaining barriers to electricity wholesale market trading. The results of the surveys provide input into the assessment of developments in electricity wholesale markets which the BNetzA performs every year for the preparation of its Annual Report.

Table 3.3–Network and system stability: redispatch, grid reserve and feed-in management

Network and system security measures				
		2015	2016	2017
Redispatching				
Total volume[1] of operational plants	GWh	15,436	11,475	18,456
Cost estimate[2] for redispatching	€m	412	223	392
Cost estimate for countertrading	€m	24	12	29
Grid reserve power plants				
Volume[3]	GWh	551	1,209	2,129
Cost estimate for activation	€m	66	103	184
Capacity[4]	MW	7,660	8,383	11,430
Annual costs of holding in reserve	€m	162	183	296
Feed-in management				
Volume of curtailed energy[5]	GWh	4,722	3,743	5,518
Estimated compensation	€m	478	373	610
Feed-in adjustments				
Volume	GWh	27	4	35

Notes:

1) Volumes (reductions and increases) including countertrading and remedial action measures according to monthly report to the BNetzA.

2) TSOs' cost estimate based on actual measures including costs for remedial actions.

3) Activations of grid reserve power plants including test starts and test runs. The feed-in of grid reserve power plants is only increased.

4) Total capacity of German and foreign grid reserve power plants in MW. As at 31 December of the respective year.

5) Reduction of installations remunerated in accordance with the RES or CHP Acts.

As part of its monitoring role, the BNetzA provides quarterly updates on the progress in planning and construction that has occurred for individual projects in the transmission system during the previous three months, as well as transmission links to offshore wind farms. Network optimisation measures – ie the completed and planned activities of network operators to increase the utilisation of the existing transmission system – have also been included in the monitoring since the second quarter of 2018. The status of each project can be viewed at www.netzausbau.de/vorhaben.

More and more electricity is being supplied by smaller and smaller electricity generation installations, which are becoming increasingly integrated in the market. To ensure that this system works properly, it is necessary to have reliable plant data that can be used in a uniform manner by all market players. It was not possible to provide data in a sufficiently high quality using the previous register, so the BNetzA set up a new, comprehensive one known as the **core energy market data register** to make the electricity and gas market fit for the future. The legal basis for the register is laid down in the 2014 Renewable Energy Sources Act (EEG). The new register has been up and running since the beginning of 2019 and permits operators of large and small installations to enter and update the relevant details in an up-to date internet portal. The register can be accessed at www.marktstammdatenregister.de.

3.2.1 Transparency

The purpose of regulation is to establish fair and effective competition in the supply of electricity and gas. The responsibilities of the BNetzA therefore include ensuring non-discriminatory third-party access to networks and policing the use-of-system charges levied by market players.

A non-discriminatory, reasonably priced supply of electricity and gas for all who want it will encourage greater competition in these important (wholesale) markets. And this will ultimately benefit consumers, who can look forward to having a greater selection of energy suppliers to choose from, not to mention lower energy prices.

The BNetzA's monitoring tasks are set out in the Energy Act (EnWG). As part of its activities the BNetzA conducts an annual survey of companies in the energy market.

The BNetzA is required to publish a report annually on the results of its monitoring activities, conducted in the performance of its regulatory tasks in the electricity and gas sectors, most notably to create transparency in the markets. The BNetzA works together with the Bundeskartellamt in drawing up the report.

Moreover, “Energy of the Future" monitoring process has been initiated. In this process the federal government closely observes the implementation of its Energy Concept and package of measures, plus their targets, with a view to a secure, economic and sustainable energy supply.

The organisation of the monitoring process has been laid down by Cabinet decision as follows:

- The Federal Economics Minister is to draw up an annual Monitoring Report with input from the other departments concerned.
- A Progress Report is to be drawn up every three years, beginning in 2014.
- This process is to be supported by an independent commission of four distinguished energy experts.

- An Administrative Unit has been established at the BNetzA for organisational backup.

The annual monitoring report is essentially factual. As such it shows the progress made in reaching the targets and the level of implementation. The Progress Report is strategic and more extensive; it will focus on identifying causes and obstacles and propose further action, where necessary.

3.2.2 Efficiency Benchmarking

The BNetzA carried out efficiency benchmarkingfor German TSOs. The efficiency scores for the German TSOs were identified ahead of the third regulatory period using a generic network analysis. In the course of designing the model, it became clear that the current situation – with the German transmission systems not being large enough for the ongoing energy transition and the increase in necessary congestion management measures – could only be represented in a strict structural efficiency bench marking using greatly simplifying assumptions. As a result, three of the TSOs achieved efficiency scores of 100% and the fourth 99.92%.

3.2.3 Quality Element

Incentive regulation harbours the risk that operators will make the required cuts in revenue by saving costs through not investing in their networks or not carrying out other necessary measures to maintain or improve quality of supply. This could lead to a poorer quality of supply. The Energy Industry Act (EnWG) and Incentive Regulation Ordinance (ARegV) therefore provide for regulation of supply quality in energy supply networks.In general, this system is valid for the TSO as well. However, it is not applied to the TSO, because there is no reliable data available concerning continuity level on high voltage level and extra high voltage level. The system is an addition to the incentive-based regulation, which was implemented in 2009. No cost estimation surveys, or estimations of an optimal continuity level were conducted. Network operators are able to get a reward or a penalty which is dependent on their overall performance concerning continuity of supply in comparison to the other network operators.The system of quality regulation has a neutral effect on revenues, ie the total mark-ups and deductions cancel each other out across all network operators. With the aim of further developing the quality regulation system, the methodology for determining the quality elements based on network reliability is currently being reviewed with expert support.

3.3 Norway

The Norwegian regulations for system operation govern the duties and responsibilities related to Statnett's conduct as TSO. It is one of the regulations under the Norwegian Energy Act of 1990. The following principles apply for the TSO's conduct:

The TSO shall:

- Provide frequency regulation – ensure momentary balance at all times.
- Act in a neutral and non-discriminatory manner.
- Develop market solutions – ensure efficient development and utilisation of the power system.
- Make use of means based on market principles to the widest extent possible.
- Coordinate and monitor the dispositions of licensees and end-users.
- Distribute information of importance to the power market and the general quality of supply.

As the Norwegian regulatory authority, NVE controls and audits Statnett's activities as TSO.NVE and Statnett have review meetings biannually. The meetings revolve around the license for system operation, system operation

regulations, revenue cap regulations and license for foreign trade. NVE convenes the meetings and writes the minutes. The minutes are publicly available on NVE's website.

The Norwegian regulation of quality of supply applies to those who wholly or partially own, operate or use electrical installations or electrical equipment connected to the Norwegian power system.

Everyone connected to the power grid will influence the quality of the electricity supplied from the system to a certain extent. The term 'quality of electricity supply' includes continuity of supply, voltage quality and commercial quality, in terms of information on the level of continuity of supply and voltage quality to be expected.

3.3.1 Transparency

The Statnett is responsible for developing and operating the "data hubs" for each of the electricity retail markets in the Norway.The Norwegian data hub is now in operation and was successfully launched on February 18th, 2019.

Suppliers are required to provide customers with access to their metering data on the web. Customers may also directly access "Elhub" to see data that is stored there and see who has access to the data. Third parties may access Elhub with permission from the customers. NVE is in charge of the Norwegian Elhub project at a superior level, while Statnett is responsible for the operational implementation. NVE makes all binding decisions regarding Elhub for Statnett, DSOs, suppliers and third-party service providers. Statnett provides non-binding guidelines. As required by NVE, Statnett has established a stakeholder council for the project. The council consists of representatives from DSOs and suppliers, while NVE participates as observer. The council has provided the industry with updates on the progress of the project from Statnett and NVE and invited to discussions of issues raised by any of the parties. NVE has also required that Statnett applies an external Quality Assurance (QA). Since the beginning of 2014 three QA revisions of the project have been undertaken, resulting in recommendations for improvement of the project regarding project management, risk management, cost control, security, migration, architecture, contract features, change request handling, stakeholder interaction, resources/competence, progress, goals/mandate of the project and realization of benefits.

3.3.2 Continuity of supply

Continuity of supply is the availability of electrical energy, measured by the frequency and duration of interruptions.NVE has not set quantified requirements for the continuity of supply, but Economic Revenue Regulations take the cost of the interruptions into account when deciding the income cap for network companies. Nevertheless, all network companies are obliged to fully restore the power supply without undue delay after an interruption. NVE may impose network companies to limit the consequences of interruptions.

The Norwegian financial incentive-based regulation on continuity of supply (CENS) gives the network companies, TSO level, economic motivation to ensure an optimal resource allocation when all minimum requirements are complied with. The objective is to achieve the most optimal level of continuity of supply for the society as a whole. The customers' costs related to interruptions are detected through nationwide surveys and will vary between different customer groups, when the interruptions occur etc. The costs related to investments to reduce the extent of interruptions will on the other hand depend significantly on the location of the customers' connection to the power system, including network topology, geography, climate etc. From the Regulatory point of view, it is important that decisions influencing the continuity of supply are also based on cost-benefit analyses[16]. Thus, the costs related to decreasing the extent of interruptions must be lower than the future decrease in customers' interruption costs

[16]CIRED paper no 494 and CEER GGP C10-EQS-41-03.

due to the investment. Incentives to optimise the continuity of supply levels, should take into account all cost elements. Consequently, for some customers this may imply reduced, increased or maintained CENS levels. No

minimum requirements and no caps or floor are addressed in the schemes. For TSOs, the indicators used include interrupted power at a specific reference time, duration, time of occurrence (during the day, during the week, calendar month), whether the interruption was notified in advance or not.

Since 1995, network companies have been obliged to report interruptions above 1 kV to NVE. From 2014, interruptions on all voltage levels have been reported. NVE publishes an annual report where data on continuity of

supply for each network company is presented. The network companies analyze all operational disturbances above 1 kV and report this data to the TSO, Statnett SF. The TSO publishes an annual report with data from these analyses, for voltage levels above and below 33 kV. All network companies use the national interruption reporting system FASIT (in Norwegian) for registration and reporting interruptions.

NVE considers the continuity of the electrical supply to be kept as good. However, the continuity of supply is highly influenced by conditions in the surroundings, such as wind, snow, ice, thunderstorms, vegetation, birds/animals, etc. NVE does not exclude any exceptional events from the interruption data.

Voltage quality: Voltage quality is a description of the applicability of electrical energy, and describes how the magnitude or waveform deviates from the ideal values. The voltage needs to be within a given quality to be useable and not cause damage to electrical equipment. Consequences of poor voltage quality include breakdown of equipment, reduced lifetime of devices and flickering in lighting.

The Norwegian quality of supply regulation includes minimum requirements for voltage frequency, supply voltage variations, rapid voltage changes, short and long-term flickering, voltage unbalance and harmonic voltages including total harmonic distortion (THD). If considered necessary, NVE may set minimum requirements for other voltage disturbances, such as voltage dips, voltage swells, transient overvoltage, inter-harmonic voltage and main signalling voltage.

Network companies have been required to continuously register dips, swells and rapid voltage changes in their own characteristic high and medium voltage network since 2006. In addition, from 2014, they have been obliged to register THD and flickering. From 2014, network companies have also been obliged to report the abovementioned voltage quality parameters (except rapid voltage changes) to NVE.

Commercial quality: In the event of customer complaints regarding power quality, network companies have to make the necessary investigations in order verify compliance with the requirements according to regulations. If the complaint concerns voltage quality, on-site measurements must be made according to relevant IEC-standards. If the measurements prove non-compliance to limits set according to regulations, the network companies must identify the reason for this and who is responsible for the violation. Network companies cannot charge the customer for these investigations, if the complaint is legitimate. If the TSO or DSOs have carried out all the aforementioned investigations without reaching an agreement with the customer, the case can be brought forward to NVE for investigation.

Network companies are obliged to give information on given data for the quality of supply in their network within one month, upon request by current or potential customers. This data includes, amongst other things, results from registration of interruption data, analyses of operational disturbances and specific conditions in the network that could have an influence on the quality of supply for the customer.

The wholesale market is divided into different timeframes of subsequent markets following each other on the road towards production time. In these markets, producers, suppliers and large consumers meet to trade.

3.3.3 Wholesale market

NVE has assigned a market place concession to Nord Pool to operate the physical power exchange and is responsible for ensuring that the marketplace is operated efficiently and effectively. Concessions to operate cross-border

interconnections are granted by the Ministry of Petroleum and Energy. NVE monitors compliance with concessions given to the Statnett for operating cross-border interconnections, mainly in close dialogue with the relevant authorities in neighboring countries. Furthermore, NVE monitors Statnett as system operator in Norway to make sure they operate the system in an efficient and neutral manner.

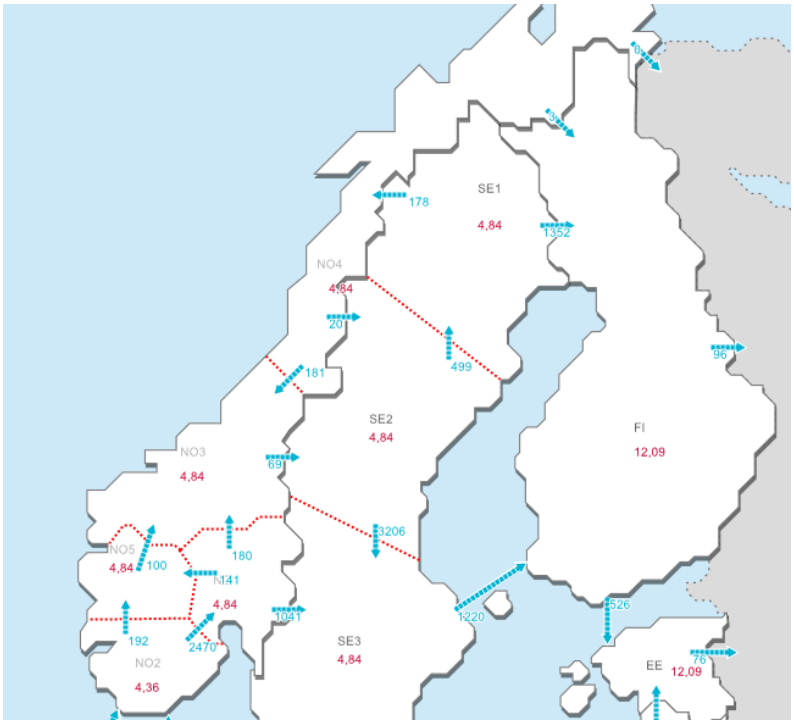


Figure 3.7 – North-pool cross-border power flows and prices[17]

The Nordic region is a single electricity market divided into different price areas (e.g. NO1). The map shows how much power is being exchanged between the different price areas (spot market areas) as a real-time manner.

The price areas are market areas for reporting purchases and sales of power on the power exchange. This means that bidding for purchases and sales of power shall take place specifically for each spot market area for every hour

[17] Source: https://www.statnett.no/en/for-stakeholders-in-the-power-industry/data-from-the-power-system/

during the next 24 hours. The price is thus not regulated by the authorities but is a result of the supply and demand for power for this market area which is reported to the power exchange.

Consequently, the power and market situation in each area will be determined by which direction power is flowing between the spot market areas. Power generators will normally set higher prices for their power in areas with a shortage of energy than generators in areas with a better balance of energy.

This will, in turn, lead to lower power generation in areas with a shortage of energy, while areas with a better balance of energy will produce more than the consumption within their own area. Power will thus flow from low-price areas to high-price areas.

This will also result in full utilisation of transmission capacity when there is a need to transmit power from one area to another. Higher prices in areas with a shortage of energy will also contribute toward reducing consumption. This division into price areas is intended to contribute toward a reduction in the risk of local or regional power deficits.

The Nord Pool markets are divided into several bidding areas. The available transmission capacity may vary and congest the flow of power between bidding areas, and thereby different area prices are established.

For each Nordic country, the local TSO decides which bidding areas the country is divided into. The number of Norwegian bidding areas can vary based on the transmission system constraints.

The different bidding areas help indicate constraints in the transmission systems and ensure that regional market conditions are reflected in the price. Due to bottlenecks in the transmission system, bidding areas may get different prices called area prices. When there are constraints in transmission capacity between two bidding areas, power will always go from the low-price area to the high price area. This principle is right for society: the commodity ought to move towards the high price where the demand for power is the highest.

3.4 Portugal

Portuguese Energy Services Regulatory Authority (ERSE, EntidadeReguladora dos ServiçosEnergéticos), the body in charge of regulating the natural gas and electricity sectors in Portugal, in compliance with the provisions of Directives 2009/72/EC (electricity) and 2009/73/EC (natural gas) of the European Parliament and of the Council, both of 13 July 2009. These Directives dictate that regulators must annually inform the national authorities, the European Commission and the Agency for the Cooperation of Energy Regulators (ACER) on their activities and on any developments observed in the electricity and natural gas markets.

National legislation, namely Decree-Law No. 215-A/2012 of 8 October, and Decree-Law No. 230/2012 of 26 October, also require ERSE to prepare an annual report on the functioning of the electricity and natural gas markets and on the degree of the effective competition within those markets. Accordingly, ERSE must send its report to the member of the Government responsible for the energy sector, to the Portuguese Parliament and to the European Commission. The report must also be published. Portuguese Energy Services Regulatory Authority (ERSE, EntidadeReguladora dos ServiçosEnergéticos), the body in charge of regulating the natural gas and electricity sectors in Portugal, in compliance with the provisions of Directives 2009/72/EC (electricity) and 2009/73/EC (natural gas) of the European Parliament and of the Council, both of 13 July 2009. These Directives dictate that regulators must annually inform the national authorities, the European Commission and the Agency for the Cooperation of Energy Regulators (ACER) on their activities and on any developments observed in the electricity and natural gas markets.

National legislation, namely Decree-Law No. 215-A/2012 of 8 October, and Decree-Law No. 230/2012 of 26 October, also require ERSE to prepare an annual report on the functioning of the electricity and natural gas markets and on the degree of the effective competition within those markets. Accordingly, ERSE must send its report to the member of the Government responsible for the energy sector, to the Portuguese Parliament and to the European Commission. The report must also be published.

3.4.1 Network access

The network connection process, shown in the figure above, is strictly managed by several specialized areas in REN to ensure that new installations are developed and connected to the RNT in safety and with the technical accuracy required by legislation and regulations, as well as by REN internal standards. In addition to the technical accuracy required in this type of connection, a close relationship between REN and promoters is vital for the control, monitoring and success of the connection to the network of the production/consumption installation.

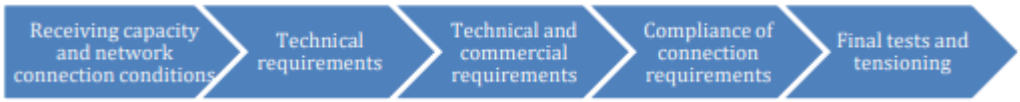


Figure 3.8– Progress for REN Network Access

3.4.2 Quality of Service

The quality of service of the National Transmission Network (RNT) was marked in 2018 by a large-scale fire on 4 August, which affected the Carregado – Seixal line, causing two interruptions. One of these interruptions lasted 42.7 minutes, corresponding to non-supplied energy of 74.1 MWh, which in accordance with the Quality of Service Regulations is classified as an Incident of Significant Impact. Despite this, the quality of technical service provided - understood as being security and continuity of supply of electrical Minutes Interruptions by fortuitous or force majeure and exceptional events Other interruptions power with power with the necessary technical characteristics - was positive. The trend observed in previous years towards gradual and sustained improvement in the performance of the National Transmission System (RNT) was consolidated.

With regard to continuity of service, the fire which affected the Carregado – Seixal line had specific impact on the EIT, ENS, SAIDI and SARI indicators which recorded values much above those of recent years. In relation to the Quality of Service Regulations (QSR), REN requested ERSE to classify both interruptions affecting this line on 4 August as an exceptional event. The remaining general indicators established in the QSR (SAIFI and MAIFI) had figures in line with those of recent years. It can thus be seen that the policies and strategies implemented by the RNT concessionaire for electrical power transmission, are both suitable and efficient in network operation (attributes which are confirmed by comparative analysis studies of technical-economic performance among electricity TSOs). Equivalent Interruption Time (EIT), an indicator of overall performance commonly used by electrical utility firms, attributed directly to REN, was 49.8 seconds. This corresponds to energy not supplied (ENS) of 79.1 MWh. Both interruptions on the Carregado – Seixal line accounted for 96.8% of this figure, in other words, these interruptions led to 76.6 MWh of ENS. This EIT value represents what would be a practically uninterrupted supply of electrical power (at 99.9998% of the time, i.e. 999 hours, 59 minutes and 54 seconds in every 1,000 hours) to a single 'equivalent' consumer (all of mainland Portugal), with power and energy which would represent all the different delivery points to the national distribution network and consumers directly connected to the RNT.

Table 3.4–Continuity of supply indicators in Mainland Portugal, 201718

Voltage Level	Indicator	Interruptions			
		Planned	Unplanned		
			Operator Responsibility	Exceptional Events	Waiting for Classification as Exceptional Event
Transmission	TIE(min)	-	0.090	-	0.020
	SAIFI(int)	-	0.040	-	0.050
	SAIDI(min)	-	0.130	-	2.650
	MAIFI(int)	-	0.050	-	0.030

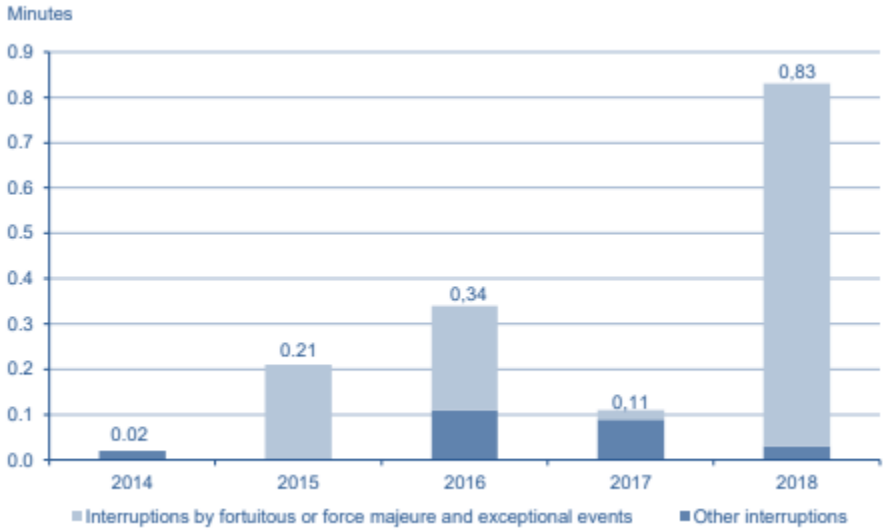


Figure 3.9–Equivalent Interruption Time

3.4.3 Balancing

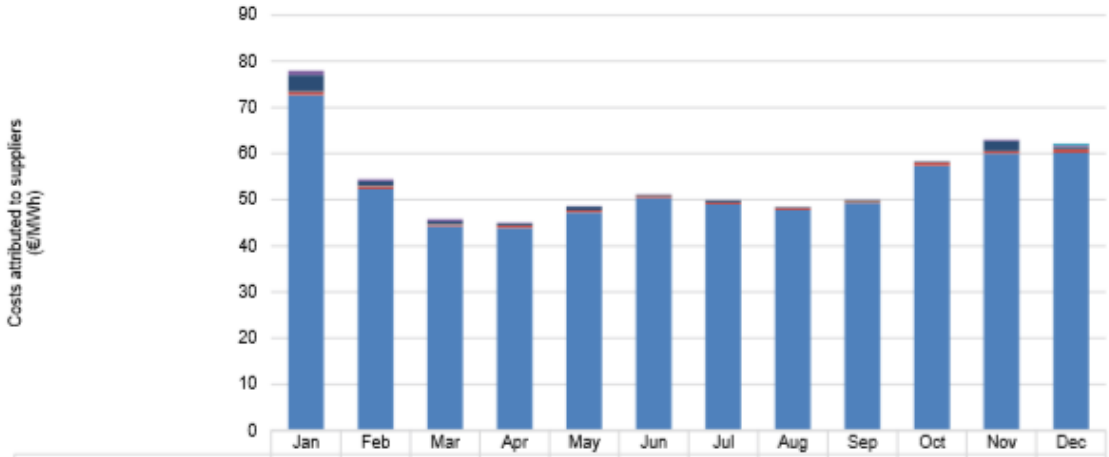
The Portuguese legal and economic context of the electricity in 2017 was fairly stable, with the sectors taking additional steps in the direction already pursued in the recent past, namely: the integration of wholesale markets in Iberia.

[18]Source: REN and EDP Distribuição data.

Imbalances between production and demand and technical constraints are dealt within the scope of the ancillary services market, which is managed by REN in its capacity as Global Technical System Manager, as set out in the

Network Operation Code (ROR)1, and in the Manual of Procedures for Global Technical System Management for the Electrical System (MPGGS)2.

The energy mobilised to resolve technical constraints and the contracted secondary regulation band involve costs that are paid by all customers. Additionally, the costs of secondary regulation reserve and regulating reserve energy mobilisation, for each hourly period, which are used to cancel out the agents' imbalances in real time, are paid by all the market agents that have deviated in that period.the impact of the daily, intraday and ancillary services markets on the costs allocated to suppliers in 2017, including the breakdown of daily and intraday market share and of the ancillary services market is shown in the following Figure.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total ancillary services markets	5.29	2.15	1.58	1.12	1.42	0.76	0.87	0.67	0.69	0.92	3.08	1.77
FBDP Technical constraints	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
RT Technical constraints	1.00	0.45	0.52	0.11	0.12	0.09	0.02	0.06	0.06	0.04	0.35	0.36
Imbalances	3.46	1.00	0.57	0.41	0.76	0.21	0.40	0.14	0.15	0.14	2.17	0.48
Extraordinary secondary band	0.04	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.03
Secondary band	0.79	0.66	0.47	0.57	0.54	0.46	0.45	0.47	0.47	0.74	0.55	0.88
Daily and Intraday Market	72.66	52.31	44.21	43.89	47.22	50.39	48.98	47.76	49.28	57.35	60.02	60.14

Figure 3.10–Impact of daily, intraday and ancillary services markets on the costs allocated to suppliers operating in Portugal (2017)[19]

3.4.4 Wholesale market

On July 1, 2007, the Spanish electricity system was integrated with the Portuguese electricity system to form the Iberian Electricity Market (**MIBEL**). MIBEL is part of the **Internal Energy Market of the European Union**, arising from the liberalisation of electricity generation and commercialisation activities.The operators of the transport grid, Red Eléctrica de España (REE) in Spain and Redes EnergéticasNacionais (REN) in Portugal, are responsible for guaranteeing the operation of the system and the technical management of the grid, while the entity in charge of

[19]Source: REN data. Note: FBDP - Base Daily Operating Schedule and RT - Real Time.

manage the wholesale market spot MIBEL is the Operator of the Iberian Energy Market-Spanish Pole (OMIE), which is made up of the daily market, the auction intraday markets and the continuous intraday market.

The electrical interconnections between the European markets contribute to the security and continuity of the electricity supply in the interconnected systems and in turn allow a greater integration of the renewable energies. The interconnections allow the electricity generation to be carried out with the most efficient technologies and the energy to flow from where it is cheaper to where it is more expensive. The energy exchanges allow the offers of the Iberian agents to compete with the offers of the other European agents and that all markets can benefit at all times from the most competitive or favourable conditions.

Daily Interconnection Capacity of IBERIAN Market is shown below as an example.

Table 3.5 – Daily Interconnection Capacity of IBERIAN Market (Actual and Forecast)[20]

Daily Interconnection Capacity Forecast

Import Capacity Export Capacity

HOURS Import Capacity

HOUR	27 Mar	28 Mar	29 Mar	30 Mar	31 Mar	01 Apr	02 Apr	03 Apr	04 Apr	05 Apr	06 Apr	07 Apr	08 Apr	09 Apr	10 Apr
1	3060	2295	1980	1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
2	2475	2295	1980	2655	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
3	2475	2295	2160	2655	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
4	2475	2295	2160	2655	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
5	2475	2295	2160	2655	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
6	2475	2295	2160	2655	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
7	2475	2295	2520	2655	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
8	2475	2295	2520	2115	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
9	2475	2295	2520	2115	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
10	2970	2655	2520	2115	2800	2800	2800	2800	2800	2700	2800	2800	2800	2800	2700
11	2970	2655	2880	2115	2800	2800	2800	2800	2800	2700	2800	2800	2800	2800	2700
12	2970	2655	2880	2025	2800	2800	2800	2800	2800	2700	2800	2800	2800	2800	2700
13	2970	2925	2880	2025	2800	2800	2800	2800	2800	2700	2800	2800	2800	2800	2700
14	2970	2925	2880	2025	2800	2800	2800	2800	1800	2700	2800	2800	2800	2800	2700
15	2970	2925	2880	2025	2800	2800	2800	2800	1800	2700	2800	2800	2800	2800	2700
16	2970	2925	2880	2025	2800	2800	2800	2800	1800	2700	2800	2800	2800	2800	2700
17	2970	2925	2880	2025	2800	2800	2800	2800	1800	2700	2800	2800	2800	2800	2700
18	2970	2925	1980	2025	2800	2800	2800	2800	2800	2700	2800	2800	2800	2800	2700
19	3060	2475	1980	1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
20	3060	2475	1980	1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
21	3060	2475	1980	1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
22	3060	2475	1980	1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
23	3060	2475	1980	1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
24	3060	2475		1395	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800

Units: MW Actual / Forecast

[20] Source: http://www.mercado.ren.pt/EN/Electr/MarketInfo/Interconnections/CapForecast/Pages/Daily.aspx

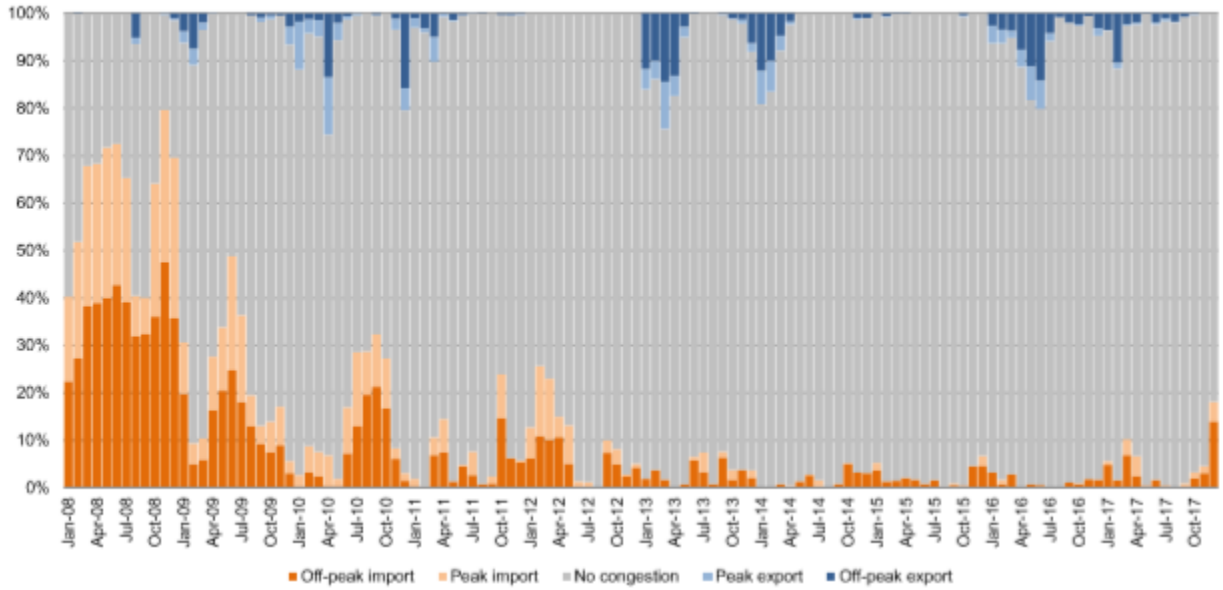


Figure 3.11–Usage of the Portugal-Spain interconnection capacity, 2008 to 2017[21]

3.4.5 Security of Supply

In the Portuguese legal framework, the competences concerning the security of supply in the electricity sector are the responsibility of the Government, which has delegated its monitoring to the DGEG77. However, ERSE monitors the evolution of the installed capacity and the evolution of demand, which is addressed in greater detail below.

With a view to assessing the regime for the allocation of incentives to ensure security reserve provided by the electricity-generating plants to the National Electricity System (SEN), in June 2016, ERSE published its technical assessment report and established, as its main recommendation, the understanding that a possible review of the capacity mechanism payments should be guided by the creation of a mechanism governed by market rules, in line with the European framework in this area and properly structured at the regional level within the framework of MIBEL. This key recommendation was supported by the following criteria and reasoning: regional and European harmonisation, EC guidelines on State aid and compliance with market rules.

3.5 UK

Each year, the transmission and distribution network owners must report to Ofgem on their performance. Where they have not performed well, Ofgem takes action. Under Ofgem:

“RIIO stands for revenue = incentives + innovation + outputs. This price control began on 1 April 2013 and runs for eight years, to 2021”

model each onshore electricity Transmission Owner (TO) company has to deliver and report on a range of outputs. The three TOs are:

1. National Grid Electricity Transmission plc (NGET) for England and Wales

[21] Source: REN and OMIE data.

2. Scottish Power Transmission Limited (SPT) for Southern Scotland
3. Scottish Hydro Electric Transmission plc (SHET) for Northern Scotland and Scottish Islands Groups.

In order to makethe energy market as transparent as possible so consumers, market participants and other interested parties, DataPortal gives direct access to all interactive data charts in a single location, alongside indicators which are key for performance monitoring.

Indicators about networks, customer service and wholesalemarket are published by Ofgem for transparency and customer protection purposes. There are also other issues monitored by Ofgem such as EU requirements on unbundling, transparency, compliance etc.

The data presented as network indicators gives a snapshot of the network owners' financial performance and their performance against key RIIO-T1 outputs for consumers. These network indicators are;

- Customer Satisfaction,
- Network Connections,
- Volume of Energy not Supplied,
- Environmental Impact; emissions,
- Return on regulatory equity,
- Expenditure vs allowance,
- Estimated network cost per domestic customer.

As part of the performance monitoring, Ofgem also publish an annual report.This report covers key findings on the delivery and financial performance of TO businesses through the RIIO-ET1 price control period including comment on certain aspects of the electricity transmission System Operator's (SO) performance. It presents TO performance in the following areas:

- achievement of annual output targets (with a specific focus on performance in 2017-18).
- anticipated level of delivery against outputs that adjust automatically with changing needs.
- the recent progress against the relevant innovation mechanisms.
- an overview of the TO's current expectations of costs incurred against the total allowance anticipated across the eight-year period.

3.5.1 Network

Indicators monitored and published by Ofgem about network are as follows:

Customer Satisfaction: Ofgem want electricity transmission network owners to understand consumers' needs and proactively engage with them to make sure these are met. Network owners receive an annual financial reward or penalty based on their survey scores. Rewards can be up to 0.5% of annual revenues per company. There is also a stakeholder engagement incentive discretionary reward, which is an annual panel assessment of stakeholder engagement. For the customer and stakeholder satisfaction surveys incentive, companies may be rewarded or penalised depending on their performance against the targets set.

The methodology for this incentive is outlined in the network owner's licence conditions. Ofgem and an independent panel of experts conduct the assessment for the stakeholder engagement incentive.

TOs are scored against the three broad measures of customer service that are:

– Stakeholder engagement

- Stakeholder survey
- customer survey (only for NGET)

The following chart shows performance against two of three scores for five years.

Figure 3.12–Performance for five years

Network Connection: Electricity TOs are required to deliver timely and effective connections to the network.

Under the price control, Ofgem expect from TOs to provide a good service for customers wanting to connect to the network. Each year, TOs must report on their performance under the RIIO-T1 price control. Ofgem's review of their submissions and supporting information informs annual publications on TO performance.

The following chart is an indicator of company performance on network connections delivered on time over the completed years of the RIIO-T1 price control. Ofgem update this chart on an annual basis.

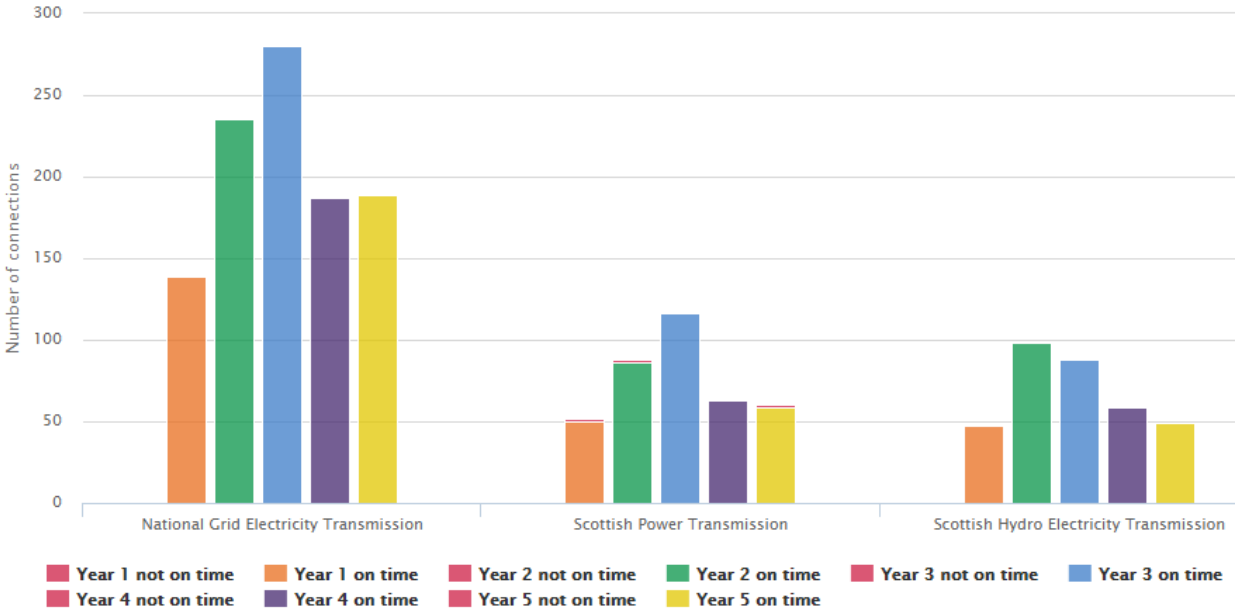


Figure 3.13–Network Connection by TOs

Volume of Energy not Supplied: Ofgem sets targets for each TOs' level of energy not supplied. Under the price control, Ofgem expect from TOs to maintain network reliability and reduce the number and duration of power cuts.

Each year, TOs as network companies must report on their performance under the RIIO-T1 price control. Ofgem's review of their submissions and supporting information informs our annual publications on network company performance.

The following chart is an indicator of TOcompany performance on reliability and availability of energy. It shows the volume of electricity not supplied by electricity TOs. 'Energy not supplied' means the volume of energy to customers that is lost as a result of faults or failures on the network. Ofgem update this chart on an annual basis.

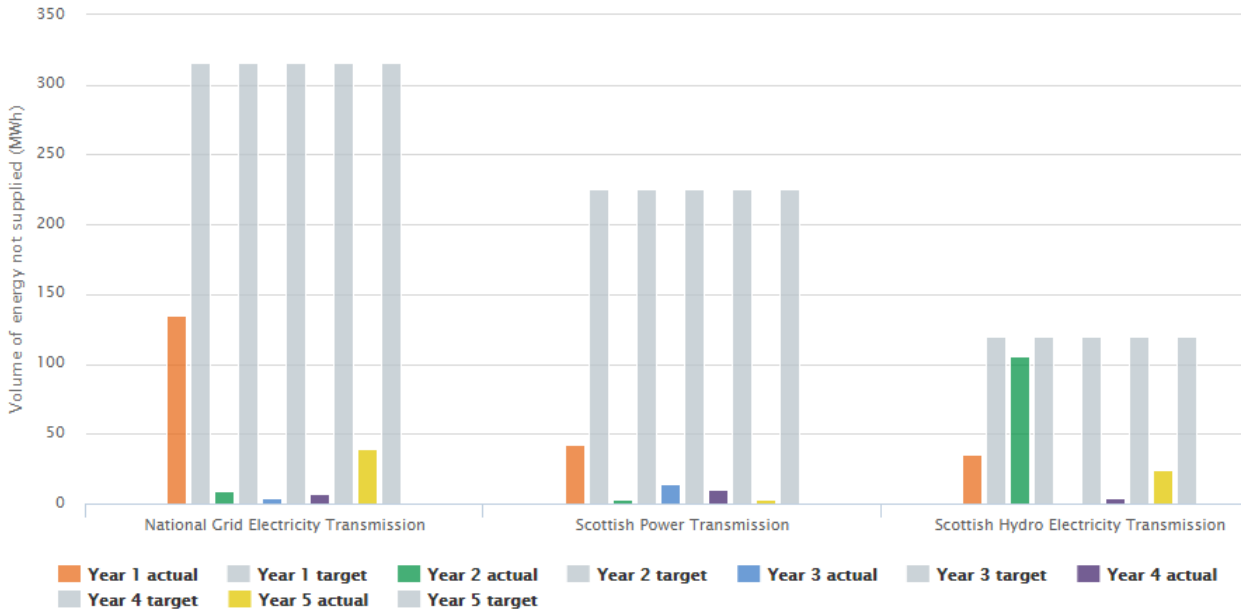


Figure 3.14–Volume of energy not supplied

Environmental Impact: Sulphur Hexafluoride (SF6) emissions is an extremely effective electrical insulator and so is used in high-voltage switchgear and other electrical equipment. It is also a potent greenhouse gas. Electricity TOs are incentivised to limit their emissions of SF6. Ofgem target levels of emissions that Ofgem expect companies to beat.

Each year, network companies must report on their performance under the RIIO-T1 price control. Ofgem's review of their submissions and supporting information informs annual publications on TO as a network company performance.

The following chart is an indicator of environmental impact. It shows company performance against an emission reduction target for electricity transmission owners must deliver for consumers under RIIO-T1. Ofgem update this chart on an annual basis.

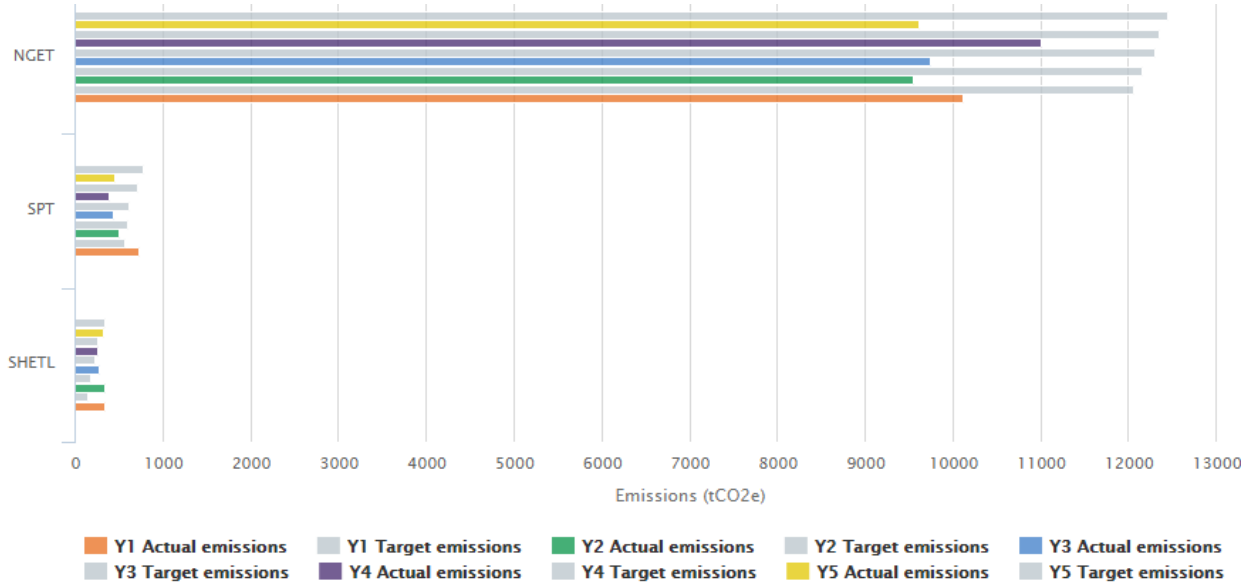


Figure 3.15–Environmental targets;emissions

Rate of Regulatory Equity (RoRE): RoREis used to monitor the financial performance of network companies under the price control. RoRE should be compared to the cost of equity allowed at the start of the price control. For all electricity TOs, this was 7.0%. No electricity TOs are forecast to earn returns below their cost of equity.The numbers include the impact of the Mid-Period Review and National Grid's voluntary deferral.

Ofgem'sRoRE calculation measures TO companies' performance for the RIIO-1 period, this includes the first five years actual return and their forecast performance for the remaining three years of RIIO-1.

ReportedRoRE values for the TO companies compared against the assumptions which Ofgem set for RIIO-1. Ofgem's RoRE now includes their actual and forecast financing (cost of debt) and tax performance. This is a new way of reporting RoRE, and values may not be comparable with the values which was published in the past. Ofgem's calculation assumes all outputs will be delivered.

Following chart is an indicator of financial performance. It shows Ofgem's estimates of electricity transmission owners' return on regulatory equity (RoRE). It is current view of an eight-year average RoRE over RIIO-T1.This chart is updatedon an annual basis

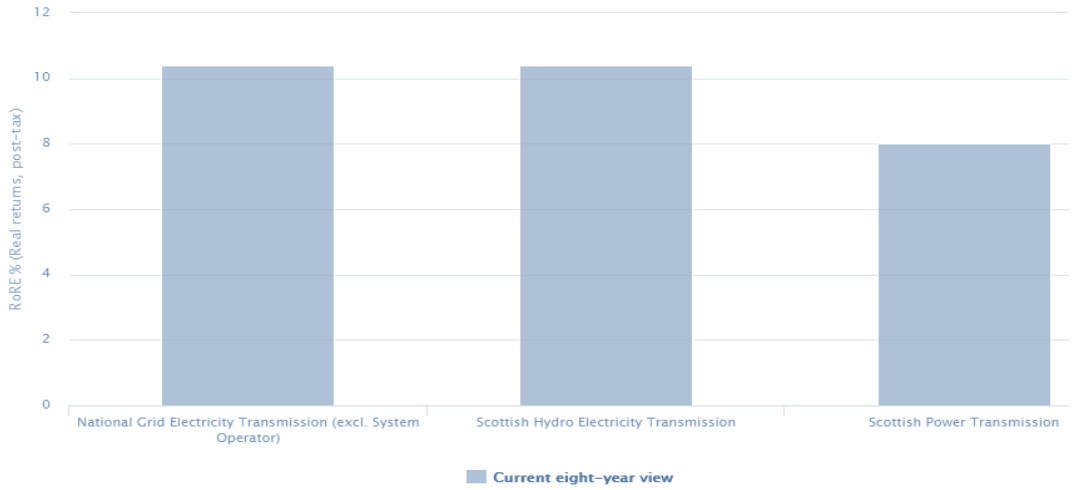


Figure 3.16–Return on Regulatory Equity

Expenditure vs Allowance: This chart is an indicator of company financial performance against cost allowances for the first four years of RIIO-T1.Ofgem set the total amount each TO company can spend ahead of the price control (company 'allowances') and monitor their actual spend ('total expenditure') against these amounts annually. TOs as Network companies are allowed to retain a part of any savings achieved, with the rest being passed on to consumers.

Each year, TOs as network companies must report on their performance under the RIIO-T1 price control. Ofgem's review of their submissions and supporting information informs our annual publications on TO network company performance.

The following chart is an indicator of financial performance. It compares electricity TOs' realised total expenditure for their regulated business activities against their allowance for each year of the RIIO-T1 network price control. Ofgem update this chart on an annual basis.

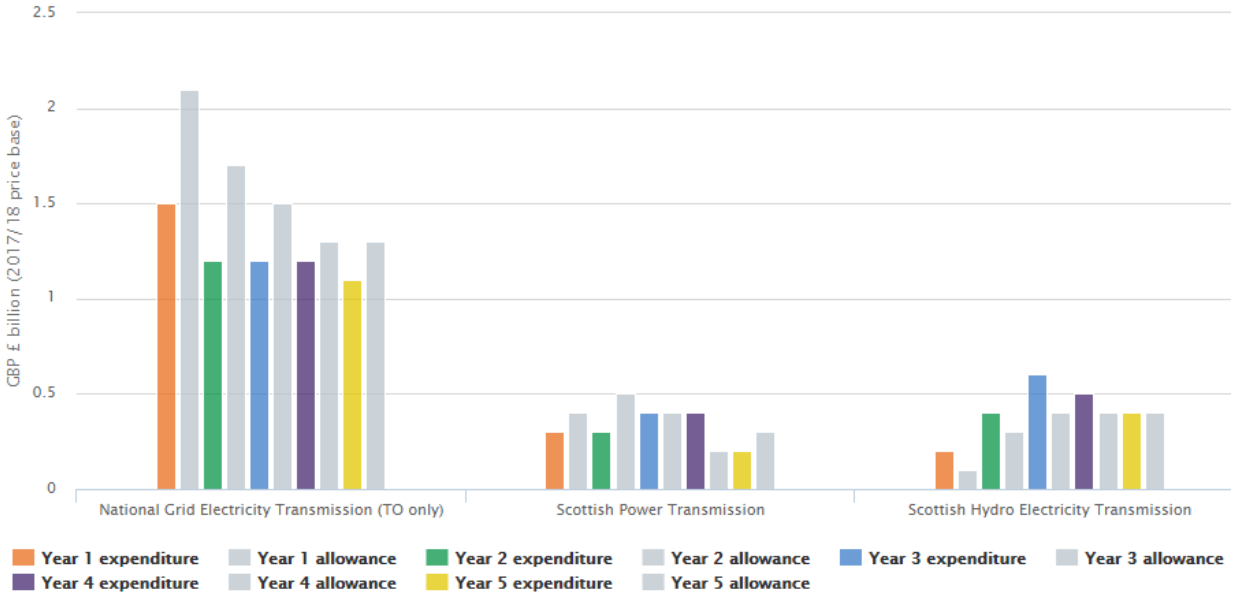


Figure 3.17–Expenditure vs allowance

Estimated Network Costs per Domestic Customer: Suppliers are charged for the costs to build, maintain, improve and operate the energy networks. Most of the networks are owned by monopoly businesses. Therefore through regulation, Ofgem limit the revenue that these companies can recover from customer charges to run the networks.

The network charges paid by suppliers vary depending on where their customers live, what type of meter they have, when energy is used and how much energy they use. In total, these charges accounted for approximately a fifth of a dual fuel bill in 2019.

Different charges apply for the high voltage/pressure transmission networks (which take electricity and gas around UK) and the lower voltage/pressure distribution networks, which connect customers to the overall networks.

As well as the charges to suppliers that are considered here, electricity generators and gas producers are also charged for their use of the networks. It is important to note that trends in network costs will therefore also affect supplier costs indirectly through wholesale prices.

Network costs are calculated by combining charging information published by the network companies with assumptions about consumption and losses for domestic customers.

All costs are calculated for medium annual typical domestic consumption values of 12,000kWh for gas and 3,100kWh of electricity, which is held fixed across the charging years. The actual network costs a supplier incurs to serve a customer will depend on how much energy is used, the timing of its use as well as the charges that apply from one year to the next.

The costs shown are UK averages, calculated by taking a simple unweighted average of the tariffs that apply in different regions of the country.

The costs are expressed in nominal money (i.e. the amount of money a customer 'pays over the counter'), rather than in real terms (i.e. after adjusting for inflation). For electricity, the costs reported are for a standard unrestricted meter.

Balancing Services Use of System charges are not included on the chart. These charges cover the cost of services used to balance the electricity system and internal system operator operating costs.

The methodology used to calculate these charges is consistent with Ofgem's methodology for the Default Tariff Cap.

The following chart shows Ofgem's estimate of trends in the annual cost of the different components of network charges for a domestic customer with a fixed amount of consumption.

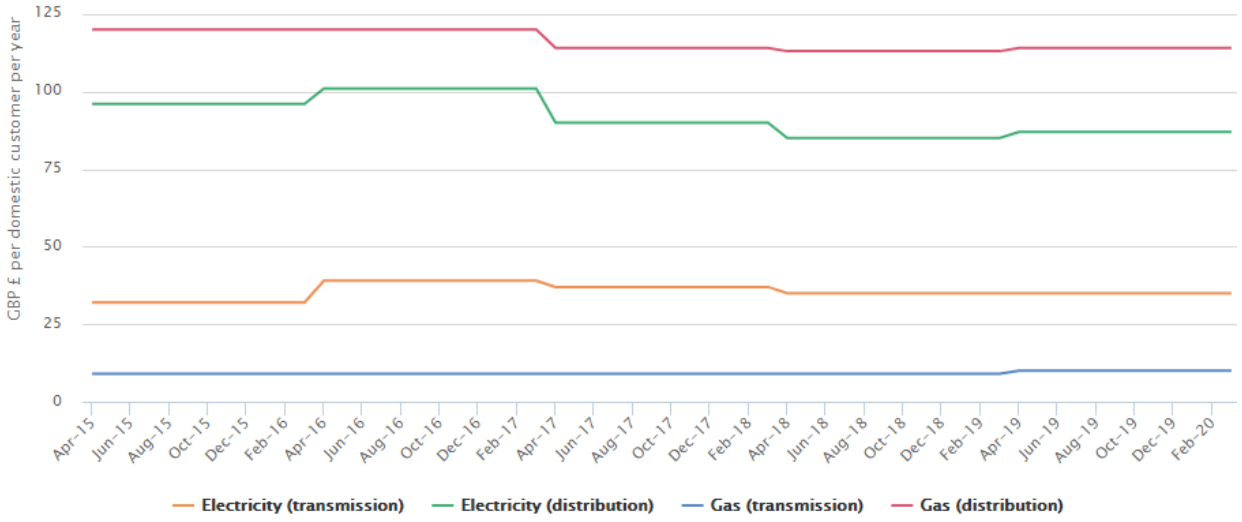


Figure 3.18– Estimated network cost per domestic customer

3.5.2 Monitoring of TOs under RIIO Model

Each year Ofgem report on how the onshore TOs have performed against the outputs and allowances set for the RIIO-ET1 price control. This is part of Ofgem's annual process of monitoring network companies and holding them to account for the money they spend and collect from consumer bills.

In July of each year, each TO must submit information to Ofgem that outlines the actual costs they have incurred up to 31 March of that year and forecast costs to the end of RIIO-ET1. They also provide a written commentary with further detail, including reasons for differences between costs, allowances and forecasts.

Ofgem analyse this information and examine any variation inTO performance against their annual and eight-year output targets. Ofgem also meet with the companies to discuss technical and financial aspects of their submissions.

Outputs and measures of performance:

The following seven outputs form the cornerstone of the RIIO price control framework:

- **Safety:** The safety category requires adherence to all safety legislation requirements and has no explicit target. All companies are in compliance with the necessary legislation.

- **Reliability;**contain an annual output target.Meeting the commitment will generate incentive payments to the TO, with penalty deductions triggered in the event of a TO missing an annual target.
- **Availability;**contain an annual output target.Meeting the commitment will generate incentive payments to the TO, with penalty deductions triggered in the event of a TO missing an annual target.

- **Environmental;**contain an annual output target.Meeting the commitment will generate incentive payments to the TO, with penalty deductions triggered in the event of a TO missing an annual target.

- **Customer Satisfaction;**contain an annual output target.Meeting the commitment will generate incentive payments to the TO, with penalty deductions triggered in the event of a TO missing an annual target.

- **Timely Connections:** reflects the licence requirement to ensure the TOs respond in a timely manner to customer requests for connection to the national electricity transmission network (NETS). All network companies are providing new or modified connections offers to customers within the required licence timescales
- **Connection Works and Wider Works**; Those outputs are financially incentivised through rewards and/or penalties. The outputs have multiple metrics to present some quantifiable measures for illustration.

Incentives:

TOs have performed well under the incentive framework: outperforming their baseline targets. The key features of this outperformance (to date) is briefly summarised below:

- **Stakeholder Satisfaction Output:** The Stakeholder Satisfaction Output (SSO) was designed to encourage TOs to become more outwardly focused in their business practices and to be more responsive to changing stakeholder needs. In RIIO-ET1 performance against the SSO is primarily incentivised and assessed through the quality of network companies' engagement with their stakeholders (the 'Stakeholder Engagement Incentive' or SEI).
- **Energy Not Supplied (ENS) :** Means the volume of energy to customers that is lost as a result of faults or failures on the network. ENS is measured in Megawatt hours (MWh). Reducing ENS means minimising interruptions to supply on the electricity system. The transmission network supplies all of UK, including distribution networks and other large industrial customers. In general, reliability on the transmission system is very high. Disruptions to supply at transmission level voltages typically have a low probability of occurrence, but a high impact on those connected to the network. TOs are set a target for ENS at the start of the price control. TOs then receive an annual penalty/reward depending on whether their actual ENS in the year is above or below the target level.
- **Limiting SF6 emissions:** TOs are subject to a financial incentive to limit their emission levels of SF6 gas. The RIIO-ET1 SF6 incentive is designed to drive companies to fully consider lifetime costs (including the environmental impact of the expected emissions) when making decisions about SF6 assets and to improve the management of, and reduce leakage rates from, SF6 assets operating on the system.In RIIO-ET1 each TO has a different leakage target depending on its assets, and baselines adjust each year to account for new assets containing SF6 that are added to the network. TOs are subject to a reward/penalty based on the difference between theiractual emissions and their baseline leakage target. The value of the incentive is set each year based on prevailing non-traded annual carbon price.
- **Transmission losses:** In order to help provide long term value to consumers, all onshore TOs have a reputational incentive to reduce transmission losses. To date all three TOs have complied with the licence condition by putting strategies in place to reduce losses on their networks and by reporting against these annually. Losses on the transmission network are affected by a number of factors including the volume of electricity transmitted, loading profile of circuits, the transmission distances between generation and

demand, the level of reactive compensation, the type of transmission equipment (such as conductor) and the composition of circuits.

- **Innovation:**The RIIO innovation mechanisms encourage TOs to make innovation central to the transition to a low carbon economy.
- **Network Innovation Allowance (NIA) :** The NIA was established as part of the RIIO-ET1 price control. It is a use-it-orlose-it allowance that each licensee received as part of its price control settlement. It is designed to fund smaller scale research, development and demonstration projects in line with the NIA Governance Document. Licensees are able to use the allowance to fund qualifying expenditure.
- **Network Innovation Competition (NIC):** The NIC is an annual competition open to both electricity transmission and distribution companies. It provides funding to a small number of large-scale innovation projects. If successful, these projects should bring a wide variety of financial and environmental benefits. The scope of licensee involvement in the NIC is broader than the NIA. whereas other licensees may lead bids for funding under the NIC.

- **Innovation Rollout Mechanism (IRM) :**The purpose of the IRM is to facilitate the rollout of proven innovations, which will provide long-term value for money to consumers, in advance of the next price control period. To qualify, rollouts must deliver carbon and/or environmental benefits and must not provide a commercial return for the licensee within the price control period.

Financial performance:

A regulatory financial performance sets out detailed assessment of the network companies', based on the information they submitted using the new regulatory finance performance reporting (RFPR) process. This provides more targeted, detailed financial information on performance under RIIO, namely the impact on each company's returns of that company's level of gearing, cost of debt and actual tax payments. These are given as follows;

- RoRE for the RIIO-1 period
- Allowed revenue and the Annual Iteration Process (AIP)
- Gearing and financing
- Regulatory Asset Value (RAV).

Customer bill impact:

Ofgem's Default Tariff Cap provides an estimate of the overall cost of domestic energy bills. This includes estimates of the proportion of the overall cost of energy which is electricity transmission costs. Ofgem's methodology uses an average electricity demand applied uniformly across all regions and over time. Actual customer bills are sensitive to geographic region, consumption volume and the timing and duration of contracts.

3.5.3 System Operator (SO) Performance

NGET is the designated electricity System Operator (SO) responsible for day-to-day system operation, including balancing supply and demand and constraint management. To do this NGET buys and sells electricity and procures associated services. The cost NGET incurs is recovered from users of the system via Balancing Services Use of System (BSUoS) charges.

There are various costs that NGET incurs as SO and for which it seeks to recover revenue through its price controls. The RIIO-ET1 price control for the SO includes allowances for CAPEX (primarily related to investment in IT systems) and OPEX (covering the ongoing costs of running the business, including support for IT systems).

All SO cost allowances for system balancing are determined via a separate process outside the RIIO-ET1 mechanism. The main incentive is the Balancing Services Incentive Scheme (BSIS) which incentivises the SO on actions it has to take to operate the UK electricity transmission system.

3.6 Turkey

In Turkey data to be collected from market stakeholders and monitored is mainly defined within the scope of the Regulation on Notifications in the Energy Market. The purpose of the Regulation is to regulate procedures and principles with respect to the collection of data required by Energy Market Regulatory Authority (EMRA) for surveillance, analysis and reporting procedure of market activities. The Regulation sets principles and procedures such as making and amending notifications, collecting notice, authorization and confidentially.

TEIAS is obliged to submit regular reports and data related with their activities as per specified formats in compliance with the Regulation on Notifications in Energy Markets published on 27.05.2014. At present, there is EBIS (Energy Market Notification System) used by EMRA related to data gathering and monitoring of electricity transmission. The system is used to manage energy (electricity, natural gas, oil and LPG) data centrally considering the system security, to gather required data from the market players, to get license applications in electronic format and to provide input to statistical analysis and decision support systems.

TEIAS has already commenced to submit relevant data and reports throughEBİS as electronic means. The notifications are carried out by the authorised representatives of the license holders with electronic signatures. The system is accessed by the authorised representatives via a special web address (https//bildirim.epdk.org.tr)

The following table shows the information requested from TEIAS under the Regulation.

Table 3.6–Information requested from the TEIAS under the Regulation on Notifications in the electricity market

Name of Notification	Notification Frequency	Notification Time	Period of Notification
Quality Notification	Monthly	Until the end of the following month	Previous month
Transmission System Connection Applications Notification	Annually	Between 1-31 Junuary of the following year	Previous calendar year
Load Dispatch Daily Notification	Daily	The following day	Previous day
Load Dispatch Monthly Notification	Monthly or Depending on the formation	Until the end of the following month	Previous month
Planning Monthly Notification	Monthly	Until the end of the following month	Previous month
TEIAS Revenue Requirement Notification	3 Years	Between 1 August and 31 October of the year before the start of the implementation period	The next three-year period
Transmission Company Tariff Revision Notification	Annually	Between 1 August and 31 October of the following year	Previous calendar year
Unlicensed Generation Network Notification (Monthly)	Monthly	Until the end of the following month	Previous month
Annual License Fee Notification	Annually	Until the end of the month in which the first payment of the annual license fee is paid.	Previous calendar year
EKS* Risk Reduction Activity Tracking Notification	6 Months	End of the January and July	Previous 6 months
EKS Recognition and Risk Assessment Statement	Annually	Until the end of January of the current year	Current calendar year
EKS Inventory Notification	Annually	Until the end of January of the current year	Previous year

*EKS: Industrial Control System

TEIAS is a state monopoly operating in electricity transmission activities. TEIAS's responsibilities includes:

- Preparing forecasts of electricity market development (subject to approval by EMRA).
- Real time balancing of the demand and supply in the market.
- Procuring ancillary services to ensure energy balance and quality.
- Allocating interconnection lines capacities for import and export electricity
- Procuring energy for transmission losses.

Other than the points stated above, TEIAS also acted as the Balancing and Ancillary Services market operator .Therefore, TEIAS also publishes the main data related with the electricity transmission activities which can be stated as the TEIAS records on their web-site namely Load Dispatching Information System (YTBS), TEIAS Market Management System (TPYS), TEIAS Capacity Allocation Tendering (TCAT) System for ENTSO-E interconnection lines through existing electronic platforms as a transparency manner.

TEIAS Load Dispatching Information System (YTBS):

TEIAS publishes the following daily data related with the electricity market statistics through its transparency platformYTBS;

- Peak load report,
- Regional Peak load Report,
- Hourly Development of Turkish Electricity Consumption,
- Monthly Development of Turkish Electricity Consumption,
- Energy Generation, Consumption, Export and Import Report
- Breakdown of Daily and Monthly Production by Company and Source,
- Available Generation Report.

A view is shown from YTBS transparency platform as follows.

Figure 3.19–TEIAS's YTBS Transparency Platform

TEIAS Market Management System (TPYS):

In real time, there will certainly be discrepancies between the forecasted generation and demand due to forecast errors, failures, etc. As a matter of fact, unlike any other commodity in markets, electricity cannot be stored, which requires real time regulation of generation (and sometimes demand). Regulation is handled by the system automatics and the national load dispatch centre of the electricity transmission system operator TEIAS that requires a balancing market.

The provision of primary andsecondary frequency control services is also based on daily Ancillary Services marketoperated by TEIAS. Currently, TEIAS is procuring about 300 MW primary frequency control reserve and about 1000 MW secondary frequency control reserve through the ancillary services market. Each certified/power plant shall offer at least ±1MW and ±5 MW primary and secondary frequency control reserve capacity respectively to enter the Ancillary Services market.

TEIAS is operating balancing market and ancillary services market mechanisms through TEIAS Market Management System, TPYS as a competitive and transparency manner, as it is seen below Figure.

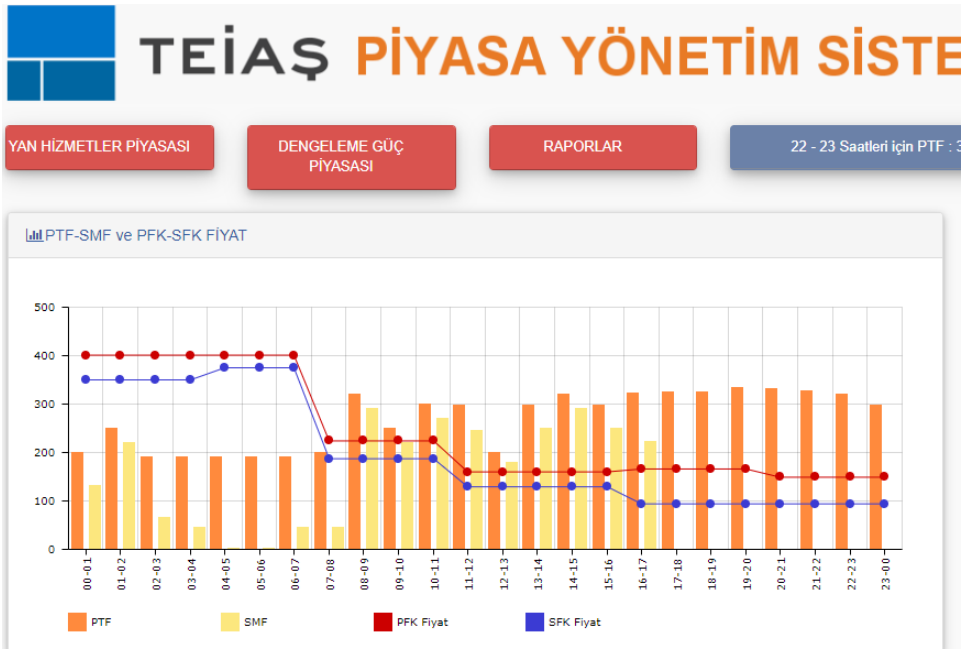


Figure 3.20– TEIAS Market Management System (TPYS)

TEIAS Capacity Allocation Tendering (TCAT) System:

Since the 18th of September 2010, the Turkish power system has been operating synchronously parallel with the ENTSO-E CESA. Therefore, TEIAS as the Transmission System Operator (TSO) in Turkey has to obey all rules and regulations of the system which is similar to all other member TSOs.

There are yearly, monthlyand daily auctions for transmission capacity to the ENTSO-E neighbours (Greece and Bulgaria).TEIAS is managing Capacity Allocation Tendering (TCAT) System for ENTSO-E interconnection lines through existing electronic platforms as a transparency manner as it is shown in following Figure.

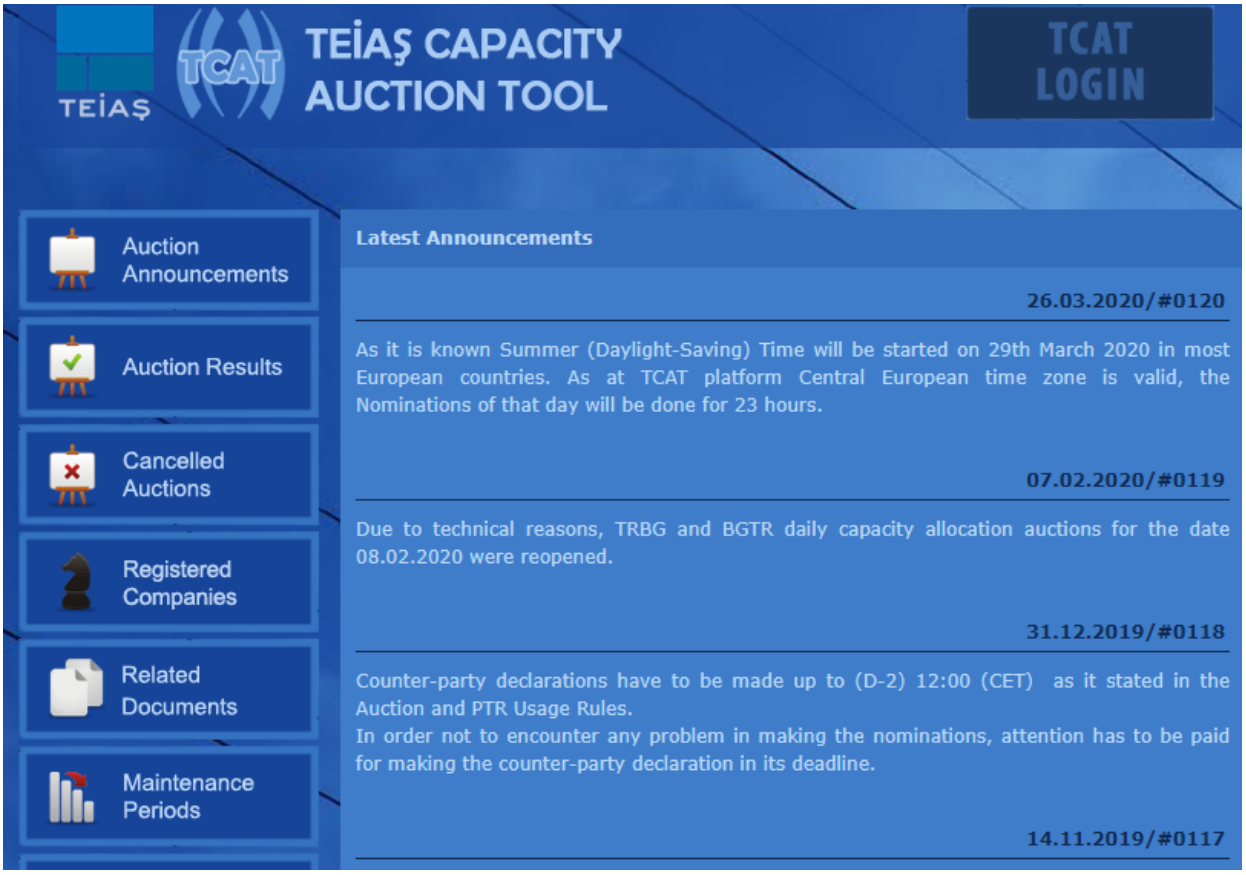


Figure 3.21– TEIAS Capacity Allocation Tool (TCAT)

3.7 Gap Analysis and Recommendations

Within the scope of this section gaps between the countries analysed and Turkey are stated, and related recommendations are provided. To summarize;

- Indicators to follow the performance of TEIASis similar with European TSOs.
- Data is mostly collected via surveys and questionnaires in Europe.
- NRAs has their own platforms to collect data (e.g. meter consumer info etc.) and share information with the customers/companies.

Table 3.7 – Overview of gap analysis and recommendations

	EU Practices	Turkey Practice	Recommendation
Responsibilities	- National Regulatory Authorities (NRAs) have the duties to exercise monitoring activities of the wholesale electricity markets as well as distribution segment. These duties include at least monitoring the level of transparency of the prices, the level and effectiveness of market opening and competition at wholesale to the benefits of all energy consumers.	- EMRA is responsible from monitoring activities. EMRA publishes monthly and annual reports on the development of electricity markets.	- Same as EU countries.

	EU Practices	Turkey Practice	Recommendation
	- As part of RIIO mechanism in UK, each year, TOs report to Ofgem on their performance and Ofgem publish annual report.		
Unbundling	- In line with the Electricity Directive, legal unbundling issue has reached a certain level. Generally, annual follow-up is done anddetailed information is requested from the companies only if needed.	- Legal unbundling has been completed in Turkey in 2013.Studies related to information unbundling is done. In addition,Turkish Competition Authority, has been monitoring issues related to competition.	- Same as EU countries.
Network Development	- In Germany, network optimization and reinforcement measures implemented by TSOs are monitored by NRA, to followthe growth in renewable energy and embedded generation as well as tariff related issues. - In Norway, NVE publishes an annual report on development in the network industry. The report looks at fluctuations over the past 10 years in revenues, costs, investments and regulatory asset base, rate of return, grid losses, CENS, etc. - In UK, customer satisfaction with network operators, average time to connect to the transmission network, Transmission Losses Return on Regulatory Equity (RoRE), expenditure vs allowance and estimated network costs per domestic customer are some measures followed by Ofgem regarding network.	- Transmission Network quality indicators is not introduced yet. However, development of the transmission network (especially for tariff) is monitored by EMRA.	- Together with the new developments such as increased renewable energy sources, unlicensed generation, storage facilities, EV charging station etc. monitoring of network development would be more significant. In this regard, new monitoring measures might be developed.
Quality of Supply – Continuity of Supply	- In Germany, the Energy Industry Act (EnWG) and Incentive Regulation Ordinance (ARegV) therefore provide for regulation of supply quality in energy supply networks. In general, this system is valid for the TSO as well. However, it is not applied to the TSO, because there is no reliable data available concerning continuity level on high voltage level and extra high voltage level. - In Norway, TSO use the national interruption reporting software FASIT, developed for recording faults and interruptions in the power system. The FASIT system makes it possible for network companies to record information about faults on equipment (components), delivery point interruptions and restoration and repair times. - In Portugal, NRA (ERSE) annually publishes information on quality of service and analyses the performance of network operators and	- There is no quality indicator to monitor yet.	- To improve overall quality of supply in transmission networks, monitoring most common ENS (energy not supplied) and AIT (average interruption time) grid should be the focus.

	EU Practices	Turkey Practice	Recommendation
	last resort suppliers regarding continuity of supply, voltage wave quality and quality of commercial service. The reports are based on company information provided to ERSE.		
Quality and Level of Maintenance of the Networks	- In Norway, Cost of Energy not Supplied (CENS) is monitored and used to ensure a proper level of maintenance of the networks. NVE carries out audits on Stattnet regarding operation and maintenance. The quality of the maintenance is monitored on these audits. - In UK, Ofgem also monitors the time taken to repair faults through the Interruptions Incentive Scheme (IIS). The time taken to repair has been incentivized as part of the 'customer minutes lost' element of the Scheme.	-	- According to value of lost energy calculations (VOLL) additional bonus might be provided to TSO with highest VOLL figures who reduce their loss ratios. Therefore, not only loss reduction ratio, actual loss energy amount needs to be included in the process.
Voltage Quality	- The Norwegian quality of supply regulation includes minimum requirements for voltage frequency, supply voltage variations, rapid voltage changes, short and long-term flickering, voltage unbalance and harmonic voltages including total harmonic distortion (THD). If considered necessary, NVE may set minimum requirements for other voltage disturbances, such as voltage dips, voltage swells, transient overvoltage, inter-harmonic voltage and main signaling voltage. - DSOsare also obliged to report these voltage quality parameters (except rapid voltage changes) to NVE in Norway.	- Quality of supply regulation includes minimum requirements for voltage quality. Nominal voltage levels and voltage fluctuation limits are also defined in Network Regulation for different levels and transmission system users are required to install power analyzers when required by the customer and correct the issue.	- Same as EU countries.
Customer Services	- In UK, a customer satisfaction surveyis performed by Ofgem. Customer Satisfaction; contain an annual output target. Meeting the commitment will generate incentive payments to the TO, with penalty deductions triggered in the event of a TO missing an annual target. - Ofgem and an independent panel of experts conduct the assessment for the stakeholder engagement incentive.	- Indicators such as response time to for connecting new customers to the network, time for giving information in advance of a planned interruption are used.	- Indicators used are similar in general. On the other hand, customer satisfaction should be monitored by proper independent surveys.
Commercial Quality	- In Norway, in case of an event, TSOis obliged to give information on given data for the quality of supply in their network. This data includes results from registration of interruption data, analyses of operational disturbances and specific conditions in the network that could have an influence on the quality of supply for the customer.	- Same as above	- Same as above
Metering	- Data collected regarding metering includes meter points requiring smart meters, type of activities related to meter operations,	- Meter data is only aggregated by EPIAS	- Following deployment of smart meters at a certain level, meter

	EU Practices	Turkey Practice	Recommendation
	additional services for smart metering systems, meter technology employed, metering investment and expenditure, final consumer prices for metering equipment	for settlement purposes.	data shall be monitored and analyzed in more detail (including mentioned data in EU practices)
Data Collection and Analysis	- In Germany, data collection is mainly via surveys and questionnaires. Data Transfer Platform MonEDa is used to collect data. The use of MonEDa became mandatory from 2019. This platform facilitates data exchange between the Federal Network Agency and market participants for monitoring purposes.The results of the surveys are published within the scope of the report on the security of supply. - In Norway, a new IT solution for information exchange between actors (Elhub) in the power market is being developed. Data collected and exchanged will be related to supplier switching, customer change, metering, settlement of metering corrections and smart metering. - In UK, access to consumption data from smart meters is managed centrally, through the Data and Communications Company (DCC), which is licensed and regulated by Ofgem. - ERSE established Consumer Portal in Portugal to provide information such as full list of licensed or registered market electricity suppliers, what prices will be paid by consumers, what is needed to do to enter into an electricity supply contract etc.	- Data collection is via EBIS.	- New data collection and analysis systems for smart meters, information exchange between customers might be developed.
Price Comparison Tool	- In many countries, a price comparison tool is used to enable consumers to make an active choice in the electricity market. - In Norway, Norwegian Consumer Council's (Forbrukerrådet) price comparison tool **strompris.no** is used. The tool contains information about all offers available in the market since 1998 and it ranks contracts according to the estimated total cost of energy including network tariffs and taxes. NVE regulates the collection of information for the tool under the Energy Act regulations. - ERSE offers a price simulator to market participants in order to compare prices in retail market	- Price comparison tools developed by private companies are available.	- Public tool might be developed as in most of the EU countries.
Transparency	- Nearly in all of the countries, transparency regarding retail market prices and choices for suppliers is at a desired level. Supplier companies publish annual Consolidated Statements on their websites that break down suppliers' revenues, costs and profits and are reconcilable to audited accounts.	- Transparency of wholesale, balancing and ancillary services electricity market. As well as capacity allocation of interconnection	- Same as EU countries.

	EU Practices	Turkey Practice	Recommendation
	- Ofgem requires companies to audit their statements, to publish them within four months of their financial year end, to provide a detailed cost breakdown, and insight into their trading activities. - NVE publishes audit reports on various issues such as environmental inspections, land safety, power supply readiness, quality of delivery and faults analysis, tariff, financial and technical reporting, affiliation obligation	lines reached a better level.	
Financial Regulation	- In UK, Canada, TSOs are monitored financially so that they could be sustainable, and they could provide desired services at the desired quality level. In UK, Allowed Revenue and the Annual Iteration Process, Gearing and Financing, Return on Equity and Regulatory Asset Value (RAV) are used as financial indicators.	- Currently, TEIAS has already been sharing the necessary parameters to calculate WACC - i.e. borrowing cost, equity cost, gearing ratio – and other metrics related with financial strength – i.e. ROE (Return on Equity), ROA (Return on Assets), debt ratio, equity ratio, profitability indexes with balance sheet and income statements – since it is monopol and public. Thus, as is reporting process is sufficient to monitor financial position of TEIAS.	-

4 Gas Distribution

4.1 Germany

4.1.1 Market Monitoring Regulations

Similar to electricity distribution and transmission, gas market monitoring task of BNetzA is based on § 35 EnWG (Energy Industry Act)[22]. BNetzA publishes an annual report on the results of the monitoring for the performance of its regulatory tasks in the fields of electricity and gas, in particular for the creation of market transparency, in accordance with § 63 (3) EnWG[23]. As per this legislation, The Federal Ministry for Economic Affairs and Energy shall publish a report on the status and development of security of supply in the field of natural gas supply every two years (next one should be published on July 31, 2020 at the latest).

Pursuant to § 48 (3) GWB[24] (Act against Restraints of Competition), the national antitrust authority *Bundeskartellamt (BKartA)* is responsible for monitoring the degree of transparency, including wholesale prices, and the degree and effectiveness of market liberalization.

Furthermore, BNetzA monitors all relevant grid disturbances in energy grids based on § 52 EnWG. In the report, the network operator must explain the measures taken to avoid future supply disruptions based on the incident. In addition, the report must state the average supply interruption in minutes per connected consumer for the last calendar year. The Federal Network Agency can provide guidelines for the formal design of the report as well as require additions and explanations to the report if this is necessary to check the reliability of the network operator's supply. Immediate reporting requirements for disruptions with a super-regional impact are based on § 13 paragraph 8.[25]

4.1.2 The guideline for harmonization and standardization of the data coming from different sources for monitoring

The monitoring process of BNetzA comprises annual MS Excel questionnaires that are provided to market participants. Each gas market participant (i.e. TSO, DSO, retailer/supplier, metering company) is provided a separate questionnaire template. Thereby ensuring that each market participant only receives data enquiries that are of relevance to them[26]. No post-processing of data and the respective software used for that.

All questionnaires comprise password-protected worksheets that only allow participants to fill the cells they are supposed to. Thus, ensuring and facilitating data quality. Moreover, the compilation of data is facilitated as participants cannot change the structure of worksheets. In addition to that, BNetzA publishes a definition list (in PDF) that provides participants with key definitions of terms used in questionnaires.

The MaStR, which was put into operation in summer 2017, is the central register of the energy industry. Whereas previously the data of the market players was recorded in different, uncoordinated registers, so that in some cases the players had to register several times and keep their data up to date, all central master data is now to be recorded and consolidated in one register. The authorities can access a lot of data from the register, so that own surveyscan either be greatly simplified or can be omitted altogether. Plant operators and other market players can refer to the data they have entered in the register and refuse to report this data again in future. This also makes an important contribution to reducing bureaucracy.

[22]Source: https://www.gesetze-im-internet.de/enwg_2005/__35.html

[23]Source: https://www.gesetze-im-internet.de/enwg_2005/__63.html

[24]Source: https://www.gesetze-im-internet.de/gwb/__48.html

[25]Source: https://www.gesetze-im-internet.de/enwg_2005/__52.html

[26]Templates can be found here: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/DatenaustauschundMonitoring/Monitoring/Monitoring_2020/Monitoring_2020_node.html

Now the register covers all generation plants - new and existing plants, plants for the production of renewable and conventional energy, electricity and gas - and certain consumption plants as well as the operators of the plants. The operators must enter the plant data and keep the data up to date. The network operators must check and supplement the information provided by the operators. This results in a master data register that reflects reality comprehensively and very accurately.

4.1.3 The rights & responsibilities of each stakeholder in accessing and operating the data monitoring system

Registry for market data

All power and gas market participants (i.e. plant operators, grid operators, wholesalers, retailers, suppliers, balancing group managers, metering companies) must register themselves in the registry for market data (MaStR)[27]. In particular, electricity and gas network operators must check the data of plants and their operators that are connected to their respective grid and supplement it with technical information. Network operators are also obliged to take the registrations in MaStR into account in their billing procedures[28]. Apart from some classified data (e.g. geo location of small generation assets) data can be accessed publicly.

Cross-check is an also important issue. Important data of the systems and the system operators are subject to verification by the access network operator. The network operator compares the data in the MaStR with his own data. If necessary, he reports data as incorrect and communicates the data that he knows to be correct. The BNetzA checks and verifies the plausibility of the entered data. Duplicates and obvious errors can be corrected quickly.

Network operators, system operators, the BNetzA and all users of the register are involved in ensuring that the correct data is entered in the MaStR.

When registering a new or existing system, the access network operator is automatically requested by BNetzA to compare the data entered with the data available to him on the system and the system operator ("network operator check"). This serves to identify incorrect entries, but also to compare the network operator's database with that of the MaStR.

Within the Excel questionnaire, plausibility and validity rules were deposited as an aid for the market participants.

The MaStR is set up to serve the following objectives:

- Simplification of official and private sector reporting,
- Reduction of the number of registers in which operators and plants are reported
- Increase in data quality and transparency

4.1.4 Platform Monitoring Energiedaten (MonEDa)

The data collection within the framework of the annual monitoring report of the BNetzA is carried out via Excel questionnaires. The completed Excel files are transmitted via an online platform (MonEDa).[29]MonEDa is a secure interface between market participants and the energy monitoring department of the BNetzA. All relevant market participants who have taken part in the monitoring so far have already received access data for MonEDa in advance. The access data consists of a company number, a control number and a key for encryption. New participants who have not yet taken part in energy monitoring must register with the BNetzA to obtain access data for MonEDa.

[27]Source: https://www.marktstammdatenregister.de/MaStR

[28]Source: See § 111e EnWG and § 111f EnWG.

[29]Source: https://monitoring.bundesnetzagentur.de/moneda

4.1.5 Digitalization in data collection

Digitization has only been indirectly encouraged for companies through incentives to increase efficiency. Thus, it is left to the companies' own preferences.

However, it is discussed that all expenditures for network-related flexibility should be included in the efficiency comparison within the framework of the ARegVin order to create equivalent incentives. The basis for this is the EU directive 2019/944 Article 32 that Member States shall provide the necessary regulatory framework to allow and provide incentives to distribution system operators to procure flexibility services, including congestion management in their areas, in order to improve efficiencies in the operation and development of the distribution system.

4.1.6 Existing submitted data lists with frequencies per each data set and functionalities of data transferring infrastructure

Within the scope of the annual monitoring conducted by BNetzA energy market participants (electricity and gas) are required to submit relevant market and business information via MS Excel questionnaires as provided by BNetzA for the market monitoring 2020[30]. All collected data[31] provides a detailed overview of all required information per market participant (i.e. TSOs, DSOs, suppliers and retailers, and metering companies) and thus, data availability to regulatory authorities in order to comply with their market monitoring obligation. All data points are required to be entered on an annual basis for the past year (reporting date: 31 December).

Beyond structural and technical data of grid operators, customer service-related data as interruption of supply and customer switching behavior is requested by the market participants.

The transferal of filled-out questionnaires is performed via an online platform called Monitoring Energiedaten (MonEDa). MonEDa is a secure interface between market participants and the BNetzA. Since 2019, the online platform is the sole mode of submission of questionnaires[32]. Additional security is provided by using a dedicated software (eCrypt), that encrypts files before uploading them to the monitoring platform. In fact, only encrypted files can be uploaded to the platform.

4.1.7 Unbundling

Monitoring of unbundling is not directly covered by the annual monitoring process conducted by BNetzA. Instead, monitoring of unbundling is covered in a separate process. Following §6b (7) EnWG[33] grid operators are required to send several documents (printed versions) to the regulatory authority annually for monitoring purposes:

- Auditor's report of company's annual financial statement
- Company's annual financial statement
- Management report (Lagebericht)

[30] Source: See https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/DatenaustauschundMonitoring/Monitoring/Monitoring_2020/Monitoring_2020_node.html for an overview of all templates (one template for each stakeholder in the market (e.g. gas storage operator, TSO, DSO, retailer).

[31] Source: List of the collected data and excel templates: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/DatenaustauschundMonitoring/Monitoring/Monitoring_2020/Monitoring_2020_node.html

[32] Source: See https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/DatenaustauschundMonitoring/Monitoring/MonEDa/MonEDa-node.html

[33] Source: https://www.gesetze-im-internet.de/enwg_2005/__6b.html

As an important information to mention, the annual financial statement and the management report (Lagebericht) must be audited by an independent auditor. (§316.1 sentence 1 HGB (German Commercial Code). Article 16 EU Regulation 6 regulates the appointment of auditors by public interest entities. Article 16 (3) subparagraph 1 (a) to

(f) of the EU Regulation sets out concrete requirements for the selection procedure, unless an existing mandate within the meaning of Article 17 (1) and (2) of the EU Regulation is extended. The selection of the auditor is based on a public tendering procedure. The tender documents should contain transparent and non-discriminatory selection criteria as a basis for the evaluation. The company must prepare a report on the conclusions drawn in the tender procedure.

Furthermore, vertically integrated companies are required to inform regulatory authority on any changes in ownership structure. Network operators must list all shareholdings that have a share of >15% in their company with their respective percentage share in the monitoring process. Besides that, relations with sister companies are monitored within the annual financial statements. In the notes to the annual financial statements, major transactions with affiliated or associated companies within the meaning of § 271 (2) or § 311 of the German Commercial Code must be reported separately. In particular, performance and consideration must be disclosed. (§6b (2) EnWG). In order to avoid discrimination and cross-subsidization in their internal accounting, vertically integrated energy supply companies shall keep separate accounts for each of their activities in the following areas, as would be required if these activities were carried out by legally independent companies. (§6b (3) EnWG).

Additionally, independent transport network operators and large distribution grid operators (i.e. >100,000 customers) are required to implement an Equal Treatment Program and appoint an employee as a so-called Equal Treatment Officer based on § 7a sec. (5) EnWG[34] and §10e EnWG[35], respectively. The purpose of this exercise is to guarantee unbundling within the organization. The Equal Treatment Officers should report annually on process audits carried out to the regulatory authority. In this way, it can be tracked whether concrete measures have been taken to check compliance with the equal treatment program and, if necessary, whether changes have been made to business processes or work instructions. In particular, compliance with the specifications for informational unbundling is thus made traceable[36].

4.1.8 Monitoring of Gas Distribution Companies

Network operators have to submit their investments and expenditures in the network infrastructure in the annual monitoring report. In doing so, they must indicate the information on investments for new construction/expansion/extension and maintenance/renewal.

§ 51 EnWG: (1) The Federal Ministry of Economics and Energy (BMWi) shall continuously monitor security of supply in accordance with paragraphs 2 to 4. In doing so, it shall have the powers under § 12a, 12b, 14(1a) and (1b) and §§ 68, 69 and 71. §§ 73, 75 to 89 and 106 to 108 shall apply mutatis mutandis. When conducting the monitoring pursuant to subsections 3 and 4, the Federal Ministry of Economics and Energy shall take into account the information transmitted pursuant to § 12(4) and (5).

The BMWi's monitoring shall in particular also concern the quality and scope of network maintenance and an analysis of network disturbances and of measures taken by the network operators to ensure the safety and reliability of the gas and electricity supply system in the short and longer term.

[34]Source: https://www.gesetze-im-internet.de/enwg_2005/__7a.html

[35]Source: https://www.gesetze-im-internet.de/enwg_2005/__10.html

[36]See https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/EntflechtungKonzessionenVerteilernetze/Transportnetzbetreiber/Transportnetzbetreiber-node.html

The monitoring is carried out on the basis of;

1. Indicators suitable for measuring security of supply on the European electricity markets with an impact on the territory of the Federal Republic of Germany as part of the internal electricity market.

2. Thresholds, above or below which an examination is carried out and, if necessary, appropriate measures are implemented to ensure security of supply.

Moreover, at the request of the regulatory authority, network operators are required to prepare a report on their investment behavior and to submit it to the regulatory authority. In particular, the report serves to determine whether incentive regulation has no adverse effects on the investment behavior of grid system operators with regard to the purposes specified in § 1 of the EnWG. The report must show the extent to which the annual investments of the grid system operators are in an appropriate relationship to the age and condition of their facilities, their annual depreciation and their quality of supply. The regulatory authority may request additions and explanations to the report.

4.1.9 Any other data regarding compliance with the market rules monitoring of retail prices

In the context of the annual market monitoring process, BNetzA asks retailers and suppliers to submit their average household retail price structure per customer group (for instance, customers are segmented according to their annual consumption and their contract type).

However, as stated on BNetzA's homepage: "An examination of end customer prices does not fall into the BNetzA's sphere of responsibility. Objections to excessive rates for end customers will continue to be dealt with by the federal states or by the civil courts. The Federal Cartel Office (Bundeskartellamt) is responsible for verification in the case of the energy prices levied by energy suppliers operating on a nationwide basis[37]."

4.1.10 Reporting of grid disturbances

Since 2006, the BNetzA has been conducting a complete survey for the gas supply disruptions. According to § 52 EnWG[38], all gas grid operators are obliged to provide BNetzA by 30 April of each year to report all supply interruptions[39]. The BNetzA determines from these messages an average value for all final consumer, the so-called SAIDI value (System Average Interruption Duration Index); this parameter determines the average duration within one year during which a customer is affected by a supply disruption is affected.

Compliance market rules requires grid operators to submit annual values of disturbances for the following data points:[40]

- Total number of consumers affected
- Total contracted capacity of end consumers
- Total ordered capacity at upstream grid operators
- Total ordered capacity of downstream grid operators

[37] See https://www.bundesnetzagentur.de/EN/Areas/Energy/Companies/GeneralInformationOnEnergyRegulation/ResponsibilityAndTaskDelimitation/responsibilityandtaskdelimitation_node.html

[38] Source: https://www.gesetze-im-internet.de/enwg_2005/__52.html

[39] Source: See BMWi (2019): Versorgungssicherheit bei Erdgas, Monitoring-Bericht nach § 51 EnWG.

[40] Source: See Bundesnetzagentur (2008): Anlage Berichtspflichten bei Versorgungstörungen, available at https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Versorgungssicherheit/Allgemeinverfuegungen/AnlageAllgemeinverfg15239pdf.pdf?__blob=publicationFile&v=2

Beyond annual values, submission of information on individual incidents is also required, comprising:

- Start date (Date, time)
- Duration
- Type of interruption (planned, unplanned)
- Explanation of interruption.

4.1.11 Monitoring of Consumer Satisfaction and Complaints

Energy supply companies, metering point operators and metering service providers (companies) are obliged to respond to complaints from consumers within the meaning of § 13 of the German Civil Code (consumers), in particular regarding the conclusion of contracts or the quality of services provided by the company (consumer complaints), which relate to connection to the supply network, the supply of energy and the metering of energy, within a period of four weeks from receipt by the company. If the consumer complaint is not remedied by the company, the company shall explain the reasons in text form and refer to the conciliation procedure pursuant to § 111b, stating the address and website of the conciliation body. At the same time, the enterprise must state that it is obliged to participate in the conciliation procedure. On its website, the enterprise must draw attention to the conciliation procedure under § 111b, the address and website of the conciliation body and its obligation to participate in the conciliation procedure. The enterprise dealing with the complaint must inform other enterprises involved in supplying the complaining consumer with regard to connection to the supply system, supply of energy or measurement of energy about the content of the complaint if these enterprises can remedy the consumer complaint.

As the central information agency for energy consumers, the BNetzA has the task of providing independent information to private household customers about their rights, the arbitration procedure and market developments. The Energy Consumer Service set up for this purpose has been informing and supporting consumers on general energy issues and questions and on problems with suppliers and grid operators since 2011. The Energy Consumer Service has developed into a competent and reliable institution and first point of contact. Its own employees are available by telephone, e-mail and letter to answer consumer questions.

As a further contact option, a form was made available on the website in May 2019, the consumer a direct route for enquiries to the consumer service opened: www.bnetza.de/energie-kontakt

In addition to providing information and advice from the Federal Network Agency's consumer service for energy, the Berlin-based SchlichtungsstelleEnergiee.V. (conciliation office for energy) has the task of bringing about out-of-court and amicable solutions to individual disputes between consumers and energy suppliers, metering point operators and metering service providers in a formal procedure. This is free for consumers.

4.2 Italy

In Italy, energy market regulatory authority is the responsible body for data gathering and market monitoring. ARERA collects data in the same format from all market operators actively operating in electricity and gas markets. Though main topics are the same, collected data may change according to the specific features of the market and requirement of the activities.

Once defined what to collect and defined the semantics (clear definition of the data to be collected) the ARERA sets the protocols and data communication standards between operators, thus also establishing the requirements of the data to be exchanged.

The communication tools, over the years have evolved, starting with the use of the PEC with specific excel file attachments with defined fields, then moved on to the XML files to be uploaded to the portals to the application to application exchanges with certified ports.

XML files are structured in sections so you do not have a flat list of fields. This choice allows you to:

- improve the readability of XML files;
- simplify the modelling of XML files in any programming language.

Statistical process control techniques assist the regulator in governing all monitoring processes that require the collection and analysis of multitude of data from different operators.

To do this, the regulator uses process capacity analysis and benchmarking analysis. Apart from a few studies in the literature, no documents relating to the techniques used by ARERA were disclosed.

4.2.1 The guideline for harmonization and standardization of the data

Harmonization seeks to bring together various types, levels and sources of data in such a way that they can be made compatible and comparable, and thus useful for decision making. Harmonization differs from standardization in that it does not impose a single methodology or norm, but rather seeks to find ways of integrating or making "an agreeable effect" from information gathered through disparate methodologies.

Harmonization has been an obvious concern of ARERA since the start of its activity.

The principal consideration is to find pragmatic ways of making compatible and integrable datasets which have been collected for different purposes under different collection regimes and using different standards and methodologies. This means avoiding the need to convert all the data to a single standard, but rather finding ways to make it usable at some higher level of aggregation or generalization.

- Market orientation to the adoption of organizational standards that promote the approach to processes, such as market participants have been strongly invited to adopt the certification of their organizations to ISO standards, for example example ISO 9001;
- Analysis of operators and their degree of development knowledge, skills and tools at their disposal;
- Analysis, mapping and definition of the process, the stakeholders and the data needs to be collected with the clear identification of the purposes of data usage and the semantics of data collection;
- All stakeholder's involvement and participation in the data requirements definition process (not just gas and power supply chain operators, operator associations, business trade associations, end customer and non-customer associations) industry standards associations, softwarehouses, etc.);
- Defining the data set to collect and the tools to collect them;
- Processing standards and communication protocols and testing them
- Defining syntactic and semantic rules for processing XDS and XML files;
- Delivery of institutional training of operators on the requirements of the data to be collected (public events organized by the ARERA in which operators participate;
- Definition of a transitional phase of restricted data collection for the examination of the collected data and the consequent changes.
- Statistical Process Analysis (Capability and Benchmarking analysis).

4.2.2 Key points of existing market monitoring regulation

The critical success key factors of the existing regulation are the following ones:

b) **regulatory strategy** consistent with the national and European strategic plan;
c) **clear commitment** of the regulatory that has specific and clear powers;
d) **specific resolutions** that defined what to collect and how;

e) **Long and gradual process** based on the **involvement of all stakeholders** through the consultation mechanism.
f) Involvement of **different skills**.

There are many aspects monitored by the regulation, not only in terms of tariffs, as follows there is a list of areas monitored:

- Accounting and functional unbundling
- RAB and Tariffs
- Continuity and Security of the technical service: balancing services, distribution services, emergency services, measurement services.
- Technical quality
- Commercial quality: call center services, contracts and invoices
- Access to networks regulation
- Selling prices
- Protection of families in conditions of economic hardship, as well as the enhancement of the supervisory and information system to protect consumers

Table 4.1 – The rights & responsibilities of each Stakeholders in accessing and operating the data monitoring system

Stakeholder	Responsibility
ARERA	Setting regulation Data Setting Procedure and protocols to transfer data WEB PORTAL to communicate data Data safety and privacy Controlling data
ACQUIRENTE UNICO	WEB PORTALS (Integrated Informative System, Proposal Portal, Consumption Portal, Customer Office Portal) Data safety and privacy Informing ARERA Controlling data
CSEA	WEB PORTAL Data safety and privacy Informing ARERA Controlling data
DSO – TSO - Energy providers	Quality of collected data Data communicated true and reliable Compliance with the expiry times imposed by the ARERA for data communication
Software house	Reliability of enterprise information systems Extraction systems reliable and consistent with the data requested by ARERA Continuous updating of the program based on the requests of the specific ARERA resolutions

Stakeholder	Responsibility
Final Clients	Interaction in the web portals for consultations Entering claims data

4.2.3 Existing submitted data lists with frequencies per each data set and functionalities of data transferring infrastructure

The main topic of ARERA data monitoring collection are as follows:

- RAB and unbundling;
- Technical quality;
- Measurement performance;
- Grid safety &continuity;
- Commercial quality;
- Gas settlement;
- Retail Monitoring (Retail market prices, Switching, last resort and default services, Vulnerable customers).

The data coming from all the operators come directly from the enterprise information systems, called ERP systems. After more than twenty years of Regulation, it can be considered in Italy that the monitoring processes of the market from the data of the operator mature. Nowadays, ARERA and all the stakeholders knows that every change to the data collection process has an impact with the enterprise information systems that represent the enterprise structural skeleton. Portals and data collection technology will be reviewed in detail at further sections below.

4.2.4 Unbundling

Distribution and retail activities are unbundled in Italy as per EU regulations in order to avoid cross subsidization in the market. In 2015, the Authority updated the provisions on unbundling obligations for the electricity and gas sectors, approving the Integrated Text on Functional Unbundling (TIUF), in accordance with the provisions of Legislative Decree 93 of 1 June 2011 and Directives 2009/72/EC and 2009/73/EC. The innovations introduced by the TIUF, in force since 1 January 2016, include the introduction of new unbundling obligations concerning communication and brand policies for electricity and natural gas distributors, regardless of their size or business structure; they impose a complete unbundling between the sale and distribution of electricity and natural gas to avoid any risk of confusion.[41]

There are two kind of the collections regarding the unbundling, one is of an accounting nature, the other concerns functional unbundling

In the accounting unbundling, operators must send a structured excel file that reports the official accounting items that can be inferred from the official sources of the approved financial statements and closed in the manner of the accounts envisaged in the regulatory accounts. For this purpose, ARERA publishes on the website a regulatory accounting handbook rules necessary for the preparation of accounting for regulatory purposes.

Functional unbundling provides that operators, belonging to vertically integrated enterprises or groups of enterprises presenting in the different businesses of the supply chain, have to appoint a guarantor of the independence, and have to send each year a plan of interventions to ensure compliance with the adopted measures.

Relevant information are uploaded to the ARERA portal annually.

[41] ARERA Annual Report 2019: https://www.arera.it/allegati/relaz_ann/19/AnnualReport2019.pdf

4.2.5 Technical Quality

This data collection focused on the technical services offered by the DSO operators, like the connection activities, the substitution of the measurement, the appointments to the end customers. The standards are divided in specific and general and are collected by the size of the measurement. The frequency of this collection is annually.

An analogue collection exists for the power market and for the TSOs.

Better standards can also be set compared to those set by the Regulator. The data to be collected are by Province, Municipality and Distribution grid system. The data regard the number of services requested by the end customer aggregated by the size of the gas meter.

The data to be collected, compliance standards are imposed by ARERA.

- LP and MP connections;
- Supply activation;
- Supply deactivation;
- Reopening in case of default;
- Execution of simple works;
- Execution of complex works;
- Measurement grid pressure;
- Verification of measurement proprieties of the gas meter (done in the field and / or in laboratory).

4.2.6 Measurement Performance (Gas Distribution)

This data collection monitors the quality of the measurement service. The data is separated by consumption classes and for meter accessibility, each class corresponds to a specific collection frequency.

Accessible meters:

- number of consumption readings actually acquired;
- value of the percentage of meters with actual readings, differentiated by consumption classes;

Partially accessible meters and inaccessible meters:

- number of read attempts made.
- The meter fleet in many distribution plants has very high accessibility percentages depending on the period in which connections were made to end customers.

For this reason ARERA has introduced a further obligation to replace traditional meters with smart meters in cases where the DSO has not acquired at least an actual reading in the last year that these replacement obligations are additional compared to those already provided for by regulation (resolution 631/2013/R/gas).

ARERA also establishes an annual unit penalty (up to replacement) of € 4 per meter paid by the DSO in the event of failure to fulfil the aforementioned replacement obligations.

4.2.7 Grid Safety & Continuity (Gas Distribution Operator)

This collection is used to monitor the output-based incentive system. In each regulatory period, ARERA establishes the incentive plan based on the service obligations related to the safety and continuity of the gas distribution service.

The frequency of this collection is annually, and an analogue collection exists for the power market and for the TSOs.

This collection takes place at the same time as the collection relating to commercial technical quality. This type of collection is structured by distribution service (grid system) and by Province. The Regulator codes each plant managed by the distributor.

The DSO must communicate before the data collection which plants are in the start-up phase and which are newly acquired by tender, because there are some limitations in the collection.

The start-up phase is the period between the date of the first gas supply and December 31 of the second year following the year of the first supply.

The collection requires for each grid and each year that the DSO collects and communicates technical details.

If the verifications of the collected data, combined with return information of specific audits and / or complaints registered for that given plant, with logics not known to the Distributor, the regulator may decide to organize an inspection to the enterprise. The check list is made known at the time of the inspection.

During these checks, the regulator checks on a sample basis that the data communicated is true but above all checks all the obligations of an organizational nature, set out in the relevant resolutions, are respected.

For example, the call center has certain requirements, that the forms are correctly filled in, the traceability of the data, that the measuring instruments used are certified, that the odorant measurements are sent to certified laboratories.

At the end of 2013, the Regulation of the quality of gas distribution and metering services for the regulation period of 2014-2019 - Part I of the Consolidated text of the regulation of the quality and tariffs of the gas distribution and metering services for the regulation period 2014-2019 (RQDG), was approved[42]. The RQDG regulates certain relevant activities for the security of the gas distribution service. Among these we can mention the emergency services, the inspection of the distribution network, the activity of localization of the dispersions after inspection or notification by third parties and gas odorization. The regulation of these matters has the objective of minimizing the risk of explosions and fires caused by distributed gas and, therefore, its true purpose is the protection of persons and property from damage resulting from accidents caused by the distributed gas.

4.2.8 Commercial Quality (gas and power sellers)

This data collection focused on the commercial services offered by the energy providers (sellers). The data are concerned on quality of the commercial call centers, and management of customer information request and complains. The frequency of this data collection is annually.

This collection allows ARERA to monitor the commercial performance provided through the call centers of the energy sellers, the reference resolution is unique and is valid for natural gas and electricity sellers.

The standards to be monitored are:

- Maximum time for motivated response to written complaints;
- Maximum billing adjustment time;
- Maximum time for double billing correction;
- Call center response time;
- Minimum response rate to written requests for information sent within 30 calendar days;
- Minimum percentage of appointments set with the end customer within the maximum time of 1 working day;

[42] ARERA Annual Report 2019: https://www.arera.it/allegati/relaz_ann/19/AnnualReport2019.pdf

- Maximum time of complete and non-interlocutory response to the request for completion of the Consumer Counter (a virtual place, web portal, called *Sportelloconsumatori*, Consumer Office, in which the clients could present compliance for the service received);
- Accessibility to the service (called AS, is the percentage, %, of time in which at least one line is free);
- Average waiting time (called TMA, the time between the beginning of the response and the beginning of the conversation with the operator);
- Service level (called LS is the percentage, %, of calls to which the Customers who requested it actually speaks to an operator).
- Time for suspension of the supply due to arrears despite the failure to send the notice of formal notice by registered mail.

- Time for suspension of supply due to arrears, despite failure to comply with one of the following terms:
    1. Deadline by which the customer is required to pay: 15 days from the arrive date of the formal notice in which the client is informed of the arrears, if the energy provider is able to document the registered letter; 20 days from the date of issue of the registered letter if the seller is unable to document the date of sending the registered letter;
    2. Deadline between the date of issue of the notice of formal notice and the date of delivery to the postal carrier if the energy provider is unable to document the date of the registered letter: 3 working days from the date of issue of the registered letter. Registered mail; or a deadline of no more than 5 working days if the deadline of 20 calendar days referred to in point 1 has also increased by a number of working days equal to the difference between the delivery deadline observed and the minimum deadline of 3 working days;
    3. Minimum term between the expiry date of the final payment term and the date of request to the DSO for the suspension of the supply: 3 working days.
- Time for issuing the closing invoice.

ARERA uses collected data for both monitoring and conducting audits at the enterprise, and as mentioned for technical collection. In the field, however, they verify the veracity of the data communicated and the compliance of the procedures and equipment used in compliance with the reference resolutions.

4.2.9 Retail Monitoring (Retail market prices, Switching, last resort and default services, vulnerable customers)

This collection targets the regular and systematic observation of the operating conditions of the retail market for electricity and natural gas with particular reference to the degree of opening of the retail markets, the effectiveness of competition and the level of participation of end customers and their degree of satisfaction (so-called customer satisfaction).

This monitoring is a necessary tool for carrying out activities functional to:

- the **regulation of the retail market**, to promote competition and ensure the proper functioning of the market, also taking into account the path of removing the economic conditions of the protection services and the specific protection needs of end customers;
- **periodic publications** on the state of the markets, to increase the transparency of all stakeholders;
- Consistent with the **ACER / CEER guidelines** on content and methods of monitoring the retail markets in the member countries

The scope of the monitoring concerns the **sale to mass customers**:

- natural *gas sector:* domestic customers, other customers with consumption lower than 200.000 Smc

The following indicators are calculated, with reference to mass customers and, unless otherwise indicated, to the sample of obliged subjects

Each sector, gas and electricity, of the topics is analyzed through the integrated use of IT systems (portals and registers) made available to operators:

- Structure of the sector and competitive dynamics (concentration and evolution of supply and demand);
- Passages of end customers (switching, exit from protection and renegotiations);
- Offers and Prices;
- Level of customer participation and degree of satisfaction (including the quality of billing, published for the first time this year);
- Delays.

ARERA annually analyses the data and draws up an overall report on market monitoring. The data are taken from different sources, the portals to support the consumer. Via the below portals, consumers can receive detailed information about energy markets, can try to find quick solutions for their disputes with suppliers, can find answers their questions via phone or in written format, last but not least, compare alternative gas and electricity prices of various suppliers.

Figure 4.1– Portals

4.2.10 Integrated Informative System - SII[43]

The monitoring of the retail market through the sale prices, the switching relating to the supplier change, the data necessary for the gas settlement and the electric dispatching activities and the attribution of the supplier of last resort (FUI) take place thanks the *Acquirente Unico* who in in charge of the Integrated Information System (SII).

The *Acquirente Unico*[44], a public enterprise wholly owned by the *GestoredeiServiziEnergeticiSpA*, supplies electricity on the wholesale market for domestic customers and small businesses that have not yet gone to the free market.

[43]Source: https://siiportale.acquirenteunico.it/

[44]Source: http://www.acquirenteunico.it/

Since 2009, the AU's activities for the benefit of the correct functioning of the energy markets have progressively expanded with the web portal operation of the Energy and Environment Consumer Desk and the Integrated Information System.

The purpose of the Integrated Information System, SII, established at the *Acquirente Unico* with the law of 13 August 2010, n. 129/10, is to manage the information flows between the subjects participating in the electricity and gas markets according to the rules and procedures defined by ARERA relating to the electricity and natural gas markets (hereinafter SII) , based on a database of withdrawal points and identification data of end customers.

In Italy, in the liberalized electricity and gas markets, every year a multitude of subjects (more than 250 distributors and over 500 sellers) exchange about 100 million data flows, involving just under 60 million consumers. To put hundreds of different communication standards and languages in order, Law 129/2010 established the Integrated Information System at *Acquirente Unico*, as a third party, public and independent.

Today, the SII makes it possible, for example, that the supplier changeover will be carried out in just 3 weeks, as required by EU legislation, compared to the previous 3 months.

To carry out its role, the system has a national database of collection points and customer identification data whose aim is to guarantee fluidity in the exchange of data and their quality. At the same time, data security and respect for privacy are guaranteed, according to a cost containment logic.

Due to the central role it plays and the data it manages, the SII is a tool capable of performing new functions also for different needs and sectors. The real cornerstone of SII development is the availability of data to improve both the operators' commercial policies and the decision-making capacity of consumers, thus making the market more dynamic and efficient.

To date, the SII contains information relating to over 36.850.000 electricity points of delivery and over 21.700.000 natural gas points of delivery only. In particular, the information content of the Unique Centralized Register (RCU), progressively expanded with the entry into force of the new processes, in addition to the data relating to the delivery points and the end customers, SII includes significant commercial and statistical data, useful data for management purposes of the settlement, useful data for the social bonus and technical data relating to the installed meter.

The centralized model based on the RCU defined by the Regulator assigned direct responsibilities to the SII in relation to the management of the main processes relating to the retail energy market and determined the need to define and fully implement the responsibilities between the parties involved in the execution of the aforementioned processes and in the timely update of the RCU. To this end, approximately 1.000 Italian operators for each sector are accredited to the SII for the management of their responsibilities, the details of which for each role are detailed in the following Tables.

It is based on a database that contains the complete list of national sampling points and fundamental data for the management of the processes treated called the Official Central Register or RCU.

Through this system several processes are managed:

- records of the points of deliverables;
- contractual voltages (i.e. the exchange of the end customer who owns the point);
- the changes of the commercial counterparty and the switching (i.e. the change of the dispatching user, in the electricity sector, or of the distribution user, in the gas sector, responsible for the consumption of the end customer);
- Type and price (minimum and maximum) of the commercial proposals in the market that are collected in the web portal “PortaleOfferte” the consumption measurements at each pod

- management of fdd and fui, termination of transport and dispatching contracts in the electricity sector and distribution in the gas sector and activation of services of last resort11 if the customer remains without a valid supply contract;
- complaints also through the support of the web portal called *Sportello del Consumatore (Customer Office)*;

This kind of monitoring process, therefore is not a question of periodic and specific data collections but it happens by the daily use of the tools available to all operators which guarantee the transparency of the processes and allow the regulator to continuously monitor the market according to the established rules.

The indicators that are monitored in the retail market are all coded and are collected in the specific resolution of market monitoring for gas and for electricity, for example in the following table it has been reported the gas indicators that are monitored by the Italian Regulator.

Table 4.2 – Indicators monitored

Area	ID	Indicator Name	Indicator description
General Structure	1	Number of energy supplier	Sum of Energy supplier
	2	Supplied Energy	Sum of Supplied Energy
	3	**Market shares**	
	3.1	- in terms of energy	Supplied Energy / Total Supplied Energy
	3.2	- in terms of POD	Number of POD served / Total POD served
	4	**Concentration index**	
	4.1	- in terms of energy	Sum of the monthly energy market shares of the top 3 operators
	4.2	- in terms of POD	Sum of monthly market shares in POD terms of the top 3 operators
	5	**Concentration index**	
	5.1	- in terms of energy	Sum of the monthly energy market shares of the top 4 operators
	5.2	- in terms of POD	Sum of monthly market shares in POD terms of the top 4 traders
	6	**Index HHI:**	
	6.1	- in terms of energy	Sum of squares of the monthly market shares in terms of Energy of all operators
	6.2	- in terms of POD	Sum of squares of the monthly market shares in terms of PODs of all operators
Delay	**7**	**Supply suspension requests for delay:**	
	7.1	Amount of suspend requests versus number of PODs served	Total number of PODs subject to suspension requests / Total of PODs served
	7.2	Amount of suspension requests revoked for payment compared to the number of suspension requests	Total number of PODs subject to suspension requests revoked for payment / Total number of PODs subject to suspension requests
	7.3	Amount of suspension requests revoked for other reasons than payment than the number of suspension requests	Total number of PODs subject to suspension requests revoked for reasons other than payment / Total number of PODs subject to suspension requests
	8	**POD reactivations suspended due to delay:**	
	8.1	Number of reactivations relative to the number of PODs served	Total number of PODs subject to reactivation / Total number of PODs subject to suspension requests
	8.2	Reactivation quota versus suspend requests	Number of POD subject to reactivation / Number of POD subject to suspension requests;

Area	ID	Indicator Name	Indicator description
	9.1	Amount of defaulting customers	Total number of defaulting customers / Total number of customers with invoices with due dates in the quarter
	9.2	Amount of uncashed invoices	Total amount of not cashed invoices / Total amount of invoices with due dates in the quarter
	10	**Credit**	
	10.1	Creditworthiness	Total cashed amounts/ Total Invoiced Amounts
	10.2	Existing credit at the end of the quarter	Existing credit at the end of the quarter
	10.3	Amount of Short-term credit	Short-term credit / Outstanding Credit at the end of the quarter
	10.4	Amount of Medium-term credit	Medium-term credit / Credit outstanding at the end of the quarter
	10.5	Amount of Long-term credit	Long-term credit / Credit out standing at the end of the quarter
	10.6	Devalued Credit	Devalued Credit
	10.7	Devalued Credit Indicator	(Write-down of current assets - Receivables + Losses on credits)
Outcomes of the Market	11-12	*Contractual changes*	
	11.1	Rate of switching	Total of PODs that have changed suppliers / Total of PODs
	11.2	Switching rate coming out of the greater protection compared to PODs in protected regime	Total number of PODs that left the protected market, net of the deactivated ones / Total number of PODs in the protected market
	11.3	Switching rate coming out of the protected market with a connected seller enterprise	Total number of PODs that left the protected market with a connected seller enterprise / Total number of PODs in the protected market
	11.4	Switching rate coming out of safeguard	Total of PODs that have changed suppliers leaving the safeguarding regime / Total of PODs in safeguarding
	11.5	Unavailable switching measures on time	Total Number of PODs subject to switching without available measurement data / Total of PODs with successful switching request
	12.1	Economic renegotiation	Total number of PODs that have changed contracts with the same seller / Total number of PODs
	12.2	Economic renegotiations exiting the safeguard market	Total number of PODs that have changed contracts with the same seller exiting the safeguard regime / Total number of PODs in safeguard
		Prices	
	13.1	Re-entry rate in the protected market	Total number of PODs came back in the protection regime / Total number of PODs in the protected market
	13.2	Re-entry rate in the safeguarding scheme	Total number of PODs came back in the safeguard regime / Total number of PODs safeguarded
	14	Average final price before taxes, excise duty and VAT	Final Average price, net of taxes, excise, duties and VAT
	15	Average final price, net of taxes, excise duty and VAT	Final Average price, net of taxes, excise, duties and VAT
	16	Difference between Price max and Price min of the contract proposal	Difference between maximum price and minimum price (per typical user) of contract proposals found from the Authority's Find Offers portal
		Contractual Proposal	
	17	Number of standardized contract proposals	Number of contract proposals and their different types as found by the Find Offers of Authority portal

4.3 Spain

4.3.1 Evolution of Regulatory framework and Network Operators

Spanish natural gas sector is governed by the Hydrocarbon Law of 1998[45]. This framework law has been amended several times to, among other thing, transpose European Commission Directives (i.e. 2nd and 3rd Energy Packages). The Hydrocarbon Law established the first distinction between regulated and liberalized activities. Regulated activities, subject to regulated revenues, comprised: regasification, strategic storage, transmission and distribution. Liberalized activities were those carried out in a competitive regime: wholesale supply and retail sales. In order to guarantee fair and non-discriminatory third-party access regime to gas networks, the Hydrocarbon Law set first unbundling requirements introducing legal and accounting unbundling models. Legal unbundling was mandatory for companies carrying out regulated and supply activities. Different companies with separate social objectives should be established within 2 years after the entry in force of the law. To perform different regulated activities only

accounting unbundling was required. One year after the entry in force of the law, companies should submit proofs of the accounting unbundling of each regulated activity. Law 12/2007 transposed 2nd Gas Directive (EC 2003/55) introducing functional unbundling. After the implementation of this Directive, conglomerate or group carrying out incompatible activities (supply and regulated activities) should not only establish different companies (legal unbundling) but also guarantee that the following functional unbundling requirements are met:

- Management separation. A person holding management position in a company carrying out regulated activities shall not be part of the organizational structure of the business group, directly or indirectly, responsible for the day-to-day operations of liberalized activities (supply and production activities).
- Independence. Companies carrying out regulated activities and management staff shall not own equity participations in production and supply companies.
- Confidentially. Staff shall no share relevant commercial information with other companies carrying out liberalized activities within the group.
- Independence and effective decision-making. Companies in charge of regulated activities shall carry out its operations without interferences from the parent company/group or other partner companies. However, the parent company shall be allowed to monitor and approve financial programs and to establish limits to the debt level.
- Companies shall develop a code of conduct to guarantee that above requirements are met by all staff.

Companies have the obligation to submit a yearly report to the Ministry and National Regulatory Authority (CNMC) presenting the measures implemented to guarantee functional unbundling. Law 12/2007 also introduced in the Spanish regulatory framework the separation of activities between the System Operator and Transmission Network Operator. Finally, Royal Decree, 13/2012 transposed 3rd Gas Directive (EC 2009/73) and introduced additional requirements for the functional unbundling, mainly for transmission companies. For distribution and retail, most relevant provision are related to the clear branding distinction of regulated and liberalized activities. Integrated companies must use different names and corporate images for each of the three segments related to the retail sector:

- Distribution.

[45] Law 34/1998, of October 7, of The Hydrocarbon Sector.

- Retail sales at regulated tariffs.
- Retail sales at liberalized tariffs.

4.3.2 Data requirements and monitoring practices

The CNMC (Spanish NRA) has powers to monitor and, when appropriate, certify the unbundling status of transport, regasification, distribution, storage and supply activities in the gas sector. Currently, the CNMC uses three instruments to assess the level of compliance of each company with unbundling provisions:

- Audited financial statements and corporate reports.
- Codes of Conduct.
- Compliance Reports.

Regulated companies must submit their audited financial statements, as well those of the parent company. The CNMC has the right to request any additional information that may be relevant for unbundling monitoring such as share-holders register, services contracts, etc. CNMC staff carries out an internal review of available information to

verify the compliance with legal and accounting unbundling. Some provisions related to functional unbundling can also be evaluated such as the independent of management positions and equity participation limitations. Effective functional unbundling relies considerably on self-monitoring of regulated entities. The CNMC has power to request material and carry out inspections but it is not possible to fully guarantee functional unbundling without collaboration from the regulated entities.

A. Codes of Conduct

The Framework Law for gas sector sets the obligation for companies carrying out regulated activities to develop and publish a Code of Conduct with measures to comply with functional unbundling provisions. The Code of Conduct shall be communicated to all the staff and be permanently accessible through the intranet, company website and parent company website. Additionally, regulated companies shall periodically require their top management staff to give notice that they know and comply with the Code of Conduct. Training sessions shall be held to guarantee the fully understanding the functional unbundling provisions.

B. Compliance Reports

3 years after the entry in force of functional unbundling requirements (2007-2009) Spanish regulator carried out a detailed assessment of the level of compliance of each regulated company. This compliance report reviewed the following issues:

- Corporate restructuring to comply with unbundling provisions.
- Codes of Conduct elaboration.
- Implementation measures affecting staff.
- Remuneration policy to safeguard independency of activities.
- Clear and detailed separation of activities within the group.
- Equity participation prohibitions.
- Protection of confidential commercial data.
- Different premises for each company.
- Common services agreements.

For periodical monitoring, regulated companies must appoint an external auditor to assess the compliance with unbundling provisions. This external auditor shall have free access to all information, documentation, equipment and premises of the regulated company and parent company. The external expert develops a yearly compliance report. This compliance report must be submitted to the CNMC and some companies also make the compliance report publicly available.

Compliance reports include, among other things, the following elements:

4.3.3 Retail Market

4.3.3.1 Overview of Gas Market monitoring practices

In accordance with Law 3/201346, the CNMC shall monitor the effectiveness of market opening, the level of prices and competition in the natural gas sector, both in the wholesale and retail markets. The CNMC shall also monitor the complaints raised by consumers.

The monitoring practices related to gas retail market and distribution sector can be summarized in:

1. Data collection. Data provisions requirements for natural gas market participants were regulated in 2008. Regulatory framework establishes the data sets, format and periodicity requirements for suppliers, distribution and transmission companies.

Table 4.3–Yearly data collection activities of the CNMC (Spain): Natural Gas Market[47]

	Number of companies submitting information	Total number of forms processed yearly
Wholesale Market forms	30	1,500
Retail Market and Distribution forms	95	7,350
Wholesale, Transmission, Distribution and Retail (for the Ministry)	70	7,500
Customer Complaints forms	37	150

Table 4.4 – Gas Market Monitoring Reports: CNMC (Spain)[48]

Monitoring reports	Frequency	Number of reports
Gas Market Monitoring Report	Yearly	1
Wholesale Market and Supply Sources Monitoring Report	Monthly	12
Retail Market Monitoring Report	Quarterly	4

[46]Law 3/2013, of 4th June, of the establishment of the National Market and Competition Commission.

[47]Source: Source: CNMC activities report (2018).

[48]Source: Source: CNMC activities report (2018).

Monitoring reports	Frequency	Number of reports
Retail Market Monitoring Report per each region	Yearly	16
LPG Monitoring Report	Yearly	1
Supply Switching Monitoring Report	Yearly	1
Organised Gas Exchange Monitoring Report and recommendations	Yearly	1
Gas and Electricity End users' prices comparison Report	Yearly	1
Customers' complaints report	Yearly	1

2. Inspections. The CNMC carries out inspections to verify the accuracy of data received. In 2018, the CNMC carried out a total of 15 inspections in gas companies related to tariffs' applications, settlement, supply interruptions due to non-payment and regasification losses. Some of these inspections are carried out remotely via data requests and information exchanges while in some cases on-site inspections are required. Generally, inspections are carried by CNMC own staff.

   Subject to article 27 of law 3/2013, CNMC staff has powers to carry out on-site inspections and the following activities:

   - Access all companies' premises and private residences of staff under supervision.
   - Review all books and documents, including informatic material and software.
   - Make copies of all relevant documentation and keep the originals up to 10 days.
   - Seal companies' premises.
   - Interview any personnel and request additional information from staff.

   In order toassess CNMC retail market monitoring practices it is presented the information in three different sub-sections:

   - Regulated data requirements: review of legal data requirements for distribution and supply companies. Reporting templates, procedures, obligations, etc.
   - Retail Market Monitoring reports: overall presentation of indicators in use for monitoring and reporting of the retail market: market structure, prices, consumption, etc
   - Supplier switching monitoring practices: details on monitoring practices in use for supplier switching.

4.3.3.2 Regulated data requirements for the retail market: distribution and supply companies

- **Data Submission Format**. In 2008,Spanish regulation set two valid formats for data submission:

  1. Hard copies (printed) with support soft copies (USB and CD).

  2. Remote submission: e-mail address or telematic information system of the CNMC.

- **Representative**. Each market participant should designate one representative responsible of all communications between companies and the CNMC in all data submission related procedures. Any change that affects the designation of the responsible interlocutor should be immediately communicated.

- **Additional information**. In any case, the CNMC can request any additional information that is intended to clarify the scope, accuracy and content of the information submitted.

- **Inspections**. CNMC can carry out all necessary inspections and verification activities to access the accuracy of the data received.

- **Confidentially**. Confidential data submitted by companies to the CNMC may only be transferred to the Ministry within the scope of their powers. CNMC staff must not disclose any confidential data.

  Market participants submitting data may indicate which data sets they consider confidential. Data is deemed confidential if its dissemination could harm the commercial and industrial activities of the company. Companies shall provide motives about the confidentially requests and the CNMC decides if the confidentially requests are justified. The CNMC assess each confidentially request case by case and issues motivated decisions granting or rejecting confidentially requests. There is no fixed regulation establishing which data is confidential. In any case confidentiality only applies to reporting practices. Companies must share with the CNMC all the requested data but the CNMC may not be allowed to disclose part of it.

  In any case, the CNMC is always allowed to publish confidential data in an aggregated manner without disclosing specific information of companies.

- **Enforcement mechanisms/infractions**. Non-compliance with data submission requirements will be considered serious breaches that could lead to penalties.

The above regulation sets framework data requirements for all market participants in the gas sector. In addition to this framework requirements, the CNMC has developed additional data submission templates focused in some specific areas. Some of these data requirements were requested just for a specific monitoring report while others are maintained as regulated reporting obligations of companies:

- Information related to customer complaints. These data requirements are presented within the "Quality of Service and customer protection" section.

- Information on commercial offers. These data requirements are presented in the "End users' prices monitoring" section.

4.3.3.3 Retail Market Monitoring Reports

Based on the data base populated through the regulated data submission procedures. The CNMC produces quarterly and yearly reports than contain key indicators for the retail sector: market share, end users' prices, consumption, etc.

Table 4.5–Gas Retail Market Monitoring – Quarterly reports (Spain)[49]

Element	Indicators/contents
Review of key milestones in the retail gas sector	- Relevant news affecting the sector: transactions, new market rules, etc.
Regulated End Users tariffs	- Monthly evolution of end-user's tariff

[49] Source: CNMC Gas Retail Market Monitoring Report (2019).

Element	Indicators/contents
Market Structure - Supply	- Market shares by supply company (MWh and %) - Herfindahl-Hirschman (HHI)
	- Market shares by supply company (number of customer and %) - Herfindahl-Hirschman (HHI)
	- Customers per supplier by type of tariff (regulated/open market)
Consumption	- Monthly evolution of consumption and number of customers by tariff group. - Evolution of consumption and number of customers by pressure and consumption interval.
Distribution Sector	- Market Share (supply points) per DSO

Table 4.6– Gas Retail Market Monitoring - yearly key indicators report (Spain)[50]

Key Indicators of the Spanish Retail Gas Market	2018	Variation	Comment
Demand	347,850 GWh	-0.28%	Domestic and industrial consumption are at historical maximum levels.
Number of customers	7,870,899	+73,666 clients	Keeps growing steady
Number of suppliers selling gas to end users	78 (69 groups)	+8	New players entering the market
Number of suppliers with more than 5% of sales	5	=	Naturgy, Endesa, UF Gas, Iberdrola and Cepsa
Number of suppliers with more than 5% of customers	4	=	Naturgy, Endesa, Iberdrola and EDP
Supplier switching rate	8.8%	-0.6 pp	Decreases in 2018
% of customers under regulated tariffs	20%	-1.0pp	Customers keep moving from regulated to open market: clients under regulated tariffs decreased 25,000.
HHI sales	1,939	-95	Naturgy market share (the highest) decreases
HHI customers	3,502	-144	
Number of supply cuts due to non-payment	19,676	+685	2.5 cuts/1000 customers
Regulated tariff evolution (9000 kWh/year) including tax and levies	714.26 €/year 7.936 c€/kWh	+15.30% (+94.77 €/year)	Fixed charges decreased by 0.12% and variable charge went up by 20.14%.
Number of offers in the open market	108	=	Diversity in the type of offers.

[50] Source: CNMC Gas Retail Market Monitoring Report (2018).

4.3.3.4 Supplier switching

The CNMC, in accordance with Law 3/2013, shall ensure compliance with the regulations and procedures related to supplier switching. The responsibilities of the CNMC comprise:

- Monitoring supply switching in accordance with the principles of transparency, objectivity and independence.
- Promote and monitor the quick and efficient information exchange between DSOs and suppliers.
- Propose to the competent authorities improvements measures related to supplier switching.
- Elaboration of monitoring reports.

The CNMC collects on a monthly basis information from distribution companies on supply switching requests, time to respond, etc. Below we present the reporting templates used to collect this data:

Table 4.7–Supplier switching requests: data collection template (Spain)[51]

Number of supply switching requests														
Supplier name	Received	Accepted	Accepted and activated	Rejected	In progress	Average time to respond				Average time of execution				
						<6 days	1 week-1 month	>1 month	Avg time	<2 weeks	2 weeks-1 month	1 month – 2 months	>2 months	Avg time

Table 4.8–Rejected supplier switching requests: data collection template (Spain)[52]

Number of rejected supply switching requests						
Supplier name	Data format error	Problems with the consistency of data	Lack of approval from customers	Customer wants to maintain former suppliers	Other reasons	Total

Data is collected separately for those customers with and without right to regulated tariffs. These two templates are used also for the collection of information on new supply requests.

Based on collected data, the CNMC calculates the following indicators:

Table 4.9–Supplier switching monitoring indicators: quarterly reports (Spain)[53]

Indicator	Explanation/contents
Evolution of supply points per tariff type	Supply points under regulated tariffs/open market
Suppliers' market share per customer type	Open market: households, S&M enterprises and industry.
Switching rate evolution	Quarterly evolution of the switching rate (Supply points having changed supplier/total supply points)

[51] Source: CNMC Regulation (5/2008).

[52] Source: CNMC Regulation (5/2008).

[53] Source: CNMC Supplier Switching Report (2019).

Indicator	Explanation/contents
	- Per region
Average time for supply switching activation	Quarterly evolution: - Activation time: supplier side - Activation time: DSO side Information is presented for main supplier and distribution companies
Rejects supplier switching requests.	- % of rejected requests per supply company and DSO - Reasons for rejection for each distribution/supplier
Average time for new supply activation	Quarterly evolution: - Activation time: supplier side - Activation time: DSO side Information is presented for main supplier and distribution companies
Rejections of new supply activation requests	- % of rejected requests per supply company and DSO - Reasons for rejection for each distribution/supplier

4.3.3.5 End users' prices monitoring

Since 2010, Spanish CNMC has powers to collect information about the commercial offers in the open market of each supplier. The objective of this data collection procedure is to populate the price comparison tool publicly available for customers. The access to this price comparison tool is free and open to all customers without any registration requirement.

Monitoring activities carried out by the CNMC aiming to increase transparency on suppliers offers include:

- Data submission and collection.
- Monitoring and reporting practices.

4.3.3.6 Commercial offers of suppliers: data submission requirements

Tariff order for 2010 gave powers to the CNMC (Spanish NRA) to collect data from supplier companies about their commercial offers. Data submission shall be carried out in compliance with the following rules:

- Data must be provided in accordance with the reporting template developed by the CNMC.
- Data must be provided/modified at least 10 days before the commercial activation date of the offer.
- The CNMC must guarantee the confidentiality of the commercial information until the offer is publicly available.

The reporting template used to collect offers characteristics is as follows:

Table 4.10–End users' price comparison tool – reporting template (Spain)[54]

General information	- Supplier name and contact details - Offer name
Tariff data	For the first and second year: - Applicable fixed charge for each consumption level. - Applicable energy charge for each consumption level. - Applicable tax and levies.

[54] Source: CNMC Offer comparison tool.

Characteristics of the offer	- Discounts and penalizations applicable. - Validity period - Consumption interval - Limitations (e.g. only households). - Additional information - Commercial channels available. - Billing procedures available. - Price review.

4.3.3.7 Monitoring and reporting practices

The offers price comparison tool of the CNMC allows any user to obtain detailed information about all the commercial offers available. Users only enter its estimated consumption and their postal code to get a list of all supply offers available.

Based on the information collected through the reporting template for the price comparison tool (and the general data requirements from suppliers) the CNMC publishes on a yearly basis a monitoring report with a detailed assessment of retail prices.

Table 4.11–Retail Prices Monitoring Indicators: yearly report (Spain)[55]

Indicator	Explanation/contents
Number of active supplier	Suppliers having published at least one commercial offer in the comparison tool
Number of offers	Number of commercial offers in the comparison tool: - Region-wise: national, regional or multi-regional. - Per supplier - Per customer type:
Retail prices	Offers and Price-range (max-min price offer): - Per customer type and region. - Comparison between free market offers and regulated tariff. - Historical evolution of the average offer price and price range - Average saving changing from regulated price to free market.
Analysis of offers with additional services.	Number of customers contracting additional services

4.3.4 Quality of Service and customer protection

Monitoring practices of the CNMC (Spain NRA) related to Quality of Service (QoS) for gas are limited in comparison with other European NRAs such as Italy (ARERA) or the UK (Ofgem). Spanish regulatory framework does not include any incentive, penalization mechanisms related to the QoS in the revenue cap methodology for gas distribution operators. Therefore, the scope and quality of the data collected about distribution QoS is poor compared with other European regulators that apply revenue incentive mechanisms based on QoS indicators. The most important instrument of the CNMC to monitor the quality of services related to gas distribution and supply is the collection of customers' complaints. Upon approval of CNMC Order 2/2016, all suppliers and distribution companies must send to the CNMC all the complaints received together with the time required to response, final resolution and other

[55] Source: CNMC (2018).

elements. It is presented in detail all QoS data submission requirements affecting distribution and supply companies, especially those related to customer complaints, as well as monitoring and reporting practices of the CNMC.

Apart from the monitoring procedure to assess customer complaints it is also presented other data requirements related to technical and commercial QoS.

4.3.4.1 Customer Complaints: Monitoring practices

Based on the information collected on quarterly basis, the CNMC prepares each two year a monitoring report including the total number of complaints per category (for each supplier and distribution company) and summary

indicators. Customer expectations are not monitored. Customer satisfaction is not directly monitoring. Customer complaints data is collected region-wise and a household survey is carried out periodically

Table 4.12–Customers complaints monitoring report: contents and indicators[56]

Elements	Contents/indicators
Complaints by customer type	For domestic, S&M enterprises and industry: - Total number of complaints (supply points) - Complaints per each 100 supply points.
Complaints by channel	Phone, web, e-mail, in person and letter.
Complaints by subject	Customers, legal representative, courts, etc.
Complaints by region	- Total number of complaints (supply points) - Complaints per each 100 supply points.
Complaints results	Accepted/rejected/pending
Average time of resolution	Time of resolution by supplier, DSO and customer. Number of complaints solved in less than 1 month (%)
Complaints per category	- Metering - Billing and payment - Price/tariffs - Contracts and sales - Quality of Supply - Connections - Customer care services - Supplier switching - Non-payment disconnections. - Commercial mal practices.

4.3.4.2 Other monitoring practices and data requirements related to customer protection

The CNMC uses customer complaints as a proxy to assess the overall level of customer satisfaction with different quality of services aspects, both technical and commercial.

[56] Source: CNMC Monitoring Report-Complaints (2018).

General data submission requirements of distribution companies also include some indicators dealing with supply incidents and technical inspections. On yearly basis, DSOs shall submit the following information to the CNMC:

- Number of urgent requests solved by incident level. Average time of resolution.
- Number of inspections. Number of correct inspections and problems identified.

In 2016, the CNMC carried out an extraordinary survey focused on suppliers' customer services. This extraordinary survey requested information from the supplier on the following items:

Table 4.13–Customer Services – Monitoring Indicators[57]

Topic	Monitoring indicators/survey questions
Accessibility	- Customer services channels - Time availability of customer services channels - Procedures managed by channel - Non attended calls and waiting time
Transparency	- Customer services telephone transparency - Corporate image and branding. Clear distinction. - Commercial offers - Phone calls recording - Paper bills - Availability of historical consumption online
Commitment to improvement.	- Internal quality standards - Complaints resolution - Information and Transparency policy - Customers' satisfaction - Conflict Resolution - Different payment instruments
Web access	- User friendly website

4.3.4.3 Household Survey

Each 6 months, the CNMC carries out a multisectoral household survey. The survey collects data related to the telecommunications, energy and postal sectors.

The company "TNS Investigación" carries out the fieldwork and data processing which feeds the survey: every six months, the households complete postal/web questionnaires regarding the availability of the services and their use and perceptions of them and, every quarter, they send in bills for telecommunications services. This information,

[57] Source: CNMC Customer Services Report (2018).

once processed, makes up the CNMC Households' Tracking Survey. The contract between the CNMC and TNS in use amounts to 1.4 Million € for a 4 years period. [58]

Last survey included 4,878 households and 9,109 individuals. Questions cover both electricity and gas. Questions dealing with gas supply are categorized under the following topics:

- Energy sources available.
- Energy equipment available.
- Knowledge of the requirements to benefit from the social tariff discount.
- Knowledge of the difference between the supply of natural gas in the open market and in the regulated market (TUR).
- Contracts for the supply of natural gas in the liberalized or regulated market (TUR)
- Contracts of natural gas and electricity with the same supplier.
- Reasons to contract natural gas and electricity with the same supplier.

4.3.5 Distribution Network Monitoring

Historically, there has been a lack of transparency about the distribution network assets of DSOs. This is mainly due to the applicable revenue methodology that does not require any data collection about the distribution network apart from the energy distributed and the number of supply points.

Spanish RRM in use does not remunerate network operators for investments directly. Revenue cap is calculated applying incremental unitary revenues for each new supply point and MWh. If a network investment does not increment the number of customers or the energy distributed it will become a sunk cost that the company will never recover since it will generate no additional revenue.

Therefore, the CNMC (NRA) does not need to collect data about the distribution network for tariff determination.

Regulated data requirements for distribution companies only included the number of supply points and quantities distributed. No information has been collected by the Spanish NRA neither about physical configuration of the distribution network (kms, stations, etc) or investments.

Revenue Regulation for the next regulatory period (2021-2026) maintains current revenue methodology without a direct remuneration of network investments. However, in order to increase transparency of network operations it introduces new data submission requirements for distribution companies.

The CNMC shall collect information about the distribution networks in service and the expansion plan for the current year and next ten years. This information must be submitted before December 15 of each year for the assets in service as of December 31 of the previous year.

Data submission requirements of distribution operators are as follows:

Table 4.14– New data submission requirements – distribution network

[58] This contract is not limited to energy sector and includes additional market assessment activities (https://www.cnmc.es/en/node/373464).

Network Information in service	a) The coordinates of the pipeline section based on digital official cartography. b) Pipeline Section Identification Code or Supply Point Identification Code. c) Municipality where the section or connection is located. d) Year of commissioning of the section. e) Design pressure f) Diameter of the pipeline section. g) Pipe material (steel, polyethylene, etc.). h) Length i) Name and VAT number of the owner who commissioned the installation for the first time. j) If any, the name and VAT number of the owner who transferred or sold the facility to the distribution operator.
Expansion Plan and Decommissioning Schedule	**Physical information on network expansion plan** For each pressure level: - Length of new distribution network, including transformed LPG networks and replacement of the pre-existing network. - The number of new metering stations and or replaced stations. - Number of supply points expected to be put into service and their associated demand in the new distribution network and in LPG networks converted to natural gas. For new distribution networks or transformed LPG networks, it will also be indicated if they are supplied from: - Transmission network (include the identification code). - Existing distribution network (include nominal pressure) - LNG satellite plant (nominal pressure of the pipeline connected to the plant)
	Investments (in Million Euros) classified in: - Network expansion and new meters. - LNG satellite plants. - Replacement of existing assets.
	Number of new connections and the length of the associated pipelines.
	Scheduled commissioning date of the facilities to distribute gas to municipalities currently not connected to the gas network.
	Decommissioning plan. Pear each pressure level: - Network length decommissioned and the reason for closure. - Metering stations and the reason for closure.

As it can be seen, new data requirements to be implemented are very detailed and will require the development of new forms, data collection and processing procedures. CNMC is currently working on the development of the secondary regulation to support new data requirements of DSOs.

The CNMC may carry out all the required inspections to confirm the accuracy of the information provided by DSOs.

If, as a result of the inspections, differences are detected in the reported values of supply points and the quantity of natural gas supplied, revenues may be corrected by resolution of the CNMC.

4.3.6 Additional monitoring parameters: Financial parameters

Debt ratio, Financial interest payments over remuneration, Debt over fixed assets, Debt/EBITDA, Debt/operating margin indicators are collecting for financial monitoring. Spanish RRM for the next regulatory period includes a

penalization mechanism to promote the financial prudence of gas distribution companies. In the end, the objective of efficiency incentive mechanisms is to make the distribution sector sustainable in the long-term promoting productivity gains. But if productivity gains are achieved at the expenses of the financial health of the company that will hamper distribution sector operations in the long-term. To this aim, the CNMC introduces a penalization for those companies whose financial ratios exceed a threshold. The penalization could reach 1% of the total yearly remuneration of the company.

4.3.7 Data and Information System of the Spanish Authority

It is interesting to analyze the key elements of the monitoring procedure between data submission (inputs) and reporting & analysis (output).

Currently, the size of information received by the CNMC in compliance with regulatory requirements is between 50-100 MB. Data is sent through approximately 250 files: web forms, XML and Excel books.

Several data sets are complementary, either between the same data provider (market participant) or between different data providers (e.g. distribution and supply company). The CNMC verifies the consistency of the information sent by each agent and for the whole sector.

The CNMC information system comprises two main activities:

- Data reception and storage.
- Coherence analysis: data validation and register of interrelations between data sources.

4.3.7.1 Data reception and storage

Files are sent electronically through the Electronic Registry of the CNMC, via email in most of the cases and occasionally on USB.

Currently the information system contemplates two alternatives for the uploading of data:

- Automatically, from an external agent that enters a form in the system, either web or Excel, and it is the system itself that process the documentation and converts it to the format that is uploaded in the data base.
- Manually. Carried out by an internal CNMC agent who uploads the data either because there is some type of error in the information or because it has been sent though a non-electronic channel.

Each month data submitted is checked to assess its completeness. A monthly completeness report is produced with the register of agents that have not sent the required data in the adequate format and on time.

4.3.7.2 Coherence analysis

Each month the data correlation matrix is updated based on new data received. Thanks to automatically consistency checks the following actions are carried out:

- Data validation of all data received. Identification of non-consistency data.
- Assessment of inconsistencies. The CNMC assess internally if the lack of coherence co be solved internally or a clarification from the company is required.
- Notification to the agent submitting non-consistent data of the full set of errors.
- Rectification of errors after receiving new and correct information

These activities are currently carried out with external IT support. Current IT assistance contract was awarded at 50,000 EUR/year for a 3 year duration.

4.4 UK

Ofgem monitors developments in the gas market, facilitating changes to the market arrangements where it is economic and efficient to do so. It also undertakes work to protect customers' interests in respect of securing Britain's gas supplies, as well as monitoring and investigating activities which may harm competition. Ofgem's market monitoring and data reporting requirements for gas distribution (network) businesses relates both to its monitoring of the performance of the networks in relation to their license obligations, including their performance under the agreed price-control framework (RIIO) and as part of its' obligation under the European Union Gas Directive (2009/73/EC), to report annually on aspects of network regulation, promoting competition and security of supply.

4.4.1 Distribution activities and unbundling

In the UK, the regional gas distribution networks (GDNs) are natural monopolies responsible for operating, maintaining and extending the gas distribution network and for providing 24-hour gas emergency service. They are prohibited, through license conditions (Standard Special Condition D4) from procuring capacity rights, gas or gas derivatives except where these are for the purpose of shrinkage or constraint management. Under unbundling regulations, distribution licensees are required to be independent of production and supply activities. Returns (business information) are submitted on business independence, financial performance and output performance and reviewed by Ofgem to ensure compliance with unbundling certification requirements in line with EU guidelines.

There are eight gas DNOs, owned by four companies, as set out in Table 4.15.

Table 4.15– Gas DNOs in the UK

Network Owner	License Area
Cadent	East of England
	North London
	North West
	West Midlands
Northern Gas Networks	Northern
SGN	Scotland
	South
Wales and West Utilities	Wales and West

Cross subsidization

In the UK, licensed gas distribution networks are subject to conditions prohibiting regulated businesses from giving cross-subsidies to, or receiving cross-subsidies from, related undertakings. The regular information submissions that licensees are required to make, principally those relating to their price control arrangements, allow Ofgem to assess whether any risk or incidence of cross-subsidization has arisen. Each licensee is subject to strict ring-fencing and compliance obligations to prevent any undue preference to sister companies. This is monitored by Ofgem as part of the certification process for unbundling. The general requirements around reporting and regulatory ring-fencing for the distribution companies are contained within their licenses. There are several Standard Special Conditions that are particularly relevant including A36 (Restriction on Activity and Financial Ringfencing), A30 (Regulatory Accounts), A34 (Appointment of Compliance Officer) and A35 (Prohibition of Cross-subsidies) Article 41(1)(f) of the Gas Directive, is required to ensure that there are no cross-subsidies between transmission, distribution, storage, LNG and supply activities.

(Also see condition 19b below which prohibits cross-subsidy)

https://epr.ofgem.gov.uk/Content/Documents/Gas%20supply%20standard%20licence%20conditions%20consolidated%20-%20Current%20Version.pdf

Gas distribution licenses contain a requirement for independent auditors to carry out a range of procedures that have to be agreed with Ofgem, in order to provide assurance that obligations to avoid discrimination and cross-subsidies are being respected. Ofgem reviews the auditors' reports and raises supplementary questions as appropriate.

One area of focus is the interpretation and application of requirements for financial transactions to be completed at arm's length and on normal commercial terms. This is especially relevant for the terms of loans made to or by the relevant licensee. For gas distribution licensees, it is also monitored the risk of licensee-owned freehold sites being sold to related parties at insufficient value. This particularly relates to gasholder sites in major cities, where land value for development is especially high at present. Other key risk areas taken into account are:

- the basis of recharging for services provided at a group level;
- the justification for any management fees charged to the licensee by related parties; and
- the interest rates charged on intra-group loans affecting the licensee.

Much of this is assessed through the general regulatory accounts and price-control information provided by the companies which should detail any cross-company transfers and these would need to demonstrate they are consistent with accounting principles on transfer pricing and in line with commercial benchmarks. In terms of inter-company loans, but would expect the regulated business to have to demonstrate that the terms of any loan (a) were in line with commercial rates; and (b) did not contain favorable terms on repayment that may affect the financial position of the regulated entity. The detailed license conditions can be found here

(https://www.ofgem.gov.uk/ofgem-publications/49332/10683-appendix7aaprilsection23pdf)

4.4.2 Reporting Obligations for DNOs

Each GDN is responsible to operate the gas distribution network in an economic and efficient manner. To achieve this, Ofgem operates an output and incentive-based price control regime, RIIO, that ensures GDNs deliver agreed outputs and network performance. One of the requirements of the price-control is that the GDNs report regularly on their performance on costs, outputs, financial performance and revenues. There is detailed description of both what and how the GDNs should report included in the Regulatory Instructions and Guidance (RIGs) that ensures the companies provide the data and information required by Ofgem in a consistent and appropriate manner. Most of the data is collected annually while some collected in quarterly basis as well.

The details of the RIGs are included in the gas distribution company license (Standard Special Condition A40). There are four main elements to the RIGs:

- Data reporting templates
- Revenue reporting templates (including the calculation of performance based revenue incentives)
- Data commentary templates; and
- Instructions and guidance on how to report the data.

  The structure has generally been set in line with the final proposals under RIIO-GD1. It requires companies not only to report on the historical performance of the business but also provide forecasts as to how they anticipate they will perform over the remainder of the price-control period.

Ofgem publishes all templates in its website:

Data reporting, Data commentary templates for RIIO-GD2:

https://www.ofgem.gov.uk/system/files/docs/2020/01/riio-gd2_bpdt_and_guidance.zip

RIIO-GD1 version:

http://www.ofgem.gov.uk/Networks/Trans/PriceControls/RIIO-T1/ConRes/Documents1/8_RIGSDatatablesGD.xlsx

Revenue reporting pack template for RIIO-GD1:

https://www.ofgem.gov.uk/system/files/docs/2019/03/2018-19_-_gd_revenue_rrp_template_draft_v6.0.xlsx

Regulatory Reporting Pack template for GD1:

https://www.ofgem.gov.uk/system/files/docs/2019/04/2018-19_-_gd_rrp_main_template_draft_v6.0.xlsx

Minimum content needed for the Reporting of each network type includes the following items:

- **Executive summary**
- **Revenue Impact:** actual revenue vs. allowances for reporting year
- **Incentive:** performance in the year against targets with potential future highlights
- **Innovation**: summary of innovation projects and funding under the Network Innovation Allowance (NIA)
- **Outputs**: performance in the year against agreed targets
- **Costs:** performance in the year against targets for costs and workload where relevant, highlights of future performance, and expected outturn at the end of RIIO
- **Uncertainties** (including Load Related): high-level commentary in relation to anticipated impact(s) of any uncertainty mechanism and how this has evolved from the expectations at the time of drafting the Business Plans. Comment on how these have affected forecast CAPEX and output delivery

The reporting packs relate to an annual period running from April 1st to March 31st of the following calendar year. Timescales for delivery are set out in the Licence Condition but in general, annual reported data is expected to be provided before July 31st after the end of the reporting year.

Key data templates cover the following areas of the gas distribution businesses:

- Finance tables – to reconcile total expenditure in Regulatory Accounts, identify changes in net tax and debt position and report any asset disposals;
- summary tables – reporting data on actual and forecast expenditure, workload and outputs;
- Opex costs and workload tables – reporting all operating expenditure and the associated workload;
- Capex costs and workload tables – reporting all capital expenditure and the associated workload;
- Repex costs and workload tables – reporting all replacement expenditure and the associated workload;
- network asset data tables – reporting all non-financial data on the assets in the distribution network by pressure level, including storage and network exit capacity;
-

- network output, environment and innovation data tables – reporting the outputs, environmental performance and innovation activities of the gas distribution business;
- quality of service and guaranteed standards of performance tables – this reports on performance against agreed quality of service metrics and guaranteed standards of performance as set out in the Gas (Standards of Performance) Regulation (2005); and,
- revenues tables – information to calculate the actual revenue earned relative to the maximum allowed revenue constraint included in the price-control determination.

- The table below presents the individual data tables designed by Ofgem under each of the headings in the preceding bullet list.

Table 4.16–The Data tables and reports required by Ofgem under RIIO GD1[59]

Finance	
	1.4 Reconciliation to Regulatory Accounts
	1.5 Net Debt, Interest & Tax Clawback
	1.6 Disposals
Summary	
	2.1 Provisional Price Control Financial Model (PCFM) inputs
	2.2 Totex cost summary
	2.3 Workload summary
	2.4-2.6 Safety, reliability and environmental
	2.7 Performance snapshot
Opex	
	3.1 Opex cost matrix
	3.2 Year on year Opex movements
	3.3 FCO resource utilization
	3.5 Business support allocation
	3.7 Training and apprentices
	3.8 Maintenance
	3.9 LP gasholders demolition costs
	3.10 Land remediation
	3.11 Related party transactions
	3.12 Shrinkage
	3.12a Gas theft
	3.13 Street works
	3.14 Smart metering
	3.15 Statutory independent undertakings
Capex	
	4.1 Capital expenditure summary

[59]Source: Ofgem, RIIO-GD1 Gas Distibution Price Control –Regulatory Instructions and Guidance: Version 6.

	4.2 Capital expenditure analysis
	4.3 LTS, storage and entry
	4.4 Reinforcement (mains and governors)
	4.5 Governor replacement and decommissioning
	4.6 Connections
	4.7 Other Capex
	4.8 Physical security upgrade program (PSUP)
Repex	
	5.1 Replacement expenditure summary
	5.2a Repex iron mains tier 1 + mandatory <=2“ steel
	5.2b Repex iron mains tier 2A
	5.2c Repex other mains
	5.2d Diversions
	5.3 Other Repex services
	5.4 Risers
	5.5 Repex expenditure analysis
	5.6 UNC sub deducts
	5.7 Decommissioned pipes
	5.8 Decommissioned summary
Network asset data	
	6.1 LTS asset data
	6.2 Network asset data
	6.3 Capacity and storage asset
	6.4 Capacity and demand data
	6.5 Capacity output data
	6.6 MEAV
Network outputs, environment and innovation	
	7.1 Safety outputs
	7.2 Reliability outputs
	7.3 Asset health criticality
	7.4 Public Reported Escapes (PREs), reports and repairs
	7.5 Accuracy pipeline records
	7.6 Environment – Business carbon footprint
	7.7 Environment – Other
	7.8 Environment – Distribution gas entry connection
	7.9 Innovation – Innovation Rollout Mechanism
	7.10 Innovation – Network Innovation Allowance
	7.11 Innovation – Network Innovation Competition
Quality of service and performance	
	8.1 Customer complaints
	8.2 Customer satisfaction survey
	8.3 Guaranteed standards of performance (GSOP)
	8.4 Standard Licence Condition D10
	8.5 Third party and water incidents
Revenues	

	1.Maximum Allowed Revenue (ARt)
	2.Base Revenue(BRt)
	3.Pass through item revenue adjustment (PTt)
	4. NTS Exit Capacity Cost Adjustment(Ext)
	5. Incentive adjustment with respect to broad measure of customer satisfaction(BMt)
	6. Shrinkage Allowance Revenue Adjustment(SHRt)
	7. Environmental Emissions Incentives revenue(EEIt)
	8.Discretionary Reward Scheme Revenue (DRSt)
	9. Network Innovation Allowance (NIAt)
	10. Correction term revenue adjustment(Kt)
	11. Reconciliation to regulatory accounts

https://www.ofgem.gov.uk/system/files/docs/2019/03/2018-19_-_gd_revenue_rrp_template_draft_v6.0.xlsx

For more information about Carbon print, Table 7.6 demonstrates performance as a % change against a pre-agreed base year. See tab 7.6 in the RRP template for the breakdown of emissions expected by Ofgem:

https://www.ofgem.gov.uk/system/files/docs/2019/07/riio-gd1_gas_distribution_rigs_version_6.0.pdf

Also below, how to measure GHG emissions for different types of organisations in the UK:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69282/pb13309-ghg-guidance-0909011.pdf

In addition to the data, the companies are also required to provide a written commentary around the information. The main purpose of the commentary is to:

- provide an executive summary of performance and detail of the drivers behind it, presenting strategic insights.
- provide a summary of the key outputs DNO has delivered during the year with any risks to achieve these outputs, and set them in context of the delivery of overall RIIO-GD1 price control outputs.
- provide an appropriate narrative that explains the reasons for actual/forecast spend and workload and the material differences between allowances and DNOs's actual spend.

For more details, report sample can be seen in this link.

- 3rd year report of Wales & West Utilities for RIIO-GD1:https://wwutilities.co.uk/media/2210/wwu-year-three-rrp-commentary-2015-16-_full.pdf

- 6th year report of Northern Gas Networks for RIIO-GD1: https://www.northerngasnetworks.co.uk/wp-content/uploads/2019/10/NGN-RIIO-GD1-Year-6-Report.pdf

The commentary should include the following:

- Strategic summary, including an overview of company performance, business plan delivery, company strategy and Board update
- Outputs summary, reporting annual output performance against a RAG (Red, amber, green) rating (see table below)
- Totex drivers, summarizing the main Totex cost drivers and explaining discrepancies with allowed expenditure

- Performance summary on outputs, incentives and innovation; financial performance comparing allowed vs. actual revenue and the company view of customer bill impact.

To ensure transparency, the GDNs are also required to publish the majority of this information on their company websites and Ofgem also summarizes the responses in its annual RIIO reports on gas distribution.

4.4.2.1 Output reporting

Under RIIO, each company has to deliver and report on a range of outputs.

- Reliability: Companies are expected to improve network reliability and reduce the number and duration of power interruptions.
- Connections: Companies will provide a better service for customers wanting to connect to the network.
- Customer Service: Ofgem incentivizes companies to deliver good customer service and listen to stakeholders.
- Social Obligations: Companies will do more to help vulnerable customers, particularly during power interruptions.
- Environmental: Companies must reduce their carbon emissions and other environmental impacts.
- Safety: Companies are funded to ensure the network remains safe and meets Health and Safety Executive standards.

The table below lists the annual performance output data designed by Ofgem and which need to be rated through a 'traffic light' or RAG method where:

-

- R (red) represents that DNO has failed to achieve an annual output or it is forecasting to fail the output commitment for the price control period;
- A (amber) represents that DNO is at risk of failing the output commitment for the price control period; and,
- G (green) represents that DNO has successfully achieved an annual output or is on-target to meet the output commitment for the price control period.

In addition to presenting this for each company, Ofgem also produces and overall industry position, the 2018/19 position on this is illustrated in the table.

Table 4.17–Annual output performance data DNOs provide to Ofgem under RIIO GD1[60]

Output category	Output	RAG
Safety	Emergency response - 97% controlled gas escapes	G
	Emergency response - 97% uncontrolled gas escapes	G
	12 hour escape repair requirement	G
	Repair risk	G
	Major accident prevention	G
	Iron mains reduction	G
	Sub-deducts networks off-risk	G
Reliability	Loss of supply – number of unplanned interruptions	R
	Achieving 1 in 20 obligations	G

[60] Source: Ofgem, RIIO-GD1 Gas Distribution Price Control –Regulatory Instructions and Guidance: Version 6.

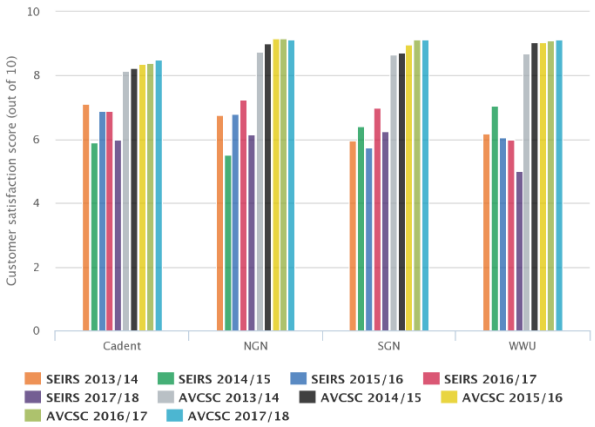
	Maintaining operational performance	G
Connections	Guaranteed standards of performance	G
	Introduce distributed gas entry standards (scmh connections)	G
Customer service	Planned interruptions survey (score out of 10)	R
	Emergency response and repair survey (score out of 10)	G
	Connections survey (score out of 10)	R
	Complaints metric	G
	Stakeholder engagement	G
Social obligation	Fuel poor connections (no.)	A
	Carbon monoxide awareness	G
Environmental	Leakage	G
	Biomethane connections information	G

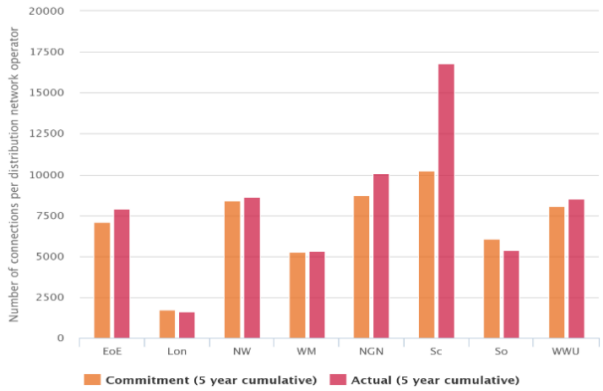
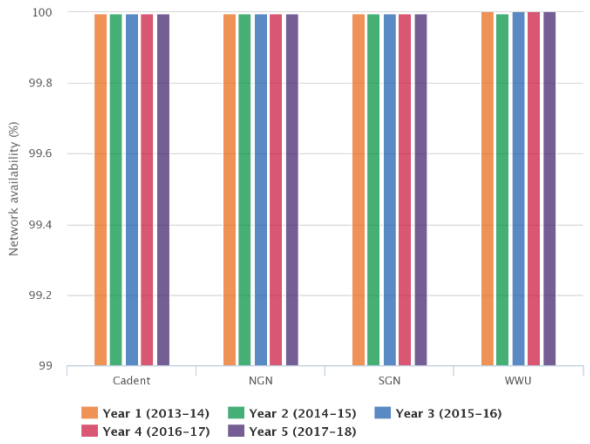
The key outputs are reported both in the annual monitoring reports and through the Ofgem Data Portal. Data Portal is publicly accessible.(https://www.ofgem.gov.uk/data-portal/overview)this data portal is a transparent portal for reporting the data that is provided by the companies (i.e. it is not the system used to submit data by companies). It is a summary of the data provided to Ofgem and in some areas may be less granular and/or more aggregated than the base data available to Ofgem.

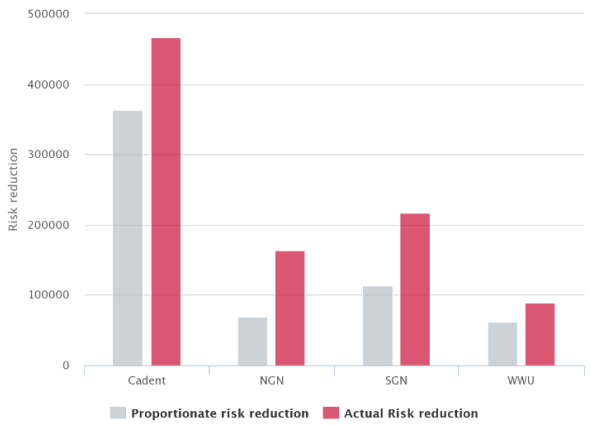
The main summary outputs of network output and financial performance are shown in the Table below.

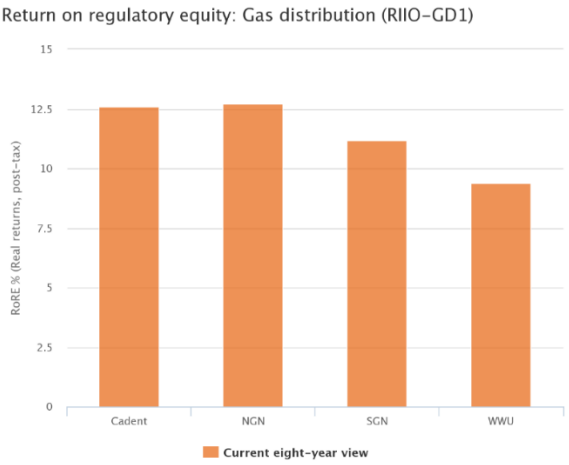
Table 4.18– Outputs of network output and financial performance

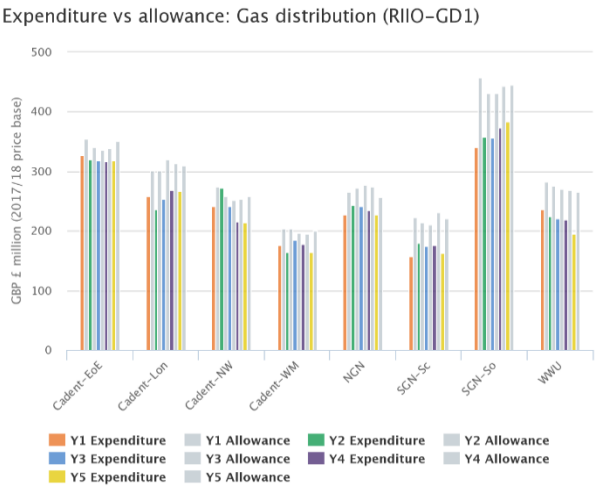
Indicator	Explanation	Methodology
Customer satisfaction with network operators	Ofgem wants GDNs to understand customer needs and pro-actively engage with them to ensure they are met. Customer satisfaction is measured annually across three elements – planned work, unplanned work and connections work	The RIGs include templates that the GDNs must use to undertake the surveys on each of the three elements, together with a cover letter for the surveys (RIGs Appendices 6 – 9). Each question is scored on a range from 1 to 10. The scores are aggregated on an ownership basis not individual licensee. GDNs can be rewarded or penalized up to 0.5% of their allowed revenue depending on how they perform against the targets. The chart shows performance in all years out to 2018/19 by company. The data comes from a survey conducted for Ofgem by an independent research consultancy which is Accent Research (https://www.accent-mr.com/). It is commissioned by Ofgem in conjunction with the Citizens Advice Bureau. Accent undertake a retail supply customer satisfaction survey for Ofgem/Citizens Advice on a quarterly basis. The sample captures over 3,200 customers and covers more than 50 suppliers. The NETWORK customer satisfaction surveys are the responsibility of the network companies. The cost is assumed by the company. GDNs report to Ofgem via Broad Measure of Customer Service (BMCS) customer service incentive within RIIO which has three components including. All gas and electricity suppliers are

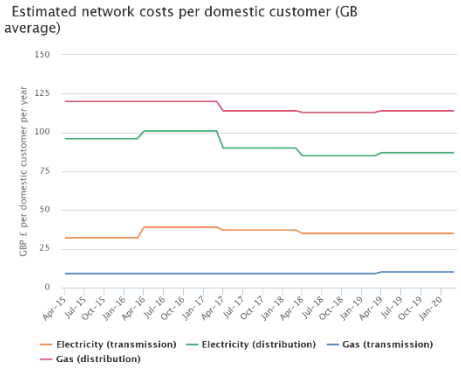
Indicator	Explanation	Methodology
		required through strict complaints handling standards to deal proactively with individual complaints. They have up to eight weeks to come to a decision on the complaint with the customers. Customers are first expected to contact their suppliers (by email, in writing or on the phone). Suppliers have a complaints procedure to collect the information they need from the customer to resolve the issue. If customer complaints received by the Suppliers are not resolved, they can escalate the complaint to Energy Ombudsman, get support from Citizens Advice via a helpline at any point during complaint, use Resolver.co.uk which a free online service and app that offers advice and helps consumers with their complaints or can directly contact with Ofgem. Customer satisfaction with network owners: Gas distribution (RIIO-GD1) 
Fuel Poor Connections	The Fuel Poor Network Extension Scheme helps vulnerable and fuel poor households who have no gas connection to connect to the gas grid through providing help with the cost of connections.	Each GDN has a target number of connections to achieve for the defined vulnerable and fuel poor groups over the course of the price-control. The original figure of around 77,000 was increased to over 91,000 from 2016. this is part of the base revenue allowance for the network businesses - they must specify in their business plans the number of new connections and make explicit the number of those that are fuel poor. It is against this stated output that they are assessed. The cost of vulnerable customer supports is socialized. Funding is built into the revenue that Ofgem allow each company to recover from its customers under the price control period 2013-2021. It is recovered through transportation charges which form part of all GDNs customer's energy bills. Commitments and achieved connections over the first 5 years of the scheme are shown below.

Indicator	Explanation	Methodology
		Fuel poor connections: Gas distribution (RIIO-GD1) 
Network Availability	This is reported as the time that the gas distribution network is available to consumers taking account of both planned and unplanned outages.	The availability and reliability metric is based on a combination of the number and duration of planned and unplanned interruptions on the network. Targets are derived from historical performance and there are no financial incentives associated with the targets. Reliability measures, based on the reported performance, have been consistently high as demonstrated in the chart below. Network availability: Gas distribution (RIIO-GD1) 
Risk removed from the network	The GDNs are required, as part of compliance with Health and Safety Executive decisions, to undertake a program of replacement of risky iron mains that represent about 25% (65,000 km) of the total pipeline length.	Within RIIO-GD1, there is an agreed primary output target on network safety, namely 'Iron mains risk reduction' target that defines the level of risk reduction the GDNs must achieve over the course of the price-control by setting the level of iron mains risk that GDNs must remove from their networks. Annual reporting is undertaken to assess whether the GDNs are on track with this. By 2018/2019 five of the license regions had exceeded their price-control targets and others were on course to achieve the agreed level of risk reduction. A sample Engineering Justification Paper of Northern Gas Networks which is one of the Annexes of its Business Plan for RIIO-2. Here

Indicator	Explanation	Methodology
		you can find detailed investment plan of the company on HSE's Iron Mains Risk Reduction Program: https://www.northerngasnetworks.co.uk/wp-content/uploads/2019/12/A23.M-NGN-RIIO-2-Investment-Decision-Pack-Mandatory-Repex.pdf Risk removed from the network: Gas distribution (RIIO-GD1) 
Volume of gas lost	Ofgem wants the GDNs to reduce their environmental impact and as part of this incentivizes the reduction in shrinkage volumes.	Specific targets are set for each GDN through a combination of the Emissions Reduction Incentive and the Shrinkage Incentive. Performance in each year against target is shown in the chart below. Volume of gas lost from the distribution network (RIIO-GD1) 
Return on regulatory equity (RoRE)	RoRE helps the regulatory body to monitor the financial performance of GDNs under the price control. This is	RoRE reports the implied return on the notional equity of the company (using the notional gearing assumption) taking account of actual cost performance (and TOTEX efficiency savings), rewards/penalties related to output performance and financing (cost of debt) and tax performance. It reports

Indicator	Explanation	Methodology
	compared to the allowed cost of equity at the start of the price-control of 6.7%	performance to date and also forecast over the remaining price-control period. For the latter Ofgem's calculation assumes all outputs will be delivered. The most recent estimate of the 8-year average performance is in the chart below. 
Expenditure vs allowance	Ofgem sets the total amount each company can spend ahead of the price control (company 'allowances') and monitor their actual spend ('total expenditure') against these amounts annually.	Each year, GDNs report on their expenditure. The difference between actual and allowed expenditure on controllable costs is then used to determine the TOTEX Incentive Mechanism through which and savings or additional expenditure are shared with consumers. The chat below shows that the GDNs have generally outperformed their controllable cost allowances in each year of the RIIO-GD1 control to date.

Indicator	Explanation	Methodology
		
Estimated network costs per domestic customer	The majority of gas network costs for a domestic customer are for the use of the gas distribution networks. Actual costs vary depending on where a customer lives, how much energy they use, and what type of meter they have. Suppliers are charged for the costs to build, maintain, improve and operate the energy networks. The level and structure of network charges are derived following published charging methodology statements developed by companies and approved by Ofgem. Details of current charging regime is provided in Pg 46-47 of EMRA's Activity 1.1 – DRAFT Natural Gas Transmission Report under Revenue Requirement Model section. It can also seen the breakdown of charges/methodology from company' charging statement documents, here are a few sample: https://www.northerngasnetworks.co.uk/wp-content/uploads/2020/02/NGN-1920-60-day-notice.pdf https://www.sgn.co.uk/sites/default/files/media-entities/documents/2020-01/Scotland-Notice-LDZ-Transportation-April-2020.pdf	Network costs are calculated by combining charging information published by the network companies with assumptions about consumption and losses for domestic customers. All costs are calculated for medium annual typical domestic consumption value of 12,000kWh for gas, which is held fixed across the charging years. The actual network costs a supplier incurs to serve a customer will depend on how much energy is used, the timing of its use as well as the charges that apply from one year to the next. The costs shown are UK averages, calculated by taking a simple unweighted average of the tariffs that apply in different regions of the country. The costs are expressed in nominal money (i.e. the amount of money a customer 'pays over the counter'), rather than in real terms (i.e. after adjusting for inflation). The chart shows Ofgem's estimate of trends in the annual cost of the different components of network charges for a domestic customer with a fixed amount of consumption across all four network types – electricity/gas transmission/distribution. The methodology is consistent with that used to calculate the default tariff cap that applies to standard variable domestic retail tariffs.

Indicator	Explanation	Methodology
		

4.4.2.2 Financial reporting

RIIO arrangements should reflect activity levels and varying financial conditions of the Network Companies with annual updates. Regarding this, network companies are required to submit completed Price Control Financial Model

(PCFM) alongside their business plans in the beginning of the RIIO process, and update Ofgem annually on the changes in key variables given in their business plans which is called the "Annual Iteration Process (AIP)".

PCFM is an excel-based financial model which calculates the incremental change on the base revenue (MOD) of the companies in the Final Proposal based on a number of variable updates. However PCFM does not represent the entire regulatory financial position of the NCs due to not including all the incentives available to them. Network Companies are expected to populate PCFM based on their updated variables. The purpose of PCFM is to apply the annual updates on below data to the base revenues of the companies in the Final Proposal of Ofgem:

- the annual cost of corporate debt,
- TOTEX components sufficient to apply the TOTEX incentive mechanism,
- allowances on uncertainty mechanisms,
- financial adjustments (such as pension variables, tax variables and legacy adjustments).

PCFM for RIIO-GD1for more detail,

https://www.ofgem.gov.uk/publications-and-updates/riio-gd1-price-control-financial-model-following-annual-iteration-process-2019

In RIIO process, Ofgem considers a suite of following financial ratios to assess financeability, including the average over the price control period and any trend:

Table 4.19 – Financial ratios

Gearing	$\frac{\text{Net debt}}{\text{RAV}}$
FFO Interest Cover (including accretions)	$\frac{\text{FFO (pre cash net interest}^1\text{)}}{\text{Cash net interest}^1 + \text{principal inflation accretion}}$
FFO Interest Cover (cash interest)	$\frac{\text{FFO (pre cash net interest}^1\text{)}}{\text{Cash net interest}^1}$
Adjusted Interest Cover Ratio (AICR) or PMICR[2]	$\frac{\text{FFO (pre cash net interest}^1\text{)-RAV depreciation}}{\text{Cash net interest}^1}$
NominalPMICR[2]	$\frac{\text{FFO (pre cash net interest}^1\text{) - RAV depreciation + YoY inflation}}{\text{Cash net interest}^1 + \text{Principal inflation accretion}}$
FFO/Net Debt	$\frac{\text{FFO (post cash interest) - principal inflation accretion}}{\text{Net debt}}$
RCF/Net Debt	$\frac{\text{FFO (post cash interest) - dividends-principal inflation accretion}}{\text{Net debt}}$
EBITDA/RAV	$\frac{\text{EBITDA}}{\text{RAV}}$
RoRE	$\frac{\text{EBIT - tax - (cost of debt x debt RAV)}^3}{\text{Equity RAV}^3}$
Dividend Cover	$\frac{\text{Profit after tax}}{\text{Dividends declared}^4}$
Dividend/Reg Equity	$\frac{\text{Dividends declared}^4}{\text{Equity RAV}^3}$

1. Cash net interest excludes principal inflation accretion on inflation linked debt.
2. Alternative ratio can be calculated that adjusts numerator for excess fast money (ratio calculated with reference to actual controllable OPEX rather than fast pot expenditure).
3. Debt RAV and equity RAV are calculated by reference to the notional structure.

Dividends should reflect circumstances of each company and should include payments made under subordinated shareholder loans.

4.4.2.3 Broad Measure of Customer Satisfaction (BMCS)

The BMCS is a customer service incentive under RIIO-GD1, which has the following components:

1. Customer Satisfaction Survey: As already mentioned, each GDN must carry out three surveys on planned work, emergency response and repair and connections, each month and submit the results to Ofgem on an annual basis in line with the templates set out in the RIGs.
2. Complaints Metric: In case there is a reportable complaint, GDNs are expected to fill in a table which is composed of two sections, namely “Complaints to the GDN” and “Complaints to the Energy Ombudsman”. For both sections the number of complaints concerning the following four categories are expected to be provided:
   - emergency response and repair work
   - planned work

- connections services
- other issues including (but not limited to) reinstatement and excavation, communication and engineering work where they have not been recorded under the listed categories.

Complaints to the GDN sections should be filled in with the following data:

- telephone complaints received
- written complaints received
- complaints resolved by the end of the first working day (day+1)
- complaints resolved between day+2 and 31 working days
- complaints resolved after 31 working days repeated complaints
- deadlock letters issued by the GDN to the complainant

Complaints to the Energy Ombudsman should be filled in with the following data:

- Complaints taken up within the Ombudsman terms of reference
- Complaints taken up outside the Ombudsman terms of reference
- Total number of complaints taken up by the Ombudsman for resolution
- Final decisions issued by the Ombudsman
- Ombudsman decisions in favour of the complainant

3. Stakeholder Engagement: this incentivises GDNs based on an assessment of their stakeholder engagement activities with the assessment undertaken by an independent panel. The Stakeholder engagement performance is not determined until November in the year after submissions have been made.

For more detail, it could be seen below link.

https://www.ofgem.gov.uk/gas/distribution-networks/network-price-controls/customer-service

In addition, where the company must report on the BMCS (ie, Stakeholder Engagement), the guidelines for compliance and how the scoring will be undertaken is detailed below link.

https://www.ofgem.gov.uk/system/files/docs/2018/12/sei_guidance.pdf

4.4.2.4 Network charges

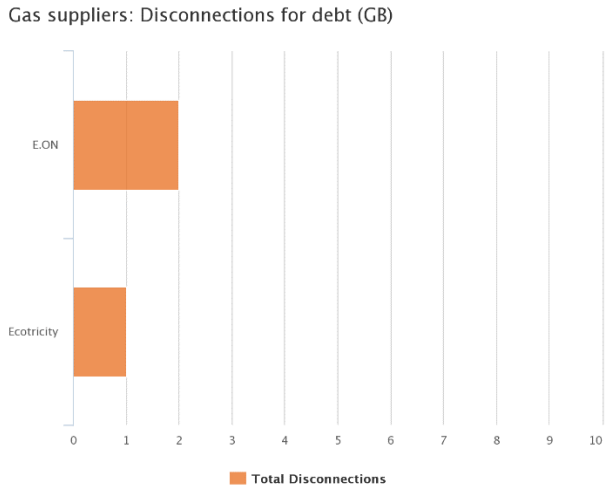
Each GDN is required to develop a network charging methodology and a connection charging methodology that must be approved by Ofgem and set out in the Uniform Network Code (UNC).

4.4.3 Wider market reporting

4.4.3.1 Retail – customer service

The customer service indicators published by Ofgem are generally not differentiated between electricity and gas due to the fact that many of the suppliers offer dual-fuel deals. The main customer service indicators published by Ofgem – around complaints, have already been described in the section on electricity distribution. The only separate reporting relating to gas supply is around disconnections related to debt, as set out in the following table.

Table 4.20 – Gas suppliers: disconnections for debt

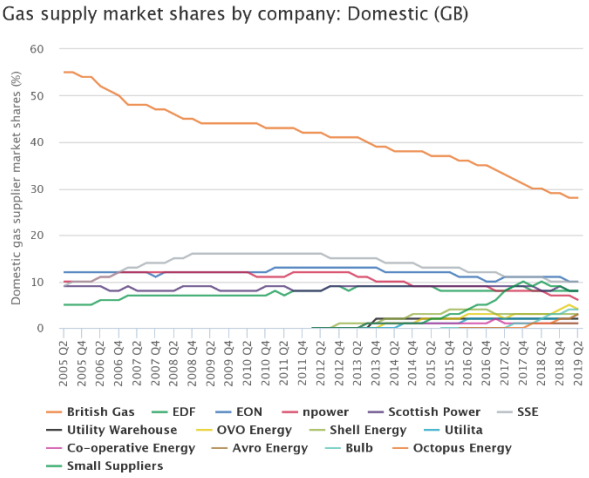
Indicator	Explanation	Methodology
Gas suppliers: disconnections for debt	Suppliers must only use disconnection as a last resort. Only where a range of repayment options have been offered and there is no alternative to recover a debt is it to be used.	Suppliers have requirements on the social obligations (Eg. taking all reasonable steps during winter (October to March) to avoid disconnecting premises where there is an occupant with disability or a chronic sickness and prohibited from knowingly disconnecting customers of pensionable age). In order to monitor these, Ofgem imposes a requirement to all gas suppliers on reporting their performance in relation to their social obligations including disconnection rates as a part of their license condition on "reporting on performance". Suppliers provide this information on a quarterly basis. By using the suppliers' social obligations data Ofgem publishes an annual report on vulnerable customers in the retail energy market and also publishes the key indicators in the data portal The latest data provided is for 2017 where the chart shows that only 3 disconnections were made of domestic customers due to debt. 

4.4.3.2 Retail– Market Structure

Ofgem's reporting of market structure indicators has largely been described in the section on electricity distribution. The table below presents the indicators that focus on gas supply.

Table 4.21 – Indicators on gas supply

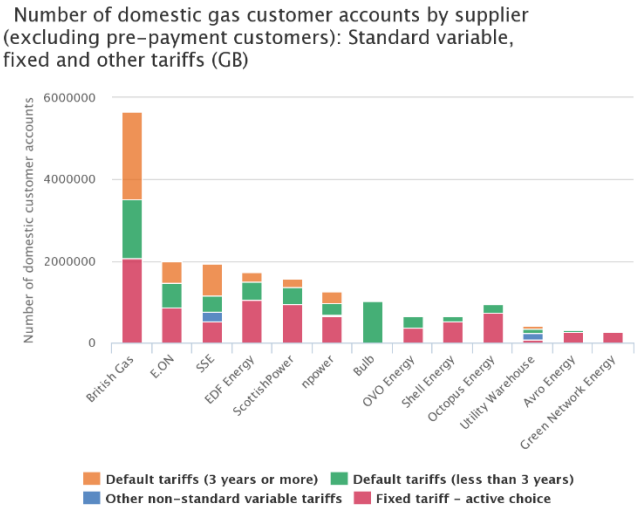
Indicator	Explanation	Methodology
Gas supply market shares by company (domestic, UK)	The evolution of market shares is a useful measure of trends in market concentration. They help Ofgem understand the impact between market shares and competitive dynamics, both for the six large suppliers and other suppliers, and	The charts report the position of the Big Six suppliers and those of the major independent suppliers.

Indicator	Explanation	Methodology
	which companies are winning or losing customers.	

4.4.3.3 *Retail – Prices and Profits*

As well as monitoring domestic electricity bill levels, Ofgem also assess the extent to which particular costs have an impact on these bills.

Table 4.22 – Domestic gas customer accounts by supplier

Indicator	Explanation	Methodology
Domestic gas customer accounts by supplier	Ofgem needs to track both the overall market share of each supplier and the type of tariff that they are on. In particular, the Standard Variable Tariff (SVT) is a default tariff with no defined length and is the basic tariff to which consumers will be moved at the end of any fixed term deals if they do not make an active choice of an alternative tariff. They are often the most expensive tariff and are subject to the default tariff cap.	The chart shows the current shares and types of tariff by company. It is notable that there are a large number of customers on default tariffs and amongst the Big Six suppliers many have been on these tariffs for more than 3 years. 

4.4.3.4 Retail - Switching

Ofgem regularly monitors the level of competition in the retail market and publishes the related results via its annual State of the energy market reports[61] .

In recent years, the retail market has become more competitive as new measures introduced by the regulator to stimulate competition have diluted market concentration. One key driver for the promotion of competition has been additional costs imposed on larger suppliers via regulatory burdens. This has allowed smaller companies, who do not face these costs, to gain market share by undercutting tariffs offered by the Big Six. An influx of new suppliers has contributed to a divergence of strategy amongst larger players with some utilities seeking to divest retail businesses, particularly in the domestic supply sector, whilst others are actively seeking to grow their customer base and instead divest generation assets.

Ofgem publishes its State of the energy market Report each year, to monitor the level of competition in retail gas and electricity markets, evolution of switching rates and tariffs. Figure below shows the evolution of market concentration and number of active licensed suppliers in the UK gas and electricity market.

Figure 4.2 – Market entries, exits and concentration levels[62]

A large increase in small suppliers has led to an increase in competition, however, in the last couple of years, we have also seen exits[63] of small suppliers mainly due to financial failures. Also the deteriorating financial situation of the small suppliers, which have not yet exited, have also been reflected to their service quality. According to Ofgem,

[61]The recent State of the Energy Market 2019 report being published in 3 October 2019: https://www.ofgem.gov.uk/publications-and-updates/state-energy-market-2019

[62]Source: Ofgem, 2019 State of the energy market Report.

[63]In the event of an exit, Ofgem, appoints a Supplier of Last Resort (SOLR) company via a tender process to transfer exiting suppliers' customers to the appointed company, in order to prevent any disruption to the customer. The SOLR also becomes liable for any credit previously owed to the customers.

the default price cap[64] in place since January 2019 is unlikely to have triggered these exits, as the suppliers who exited the market had relatively few default tariff customers.

Switching rates in the UK have been on rise since 2014 and generally follows a seasonal trend as seen in Figure 4.3 (with peaks around March and November then dipping in January and the summer months). In January 2020, switches in gas decreased to 339,782 from 418,379, which are higher than those observed in the same month in 2019.

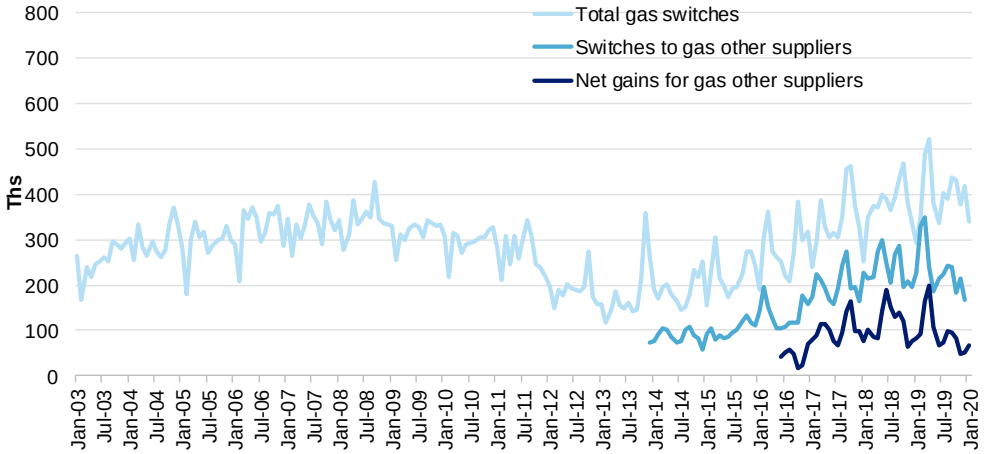


Figure 4.3–Number of domestic customers switching supplier

Note: Other suppliers: Small and medium sized suppliers apart from Big6
Source:https://www.ofgem.gov.uk/data-portal/retail-market-indicators

During the implementation of the default price cap, there were concerns that this would discourage customers from switching suppliers to find a better deal, but that hasn't been the case and the switching rates have reached the historic highest value in April 2019, three months after the implementation of the default price cap.

Ofgem is regularly reviewing the market conditions and adjusting the level of the price caps accordingly twice a year (in February and August to apply in April and October respectively) to reflect the estimated costs of supplying electricity and gas to homes for the next six-month period. In 13 March 2020, Ofgem also published its decision on the process for modifying the Default Tariff Cap[65] which was proposing a modification in the methodology used to calculate the cap.

[64]Ofgem reintroduced price regulation on retail tariffs in the form of price cap for safeguard tariffs under a separate regulatory regime, and a further price cap on standard variable tariffs and default tariffs. The default price cap on standard variable and default energy tariffs was introduced in January 2019, which is updated at every six-months and will be in place up to 2023. The cap is applied on the unit rates which is the price set for each kWh of energy used plus the standing charge (p/day).

[65]Source: https://www.ofgem.gov.uk/publications-and-updates/decision-process-modifying-default-tariff-cap

4.4.4 Additional Monitoring

4.4.4.1 Metering system installation and reading fees

Ofgem has set tariff caps for domestic credit meter rental, prepayment meter rental, domestic customer requested exchange and daily meter reading services, which are adjusted by inflation each year during the price control. Companies regulated should set charges below these caps for these four key metering services.

4.4.4.2 Asset Management

Ofgem published a position paper to (https://www.ofgem.gov.uk/ofgem-publications/154545) present its priorities and forward work plan which includes – asset management software, GIS packages as key enablers for DSO function to allow targeted policy development.

4.4.4.3 Geographic Information Systems

GIS as a data enabler for network monitoring/visibility and flexibility trading. Currently some utilities already benefit from GIS to acquire mapping and data management abilities for enhancing asset/outage management, Generally the networks have their own SCADA systems – there are initiatives to link up te SCADA systems of electricity distribution and transmission operators on a real-time basis.

4.5 Turkey

Regulation on Notifications in the Energy Market defines scope of the data to be collected from market stakeholders for monitoring purposes in Turkey. The purpose of the Regulation is to regulate procedures and principles with respect to the collection of data required by Energy Market Regulatory Authority (EMRA) for surveillance, analysis and reporting procedure of market activities. The Regulation sets principles and procedures such as making and amending notifications, collecting notice, authorization and confidentially. The following table shows the information requested from DSOs

Table 4.23 – Information requested from DSOs

Responsible Institution	Notification	Frequency
Gas Distribution Company	Gas Distribution Licence Notification	Monthly
	Gas Distribution Licence Notification (Forecast)	Monthly
	Distribution Activity Report	Monthly
	Base Data Table for Billing	Every 6 months
	Distribution Grid Development Report	Every 6 months
	Occasional Notification of Distribution Licensee	Occasional
	Natural Gas Price Notification	Every 6 months
	Natural Gas Financial Statement	Every 6 months
	Distribution Companies Bank Credit Usage Notification	Every 6 months
	Annual Licence Fee Notification	Annually
	Participation Ratio Notification	Annually
	ICS Risk Reduction Activity Tracking Notification	Every 6 months
	EKS Recognition and Risk Assessment Notification	Annually
	EKS Inventory Notification	Annually
Distribution, Storage, Wholesale, Import and Export License Owner Companies	Independent Audit Report	Annually

Licensees to be Announced on the EMRA's Website every year	Domestic Resource Identification Chart	Annually

EMRA uses EBIS (Energy Market Notification System) in data gathering. This system is being used to collect at a central platform all data of energy markets (electricity, natural gas, oil and LPG) data from the market players as well as to get license applications in electronic format and to provide input to statistical analysis.

Data to be monitored by EMRA regarding the market are defined in the Energy Market Notification Regulation. In addition, the information to be given to the Authority and additional monitoring reports are defined in the Distribution and Customer Services Supplementary Regulation. Data collection methodology to be applied in cases where it is necessary to carry out audits and investigations are also defined in the Audits and Preliminary Research Regulation.

Energy Market Notification Regulation: The purpose of this Regulation; to regulate the norms, procedures and principles regarding the collection of data needed by the Authority in the energy market, in the process of monitoring, analyzing and reporting of market activities in order to achieve the objectives set out in the relevant legislation. This Regulation was prepared base on; Articles 5, 5 / A, 5 / B, 5 / C and annex 2 of the Law on Energy Market Regulatory Authority dated 20/2/2001 and numbered 4628, Natural Gas Market Law No. 4646 dated 18/4/2001 Article 6, Article 14 of the Petroleum Market Law No. 5015 dated 4/12/2003, Articles 4 and 12 of the Law

on the Amendment of the Liquefied Petroleum Gases (LPG) Market Law No. 5307 dated 2/3/2005 and the 5th article of the Electricity Market Law No. 6446 dated 14/3/2013.

Pursuant to ARTICLE 5, obligations arising from the relevant legislation are taken into account in the establishment of provisions regarding the notification obligation. In the process of processing, compiling, transforming information and disclosing information; impartiality, trust, safety, functionality, speed and economy are taken into account. For matters not included in this article, relevant and other legislative provisions and professional ethical rules are taken as basis.

According to ARTICLE 6, within the scope of the confidentiality, with the secrets obtained in the energy market, technical secrets and financial secrets related to market activity; except for the authorities authorized by the legislation and the reports to be presented to the public or concerned, EMRA is obliged to keep it confidential without the consent of the notification obligation.

In accordance with ARTICLE 7, notifications are made by the officials of the notification obligations, in electronic signature, in accordance with the form specified in the Instruction, unless otherwise specified. In case of need, wet signed copies of notifications made electronically may also be requested by the Authority. Corrections made regarding the periodic notifications via the Notification System can be made without the request for correction until the end of the notification period. In this case, the latest notification to the Authority is considered valid. It is included in the Instruction to which date a correction request can be made after the notification period for a notification has expired. It is included in the Instruction to which date a correction request can be made after the notification period for a notification has expired. Article 16 of the Electricity Market Law, Article 9 of the Natural Gas Market Law, Articles 16 and 17 of the LPG Market Law and the Articles 16 and 17 of the Petroleum Market Law shall be applied to the erroneous notifications made. The obligation to make notifications covers the periods stated in the instruction for the period of notice during the license period in force and other natural and legal persons, unless otherwise specified in the relevant legislation.

Natural Gas Market Distribution and Customer Service Regulation: In the Natural Gas Market Distribution and Customer Services Regulation, it has been clarified the issues regarding additional monitoring reports, Balance Sheet, income statement and other additional financial statements, and Customer complaints and Maintenance and Repair Activities that must be submitted to the Authority upon request. In addition, the scope of the Authority's review authority has been defined.

The scope of the monitoring reports is determined in **Article 28**. The distribution company notifies the Authority about the progress made in the construction of the distribution network within the scope of the provisions of the Energy Market Notification Regulation. The distribution company also provides conformity certificates, test and control records, incident reports, expropriation, establishment of incorporeal rights on property and lease records of the property, obtained from the Turkish Standards Institute, showing the conformity of the equipment and materials of the established infrastructure to be issued at the request of the Authority. Distribution companies are also obliged to provide other information, documents, records and reports to be requested.

Article 29 describes the process related to the balance sheet, income statement and other additional financial statements. Distribution companies submit their annual balance sheets and income tables prepared according to the relevant legislation and other additional financial statements required to EMRA until the end of May of the following year,

In Article 30, the scope of the Authority's supervision and monitoring power is defined. EMRA directs, controls, monitors activities of the distribution company and can purchase these services, if necessary, from the accredited institutions, at the expense of the distribution company. The distribution company provides the necessary convenience for the EMRA's supervision and monitoring activities.

4.5.1 Customer Complaints

EMRA does not directly monitor customer complaints, but Distribution Companies are obliged to record customer complaints and forward them to the Authority upon request. As stated in Article 47, the Customer makes any complaints regarding the use of natural gas to the customer service unit of the distribution company. The customer can make his/her complaint personally, in writing, by phone, by fax or via the internet. Depending on the nature of the complaint, the distribution company responds and / or performs the necessary actions, taking into account the request of the customer within fifteen days at the latest. Customer complaints and transactions are recorded by the distribution company and forwarded to the Authority upon request. The call center is established by the distribution companies to provide 24/7 uninterrupted service for consumers. Distribution companies can purchase services related to call services for consumers. Procedures and Principles regarding call centers are determined by the Board. Distribution companies create a “Complaint Application System” on their website, which allows consumers to submit their complaints, easily accessible, allows the follow-up of the applications made by consumers, and allows the uploading of the document subject to the complaint by the consumer.

4.5.2 Maintenance and Repair Activities

EMRA does not directly monitor maintenance and repair activities, but may request it.

As stated in Article 57 / d, Distribution company; plans periodic maintenance and stocks spare parts by creating six-month, one-year and five-year maintenance programs. It carries out maintenance according to these plans, keeps its reports and gives it to the Authority upon request.

4.5.3 Audits and Preliminary Research Regulation:

The purpose of this Regulation is to determine the procedures and principles to be followed in preliminary research and investigations, as well as the audits to be conducted regarding natural or legal persons operating in the natural gas market.

According to Article 5, the Authority conducts an Audit. The Authority may audit all the financial and technical competencies of the company or may purchase services for these audits.

As stated in **Article 19**, the staff of the Authority charged with conducting an investigation has the authority to request the necessary information and conduct an on-site inspection; may request the submission of any necessary information and documents from the relevant persons, institutions and organizations, take original and / or samples of them, prepare the necessary minutes, request written or verbal explanation about the subject. Relevant persons, institutions and organizations are obliged to provide all kinds of documents and information requested from them. Confidentiality and confidentiality provisions cannot be prevented from providing information and documents.

4.6 Gap Analysis and Recommendations

Within the scope of this section gaps between the countries analysed and Turkey are stated and related recommendations are provided. To summarize;

- Indicators to follow the performance of distribution and retail sales companies are similar in Europe and Turkey, other than retail sale part, as Turkish DSOs are currently not unbundled as distribution and retail sale. Also there is not a functioning supplier switching as competition is not yet adequately in place in Turkey (eligibility limit is very high etc.) and providing price comparison tools by EMRA is not yet available as a result.
- Data is mostly collected via surveys and password-protected MS Excel questionnaires via dedicated data submitting systems in Europe.
- NRAs has their own platforms to collect data.
- Turkey and EU countries use similar methods and systems in data collection.
- Quality of supply monitoring needs improvement in Turkey.
- Some good practices in EU are explained and recommended for Turkey at the following table and the paragraphs after the table.
- Country specific measures are needed for financial monitoring in Turkey (explained below).

Table 4.24 – Overview of gap analysis and recommendations

	EU Practices	Turkey Practice	Recommendation
Responsibilities	- National Regulatory Authorities (NRAs) have the duties to exercise monitoring activities of the natural gas market trade and distribution.	- EMRA is responsible from monitoring activities.	- Same as EU countries.
Unbundling and competition	- Unbundling completed and competition monitored.	- DSOs are responsible for retail sale. Unbundling is not planned for the near future. Retail market is not competitive	- No unbundling and retail competition in Turkey. Competition in natural gas market as a whole in Turkey needs improvement. - At present, DSOs are also retailers of the ineligible customers and eligible customers who do not switch supplier, in a vertically integrated structure. If distribution and retail activities are unbundled in Turkey in the future, monitoring needs will occur in order to ensure DSOs duly operates in unbundling regulations. Unbundling can start with accounting unbundling and then eventually reach to functional unbundling.

	EU Practices	Turkey Practice	Recommendation
			Preparing codes of conduct and submitting compliance reports are among the tools used for this purpose.
Quality of Supply	- Service quality is of supply monitored both in technical, commercial, and continuity terms, regarded as a means of customer protection	- Quality of supply monitoring is not much comprehensive and detailed.	Service quality monitoring is at the epicenter of the incentive regulation. As proposed at section 1.1 and 1.2, service quality should be part of revenue requirements of DSOs both for rewarding high service quality and punishing low service quality (reward and penalty schemes). Monitoring of the service quality can be conducted depending on the category of the service quality, for instance, i) Monitoring call center performance can be done via call center performance criteria to be determined by EMRA, ii) Customer complaints statistics can be evaluated using data derived from complaints module on EMRA homepage, iii) Commercial quality indicators, including fast connection requirement, can be monitored via specially designed data tables, iv) Customer satisfaction surveys can be designed and/or approved by EMRA before conduction and then reported to EMRA after conducted. (More explained at the end of the table)
Metering	- Metering service providers are responsible in data collection, metering complaints monitored.	- Metering rules has been set by EMRA. Complaints are monitored. Metering is responsibility of DSOs.	- Prepaid meter monitoring is an important part of EMRA's market monitoring task as it has implications on a large number of customers in Turkey. For that purpose, sampled data can be inspected and measures to raise awareness of customers on their rights, as additional responsibility of related DSOs, can be specified by EMRA in the form of stricter rules and by this way monitoring of duly applications can be integrated with customers' own participation in the process by incentivizing usage of communication channels with EMRA more effectively.
Retail Market – Customer Switching-End User Prices	- Retail markets functioning in competition and customer switching process is monitored along with the end user prices.	- Competition in the market not sufficiently in place and switching/prices monitoring is not done in that context.	Retail monitoring includes monitoring of retail market prices, switching, last resort and default services, which is not much relevant for Turkey at present. If market openness reaches a more competitive level in Turkey, monitoring of retail market will be one of the

	EU Practices	Turkey Practice	Recommendation
			most important monitoring functions of EMRA. This monitoring is a necessary tool for carrying out activities functional tothe regulation of the retail market, to promote competition and ensure the proper functioning of the market, also taking into account the path of removing the economic conditions of the protection services and the specific protection needs of end customers, periodic publications on the state of the markets, to increase the transparency of all stakeholders, consistent with the ACER / CEER guidelines on content and methods of monitoring the retail markets in the member countries. Consistency of retail monitoring of Turkey with that of EU member countries is supposed to support Turkey's long term energy policies. Architect of monitoring and data tables collected by Italian regulator ARERA, can be appropriate benchmarks for EMRA in case such monitoring needs occur. On ARERA homepage, there is a module for price comparisons, serving with the motto "the simple and reliable comparator of electricity and gas offers", which can help potential consumers in supplier switching, under the assurance of the regulator. EMRA can set a similar system via its homepage in the future when retail market monitoring becomes a major function for EMRA, to help prospected consumers. - End users' prices monitoring can be carried out not only with DSO-EMRA communication, but also by enabling customers conforming correctness of their bills over EMRA website. As the retail market is not open enough in Turkey for at the present time, this monitoring will be limited to correct application of EMRA resolutions regarding price of natural gas procured for selling to end users and network tariffs set by EMRA. Alternatively, EMRA can instruct DSOs to provide bill control modules on their own websites, which in this case should be under supervision of EMRA.

	EU Practices	Turkey Practice	Recommendation
Financial Monitoring	- Financial tables and ratios are monitored. - Especially in GB, Ofgem conducts comprehensive financial monitoring in RIIO process including interest rates, debts, dividends and EBITDA figures.	- Financial tables and ratios are monitored. - Further actions needed in monitoring DSOs in Turkey with a country specific approach.	Monitoring financial performance of the DSOs is another key aspect of the monitoring activity. Against the risk of deterioration of financial condition of a DSO, EMRA can assume two roles. First, setting early warning indicators in the financial condition of the DSO to prevent larger damage to customers and the reputation of the sector as a whole. Secondly, using findings of the monitoring for preventing root causes as much as possible before the risks are realized. Monitoring financial performance of DSOs using financial ratios should be supported with monitoring of DSO-deteriorating relations between DSOs and their sister/parent companies as well. For the second part, once a DSO is found out to be within risky side due to its operations, EMRA can promptly take action to use findings of this individual case to take resolutions to ban certain transactions in order to protect all DSOs as a whole. EMRA should pay special attention on three topics, i) Currency risk taken by DSOs, as there is no or almost no adjusting mechanism in tariff methodology, ii) Relations with sister/parent companies, in order to prevent financial crash of DSO by the cross subsidization of these companies, iii) Failure risk of refinancing outstanding loans, caused by the mismatch of long term revenues and expenses or by other reasons. Monitoring of cross subsidization between DSOs and their sister/parent companies is a way to reduce information asymmetry between EMRA and DOSs. As in the example of Great Britain, licensed gas distribution networks can be subjected to conditions prohibiting regulated businesses from giving cross-subsidies to, or receiving cross-subsidies from, related undertakings. Procurement and selling activities can be of specific interest in that manner. Another important issue arises in this topic is the financial relations between DSOs and sister/parent companies. Payables to and receivables from shareholders accounts requires a closer look in this monitoring activity. Amounts, conditions and effects of such relations should be monitored by EMRA

	EU Practices	Turkey Practice	Recommendation
			form the very beginning of the above mentioned relations. Regulated companies can be subjected to obligation of submitting their audited financial statements, as well those of the parent company to get more capability of examination of the financial relations between DSOs and parent companies.
Environmental monitoring	- Under RIIO, carbon footprint is monitored by Ofgem.	- Not monitored.	- Carbon monitoring is another important and essential monitoring area that can be assumed by EMRA. Although current legislation does not put much assignment on EMRA for carbon footprint monitoring on the DSOs, environmental performance of the network companies can be specified as quality indicators for DSOs by EMRA and monitoring of these performance outcomes can be a part of incentivizing overall quality of services in the natural gas distribution. Regulation of the carbon footprint can also be widened to include total environmental impact by natural gas distribution business.
Stakeholder Engagement	- Stakeholder engagement is a reward creating factor used by Ofgem.	- Not included.	- The Stakeholder Engagement Incentive (SEI) encourages network companies to engage proactively with stakeholders in order to anticipate their needs and deliver a consumer focused, socially responsible and sustainable energy service. EMRA can adapt such scheme to encourage DSOs for acting more sensitive towards certain stakeholders. This category of monitoring can be integrated with cooperation actions of DSOs with municipalities in the region, and state economic development funds (and with other possible parties) for improving conditions of underserved areas.

Monitoring call center performance can be done via call center performance criteria to be determined by EMRA: EMRA has got a call center regulation and reward mechanism for electricity distribution and retail companies. These are adoptable for natural gas DSOs as well. In electricity regulation, accessibility rate, service level and answering rate are quality indicators that translates into reward for the companies. For the prospected natural gas regulation, same indicators can be adopted and it can have only reward instead of penalty at the beginning. Costs of setting up and operating call center should be added to revenues of DSOs (if not done) and percentage of reward and limit values to be reached should be evaluated by EMRA depending on the call center performance required.

Customer complaints statistics can be evaluated using data derived from complaints module on EMRA homepage: Again, the existing electricity distribution regulation on quality factor is a benchmark for EMRA to use customer complaints data within quality factor regulation. Data can be collected via EMRA homepage plus CİMER and likewise sources, alternatively DSOs own systems can be added to data to be collected. Sectorial average of complaints per customer can be an appropriate base point to evaluate DSOs relative place in the sector. Progress over the years can also be a reasonable metric to monitor and regulate in order to incentivize customer satisfaction.

Commercial quality indicators, including fast connection requirement, can be monitored via specially designed data tables: At the electricity distribution regulation on the commercial quality, there are standard durations determined by EMRA, breach of which requires payment of compensation by the DSOs to the customers or applicants. In the design of natural gas quality factor, it is recommended to add not only compensations in case not reached to the standard durations but also add mechanisms to reward better than standard durations. For instance, connecting the applicant to the distribution network can be subject to a 10 days duration and breach of this standard duration can be subject to payment of 100 TRY to the applicant. As a further regulation, EMRA can measure average duration of connections and can reward better performing DSOs, which can help incentivizing not only standard service but also better than standard service by the DSOs. Such new quality indicators can also help DSOs more focusing on the service they give instead of saving costs on the detriment of lower customer satisfaction.

Customer satisfaction surveys can be designed and/or approved by EMRA before conduction and then reported to EMRA after conducted: This requires outsourcing by EMRA in order to collect appropriate data from the field, both in the design of the surveys to be conducted and in the conduction of them in the cities of served distribution regions. As there are 72 DSOs in 81 districts of Turkey with various sizes, surveys can cost considerable amounts and it can be limited to major DSOs at the beginning for cost efficiency. Clustering the DSOs based on their sizes, especially number of customers served, can help in these limitations. As in the case of customer complaints, surveys can help receiving information the progress of overall customer satisfaction within a DSO over a period.

Stability in integrated market monitoring and continuous improvement in monitoring applications are of utmost importance. An effective monitoring should both help understanding and evaluation of EMRA on the DSOs' level of compliance with the regulations and help gaining further insight in evaluation of to what extent regulations are needed to be revised in order to reach regulatory purposes. In other words, regulatory schemes should be flexible enough to learn from market monitoring to analyze not only if DSOs are in line with the regulations but also analyze if existing regulations are in line with concurrent level of services provided by the DSOs and expectations of the customers as well. For that reason, monitoring of the market should be accompanied by regular "monitoring of the market monitoring" by EMRA, for which other stakeholders can also be encouraged to get involved in.

Traffic lights methodology explained above which is applied in GB, can encourage DSOs to operate more efficiently for achieving their targets in safety, reliability, connections, customer service, environmental performance and other relevant categories for every single DSO. Monitoring activity can produce a comprehensive and to the point output by publishing sector-wide data to display the big picture of the sector, which also can serve as a tool for evaluating EMRA itself on achievement of ex-ante targets set.

Social obligations monitoring is monitoring of companies to do more to help vulnerable customers, particularly during power interruptions, including protection of families in conditions of economic hardship. In Turkish legislation, DSOs do not have specific duties on social issues. This monitoring can be limited to encouraging DSOs for cooperating with local authorities and development funds to support prospected customers in underserved areas by designing some mechanisms to provide support for upfront costs of connection.

Finally, EMRA can go beyond customer protection and focus on customer empowerment in the monitoring of natural gas distribution sector. In general, customers, especially household customers, do not know much about their rights,

market developments, complaint channels, their options etc. As much as the customers aware of their rights they will send more feedback to EMRA using appropriate communication channels. Feedbacks received by EMRA strengthen monitoring activities as being a kind of self-control mechanism directly by customers over DSOs. The module on the ARERA homepage (atlante per il consumatore, atlas for the consumer) is a good example. More than internet documents and modules, EMRA can use various media such as public service ads, training programs, etc. specially designed considering social, cultural, educational and economic backgrounds of customers.

5 Gas Transmission

5.1 Analysis of Market Monitoring in the EU-Relevant Gas Transmission Regulations

There are many references to the required monitoring activities of the regulatory authorities in terms of proper functioning of the gas markets and transparency obligations of the of the TSO's in relation to their activities. Those can be summarised through the relevant legislative documents as follows:

5.1.1 The Third Gas Directive; "DIRECTIVE 2009/73/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 concerning common rules for the internal market in natural gas"

In its introductory part, the Directive emphasizes importance of the below stated issues which are relevant to subject matter.

- Setting up of transparent market-based mechanisms for the supply and purchase of gas, non-discriminatory and cost-reflective balancing mechanisms. Active role of the Regulatory Authorities to ensure that balancing tariffs are non-discriminatory and cost-reflective.
- The power of the Regulatory Authorities to request relevant information from natural gas undertakings, in order to make appropriate and sufficient investigations and settle disputes.
- Clear and comprehensible information available to consumers concerning their rights in relation to the energy sector.
- Regulatory Authorities' observing and monitoring the internal market in natural gas and its short, medium and long-term evolution, including aspects such as supply and demand, transmission and distribution infrastructure, quality of service, cross-border trade, congestion management, investments, wholesale and consumer prices, market liquidity and environmental and efficiency improvements.

The Directive requires the transmission system owner establish a compliance programme, which sets out measures taken to ensure that discriminatory conduct is excluded, and ensure that observance of it is adequately monitored.

Related with the confidentiality for transmission system operators, the Article 16 of the Directive states that the TSO shall preserve the confidentiality of commercially sensitive information obtained in the course of carrying out its activities, and shall prevent information about its own activities which may be commercially advantageous from being disclosed in a discriminatory manner.

For the case of unbundled structure, the below statement is relevant with the existing situation in Turkey (ie the unbundled status of BOTAŞ).

"… In order to ensure the full respect of the rules on information unbundling, Member States shall ensure that the transmission system owner including, in the case of a combined operator, the distribution system operator, and the remaining part of the undertaking do not use joint services, such as joint legal services, apart from purely administrative or IT functions."

In order to prevent unnecessary restrictions for information publicity due to confidentiality concerns, the sub article 3 reads that; *"Information necessary for effective competition and the efficient functioning of the market shall be made public. That obligation shall be without prejudice to protecting commercially sensitive information".*

The Article 41 of the Directive defines the duties and powers of the regulatory authority. The related sub articles to the subject matter are as follows:

"*(h) monitoring compliance with and reviewing the past performance of network security and reliability rules and setting or approving standards and requirements for quality of service and supply or contributing thereto together with other competent authorities;*

(i) monitoring the level of transparency, including of wholesale prices, and ensuring compliance of natural gas undertakings with transparency obligations;

(j) monitoring the level and effectiveness of market opening and competition at wholesale and retail levels, including on natural gas exchanges, prices for household customers including prepayment systems, switching rates, disconnection rates, charges for and the execution of maintenance services and complaints by household customers, as well as any distortion or restriction of competition, including providing any relevant information, and bringing any relevant cases to the relevant competition authorities;

(k) monitoring the occurrence of restrictive contractual practices, including exclusivity clauses which may prevent largen on-household customers from contracting simultaneously with more than one supplier or restrict their choice to do so, and, where appropriate, informing the national competition authorities of such practices;

(m) monitoring the time taken by transmission and distribution system operators to make connections and repairs;

(n) monitoring and reviewing the access conditions to storage, linepack and other ancillary services as provided for in Article 33. In the event that the access regime to storage is defined according to Article 33(3), that task shall exclude there viewing of tariffs;

(r) monitoring the implementation of rules relating to the roles and responsibilities of transmission system operators, distribution system operators, suppliers and customers and other market parties pursuant to Regulation (EC) No 715/2009;

5.1.2 The Regulation 715; "REGULATION (EC) No 715/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 on conditions for access to the natural gas transmission networks"

The Regulation emphasizes the below stated issues which are relevant to subject matter in its introductory part.

- Equal access to information on the physical status and efficiency of the system to enable all market participants to assess the overall demand and supply situation and to identify the reasons for movements in the wholesale price.
- Precise information on supply and demand, network capacity, flows and maintenance, balancing and availability and usage of storage.
- Alleviating limitations to publication for confidentiality reasons.
- Need to be sure that those engaging in abusive behaviour can be subjected to effective, proportionate and dissuasive penalties.
- The competent authorities should be given the competence to investigate effectively allegations of market abuse. To that end, it is necessary that competent authorities have access to data that provides information on operational decisions made by supply undertakings.
- System operators should keep information in relation to available to capacity reservations, nominations and realised flows and easily accessible by the competent authorities for a fixed period of time.

The Article 18 of the Directive specifies the transparency obligations of the TSO's reads:

"Article 18

Transparency requirements concerning transmission system operators

1. The transmission system operator shall make public detailed information regarding the services it offers and the relevant conditions applied, together with the technical information necessary for network users to gain effective network access.

2. In order to ensure transparent, objective and non-discriminatory tariffs and facilitate efficient utilisation of the gas network, transmission system operators or relevant national authorities shall publish reasonably and sufficiently detailed information on tariff derivation, methodology and structure.

3. For the services provided, each transmission system operator shall make public information on technical, contracted and available capacities on a numerical basis for all relevant points including entry and exit points on a regular and rolling basis and in a user-friendly and standardised manner.

4.The relevant points of a transmission system on which the information is to be made public shall be approved by the competent authorities after consultation with network users.

5.The transmission system operator shall always disclose the information required by this Regulation in a meaningful, quantifiably clear and easily accessible manner and on a non-discriminatory basis.

6.The transmission system operator shall make public ex-ante and ex-post supply and demand information, based on nominations, forecasts and realised flows in and out of the system. The national regulatory authority shall ensure that all such information is made public. The level of detail of the information that is made public shall reflect the information available to the transmission system operator"

5.1.3 The Reg 713/2009 – "REGULATION (EC) No 713/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators"

The Article 11 of the Regulation (Monitoring and reporting on the electricity and natural gas sectors) states that:

1. The Agency, in close cooperation with the Commission, the Member States and the relevant national authorities including the national regulatory authorities and without prejudice to the competences of competition authorities, shall monitor the internal markets in electricity and natural gas, in particular the retail prices of electricity and natural gas, access to the network including access of electricity produced from renewable energy sources, and compliance with the consumer rights laid down in Directive 2009/72/EC and Directive 2009/73/EC.

2. The Agency shall make public an annual report on the results of the monitoring provided for in paragraph 1. In that report, it shall identify any barriers to the completion of the internal markets in electricity and natural gas.

5.1.4 ACER[66]

As it was previously defined in section 3.1.2, the legal basis for the Agency's market monitoring duties is in Article 11 of Regulation (EC) No. 713/2009. To this purpose, the Agency prepares an annual market monitoring report in close cooperation with the European Commission, National Regulatory Authorities, and other relevant organisations. The objective of the Agency's market monitoring activities is to explain how energy markets can perform more efficiently, thus making energy more affordable to the benefit of European energy consumers and to

[66]This part is prepared by using the information published in the ACER Web Site.

compare retail market competition in different markets across the EU, with a view to identifying instances of best practice which improve market performance.

5.1.5 ENTSOG Interoperability and Data Exchange Network Code (COMMISSION REGULATION (EU) 2015/703 of 30 April 2015 establishing a network code on interoperability and data exchange rules)

ENTSOG Interoperability and Data Exchange Network Code (the INT NC) sets out rules regarding interoperability and data exchange as well as harmonised rules for the operation of gas transmission systems. It is applicable at all interconnection points of the transmission systems. The Regulation aims to address issues related with the interconnection agreements, units, gas quality, odourisation and data exchange and provide rules and procedures to reach an appropriate level of harmonisation towards efficient gas trading and transport across gas transmission systems in the Union.

Utilisation of common sets of units for the determination of gas quantities across the borders has a vital role in facilitating the gas transmission operations and gas trading. The Article 13 of the INT NC regulates this matter.

Article 13 Common set of units

1.*Each transmission system operator shall use the common set of units defined in this Article for any data exchange and data publication related to Regulation (EC) No 715/2009. 2.For the parameters of pressure, temperature, volume, gross calorific value, energy, and Wobbe-index the transmission system operators shall use: (a) pressure: bar (b) temperature: °C (degree Celsius)(c) volume: m3 (d) gross calorific value (GCV): kWh/m3 (e) energy: kWh (based on GCV) (f) Wobbe-index: kWh/m3 (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.

Adoption of the same gas quality specifications has also great importance in terms of union wide gas trading and production of industrial and household gas equipment. The NRA's are assigned with a specific task in order to overcome problems related with gas quality.

Article 15Managing cross-border trade restrictions due to gas quality differences

2.Where a restriction to cross-border trade due to gas quality differences cannot be avoided by the concerned transmission system operators and is recognised by the national regulatory authorities, those authorities may require the transmission system operators to perform, within 12 months,

Publication of live gas transmission data and free access to such data by the market participants is among the essential requirements and the TSOs should realize this through their web sites. Union wide gas flow data at the interconnections is published by ENTSOG as a requirement of the INT NC.

Article 16 Short term monitoring on gas quality — data publication

Transmission system operators shall publish on their website for each interconnection point, with a frequency of at least once per hour during the gas day, the Wobbe-index and gross calorific value for gas directly entering their transmission networks at all physical interconnection points. Entsog shall publish on its Union-wide central platform established pursuant to point 3.1.1(1)(h) of Annex I of Regulation (EC) No 715/2009 a link to the relevant information on the websites of the transmission system operators.

Establishing reliable communication infrastructure, taking necessary measures for unauthorised access and ensuring the reliability of the transmitted data itself are the requirements from the TSOs in terms of data exchange security and availability.

Article 22Data exchange system security and availability

1.Each transmission system operator and each counterparty shall be responsible for ensuring that the appropriate security measures are undertaken. In particular, they shall: (a) secure the communication chain in order to provide secured and reliable communications, including the protection of the confidentiality by encryption, integrity and the authenticity by signature of the sender and non-repudiation by a signed confirmation; (b) implement appropriate security measures in order to prevent unauthorised access of their IT infrastructure; (c) notify the other parties it communicates with, without delay, in regard to any unauthorised access which has or may have occurred on his own system.

…

The TSOs are required to apply common data exchange protocols for the document-based data exchange, integrated data exchange and interactive data exchange.

Article 21Common data exchange solutions

2.The common data exchange solutions shall comprise the protocol, the data format and the network. The following common data exchange solutions shall be used for each of the types of data exchange listed in paragraph 1:

(a) For the document-based data exchange: (i) protocol: AS4; (ii) data format: Edig@s-XML, or an equivalent data format ensuring identical degree of interoperability. Entsog shall publish such an equivalent data format.

(b) For the integrated data exchange: (i) protocol: HTTP/S-SOAP; (ii) data format: Edig@s-XML, or an equivalent data format ensuring identical degree of interoperability. Entsog shall publish such an equivalent data format.

(c) For the interactive data exchange, the protocol shall be HTTP/S. For all data exchange types set out in points (a) to (c), the network shall be internet.

5.1.6 ENTSOG Transparency Platform – API[67]

The ENTSOG's Transparency Platform (TP) provides a comprehensive data query mechanism by which all data can be extracted through a REST API. This API is available to the public and anyone has the possibility of extracting the published information on the ENTSOG TP in several formats.

Transparency and Technical Cooperation

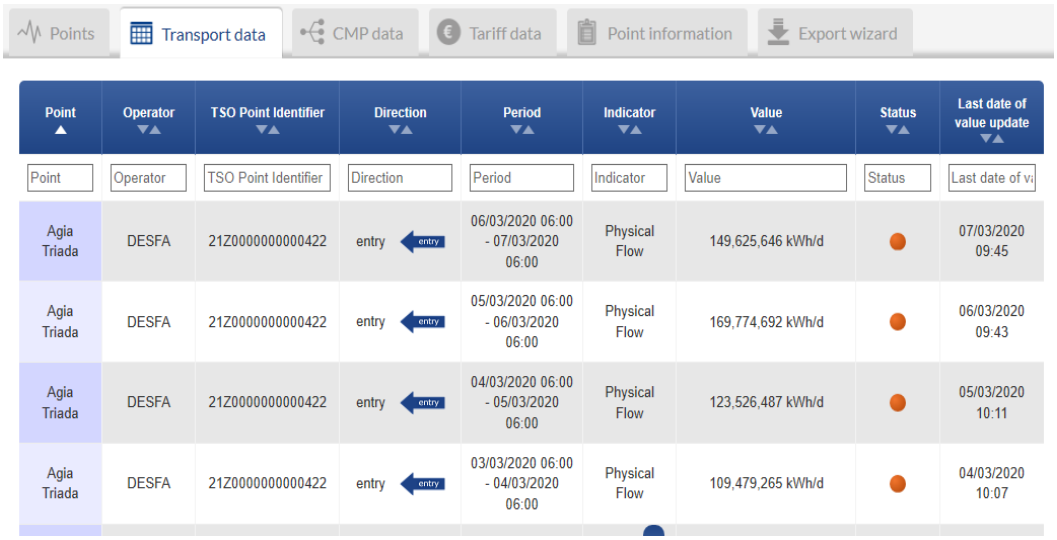
ENTSOG activities on the Transparency topic relate to management of the transparency obligations including TSOs' publications on their websites and the Transparency Platform and Regulation on Energy Market Integrity and Transparency (REMIT). Provision of the third Long-Term Gas Quality Outlook (Gas Quality Outlook) for Ten Year Network Development Plan (TYNDP) 2020. ENTSOG continues improving the gas quality reference data and the modelling assumptions used for the long-term gas quality monitoring outlook for the Gas Quality Outlook. ENTSOG also operate the Local Issuing Office (LIO) for Energy Identification Coding (EIC) scheme.

[67] Source: ENTSOG Web Site.

Transparency Activities

For the Transparency Platform, work is undertaken to analyse stakeholder feedback and implement new functionalities that will improve the usability and user-friendliness of the published data. Support will be provided to the TSOs from Energy Community Contracting Parties as they advance their efforts on transparency publications on ENTSOG's Transparency Platform and support provided to the EU TSOs to improve data quality and deliver on REMIT requirements.

The goal is to increase the transparency of daily TSO operations across Europe through the publication of relevant access and operational information.



Point	Operator	TSO Point Identifier	Direction	Period	Indicator	Value	Status	Last date of value update
Agia Triada	DESFA	21Z0000000000422	entry	06/03/2020 06:00 - 07/03/2020 06:00	Physical Flow	149,625,646 kWh/d		07/03/2020 09:45
Agia Triada	DESFA	21Z0000000000422	entry	05/03/2020 06:00 - 06/03/2020 06:00	Physical Flow	169,774,692 kWh/d		06/03/2020 09:43
Agia Triada	DESFA	21Z0000000000422	entry	04/03/2020 06:00 - 05/03/2020 06:00	Physical Flow	123,526,487 kWh/d		05/03/2020 10:11
Agia Triada	DESFA	21Z0000000000422	entry	03/03/2020 06:00 - 04/03/2020 06:00	Physical Flow	109,479,265 kWh/d		04/03/2020 10:07

Figure 5.1– A visual exhibit from ENTSOG Transparency Platform

Energy Identification Codes (EIC)

The Energy Identification Code or EIC is a 16-character code used in Europe to uniquely identify entities and objects related to the electricity and gas sector. Since 1 March 2013, ENTSOG is acting as Local Issuing Office (LIO) for the EIC Scheme for natural gas transmission.

The Energy Identification Coding scheme (EIC) is standardised and maintained by ENTSO-E who acts as “Central Issuing Office” (CIO). EIC provide a unique identification of the market participants and other entities active within the Energy Internal European Market (IEM). It is widely used in the Electronic Document Interchange.

ENTSOG cooperates with ENTSOE to further streamline and standardise the implementation of the scheme in the gas sector.

Technical Cooperation with Third-Country TSOs

Since ENTSOG’s establishment, technical cooperation has advanced in the key areas of Security of Supply and Interoperability. Pursuant to Article 8(3)(c) of Regulation (EC) No715/2009 ENTSOG developed legally non-binding recommendations for the coordination of technical cooperation of TSOs of the European Union with third-country TSOs. ENTSOG has continuously been working on building cooperation with non-EU TSOs and Energy Community

Secretariat, and has to that aim organised several workshops and meetings and fully support cooperation between EU and non-EU TSOs in case of any stress event.

Complete List of APIs (Application Programming Interfaces)[68]

The ENTSOG's Transparency Platform is not only a web platform. It also lets accessing the data directly by means of a REST (representational state transfer), which provide for a fast and intuitive data query mechanism.

There is no need to set up complex processes to download files from a remote location, or to crawl through the TP's web pages to extract the data from the various web site components. All of this can be directly downloaded, bypassing any web layer, by accessing the available REST APIs of ENTSOG.

Category	API	What it contains
Point Data	Transport Data	Nomination, Renominations, Allocations, Physical Flows, GCV, Wobbe Index, Capacities, Interruptions, and CMP CMA
	CMP Unsuccessful Requests	CMP Unsuccessful requests
	CMP Unavailable Firm Capacities	CMP Unavailable Firm Capacity
	CMP Auction Premiums	CMP Auction Premiums
	Interruptions	Interruptions
Zone Data	Transport Data	Latest Nominations, Allocations, Physical Flows
Tariff Data	Tariffs Simulations	Simulation of all the costs for flowing 1 GWh/day/year for each IP per product type and tariff period
	Tariffs	Information about the various tariff types and components related to the tariffs
UMM Data	UMM Data	Urgent Market Messages
Referential Data	Points	Interconnection points
	Operators	All operators connected to the transmission system
	Balancing Zones	European balancing zones
	Operator Point Directions	All the possible flow directions, being combination of an operator, a point, and a flow direction
	Interconnections	All the interconnections between an exit system and an entry system
	Aggregate Interconnections	All the connections between transmission system operators and their respective balancing zones

Figure 5.2–Categorisation of the data to be published through ENTSOG TP

[68] ENTSOG TP API Documentation 11 07 2018 Version 1.4.

5.2 Italy[69]

The responsibilities of the NRA- ARERA (among others) covers:

- Ensures advertising and transparency of service conditions
- Promotes higher levels of competition and more acceptable safety standards in procurement, with particular attention to harmonizing regulation for the integration of markets and networks internationally
- Increases levels of protection, awareness and information to consumers
- Monitors, supervises and controls the service quality, safety, access to networks, tariffs, incentives for renewable and similar sources, including in collaboration with the Fund for Energy and Environmental Services (CSEA) and the Energy Services Manager - (GSE)

The Authority also carries out an advisory role to the Parliament and the Government to which it can submit reports and proposals; each year it presents an Annual Report on the state of services and the activities carried out.

The Authority's provisions are adopted according to procedures governed by their internal regulations and by regulations on the general operation of the Public Administration, based on efficiency and transparency criteria. Considerable space is devoted to consultation with all stakeholders, through the dissemination of documents, the collection of written observations and any collective and individual hearings.

The mandatory public disclosure of records and provisions of a general regulatory nature is assured through publication on the Authority's website which represents the first instance of the administrative process.

Since 2005, the Authority has introduced the Analysis of Regulatory Impact (AIR) on provisions of particular importance, as a further instrument for a better quality of regulation.

5.3 UK[70]

Ofgem monitors developments in the gas market and facilitating changes to the market arrangements where it is economic and efficient to do so. It also undertakes work to protect customers' interests in respect of securing Britain's gas supplies, as well as monitoring and investigating activities which may harm competition.

It is important that National Grid has appropriate commercial incentives to operate the gas NTS in an economic and efficient manner, as they are required to do under the terms of their license as the System Operator. To achieve this, Ofgem works to develop incentive schemes that provide National Grid with an appropriate balance of risk and reward. At the same time, the interests of present and future consumers, who ultimately pay for the costs of system operation, are tried to be protected. Cash out arrangements and the System Operator incentive schemes form part of Ofgem's overall work to regulate the NTS monopolies and to work towards maintaining market efficiency. In this regard, proper monitoring of all those activities has great importance.

In terms of security of supply, Ofgem requires Shippers provide information on their long term gas contracts.

The gas transmission activities are monitored under the main areas stated below.

[69] Source: ARERA web site.

[70] Source: Ofgem web site.

Network Highlights: Outcomes from the annual reports for network company performance under RIIO are noted. The number of service interruptions across the UK, the carbon footprint of the network and underspending or overspending the allowances are the main highlights.

Reporting Obligations: The RIIO price controls are designed to encourage network companies to play a full role in delivering a sustainable energy sector, and to do so in a way that brings consumers value for money. Under RIIO, each company has to deliver and report on a range of outputs:

- Reliability: Companies are expected to improve network reliability and reduce the number and duration of power interruptions.
- Connections: Companies will provide a better service for customers wanting to connect to the network.

- Customer Service: Ofgem incentivises companies to deliver good customer service and listen to stakeholders.
- Social Obligations: Companies will do more to help vulnerable customers, particularly during power interruptions.
- Environmental: Companies must reduce their carbon emissions and other environmental impacts.
- Safety: Companies are funded to ensure the network remains safe and meets Health and Safety Executive standards.

Gas Transmission Charts and Data

Ofgem publishes various charts and data related with the gas transmission activities and performance of the system operator. The below chart is one of the charts prepared and published by Ofgem on annual basis.

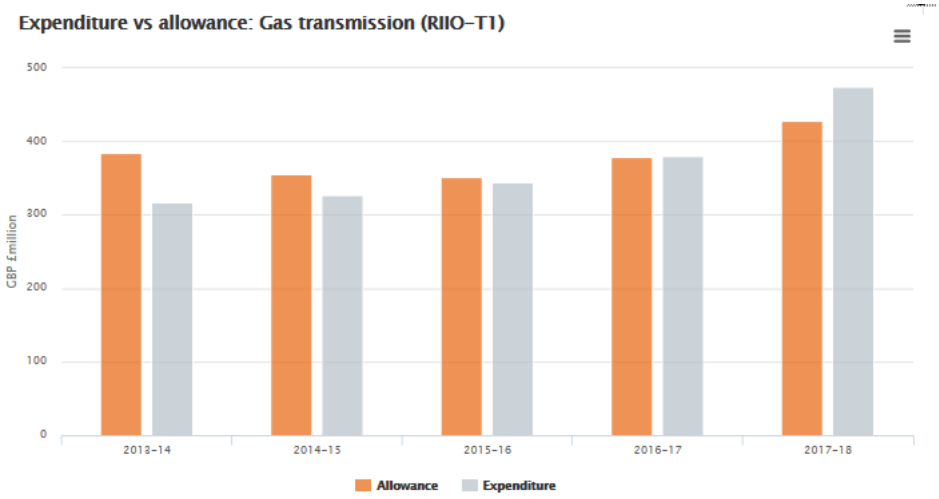


Figure 5.3–Comparison National Grid Gas Transmission's total expenditure for their regulated business activities against their allowance for each year under the RIIO-T1 price control

The wholesale market activities are monitored by Ofgem under the main areas stated below.

Wholesale highlights: Energy prices, gas supply sources and trends and the share of gas and other sources in electricity generation mix are among main highlights.

Wholesale Price Trends:

Security of Supply: Ensuring there is sufficient gas to meet demand is a key outcome of the energy market. It provides consumers with certainty they can get heat and power when they require it, and helps drive economic activity.

Access and Liquidity: The amount of competition in the energy market can have a strong impact on final wholesale prices. The more pressures there are from companies competing with one another, the more likely the wholesale market will reflect the true economic costs to supply energy.

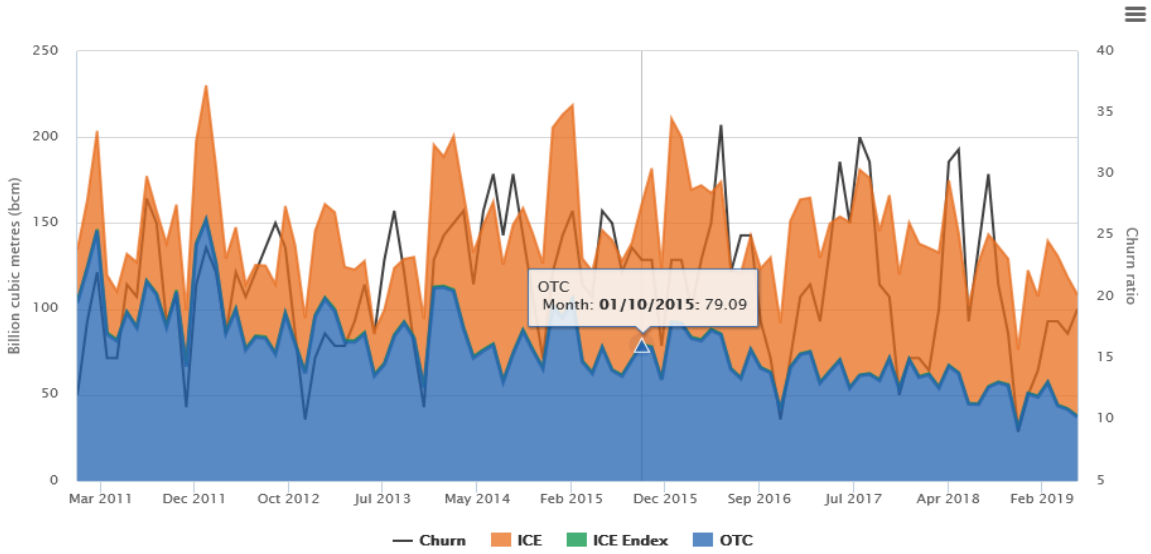


Figure 5.4 –A monthly report for Gas Trading Volumes and Monthly Churn Ratio in UK NTS

Competition: The amount of competition in the energy market can have a strong impact on final wholesale prices. The more pressures there are from companies competing with one another, the more likely the wholesale market will reflect the true economic costs to supply energy.

Sustainability and Investments: A more sustainable energy market has significant impacts on levels of pollution and greenhouse gas emissions. Investment is also essential to ensure that the market can meet the demands of current and future consumers.

Methodology and Data Sources: This range of indicators are selected to support general understanding of market outcomes, to provide a picture of the market where it is not produced elsewhere, or where there is scope for Ofgem to set a clear methodology for the data.

The data comes from sources that are either publicly available, provided by third parties or from Ofgem information requests. Specific sources and relevant dates are listed with each indicator. Ofgem reviews the indicators periodically to ensure they continue to help promote transparency and understanding of the wholesale energy market

5.4 Turkey

5.4.1 Overview of the Current Regulations related with the Monitoring and Transparency for Gas Transmission Activities in Turkey

As per its assigned duties, the regulatory authority EMRA is authorised to monitor and supervise the market activities of the license holders. The Natural Gas Market Law (4646) emphasizes the supply of good quality gas with competitive prices under competitive conditions. Considering also the role of the EMRA as the first instance authority for the settlement of disputes between the license holders, the follow of below stated activities by EMRA related with gas transmission activities and also the Organised Wholesale Market operations has a vital role:

-

- Properly managed gas transmission activities,implementation of the defined roles and responsibilities of transmission system operators,
- Expenditures by the TSO (CAPEX and OPEX)
- The interactions between the Transporter and the Shippers, non-discriminatory approach by the TSO,
- Impacts of legislative changes,
- Transparency obligations by the operators of the transmission system and the organised wholesale market,
- Abusive behaviours by any market participant.

EMRA, through its web site, publishes gas market outlook reports on monthly and annual basis where all details related with the supply and consumption of natural gas can be tracked. These reports are the most comprehensive reports published so far. However, those reports are published by EMRA earliest two months upon the end of month/year and no information on the current status of the gas transmission activities and Organised Whole Sale Market activities are available in the EMRA's website itself. Such data is published through the commercial operating systems of the operators (ie the Electronic Bulletin Board-EBB and the Continuous Trading Platform-STP).

EMRA publishes the forecasted gas annual gas consumption quantity for the following year and in that respect, it also needs to track gas consumption figures and evaluate the expected trends on sectoral basis.

5.4.1.1 The Transmission System Operation Regulation

The Regulation requires the Transmission System Operator to establish Supervisory Control and Data Acquisition (SCADA) System as part of the Dispatch Control Centre:

Dispatch Control Centre

Article 12 — *The Dispatch Control Centre shall be equipped with hardware and software infrastructures which shall be capable of monitoring the gas measurement data at all entry and exit points and other field data and processing such data. This Centre shall be donated with commanding features for shipping control and balancing.*

Communication system

Article 13 — *The transmission company establishes a communication platform to which the Shippers shall have access through an electronic bulletin board (the EBT). Such platform shall be used for the notifications and information exchange relating to nominations, the curtailments or reductions, the quantities programmed and delivered, balancing instructions by the Transporter and capacity allocations. This system may also be used for the interactions between the Transporter and other transmission system operators and storage system operators.*

Capacity Allocations

Article 14 — *The transmission company announces the available capacities through the electronic bulletin board (EBT) and determine a methodology to apply equal treatment for all parties relating to capacity sells and capacity transfers.*

5.4.1.2 The Natural Gas Licensing Regulation

The regulation has a special article related with the obligations for the non-discriminatory approach by the system operators which reads:

"Non-discrimination against the parties with equal conditions

Article 32 – *When providing services, the entities holding distribution, transmission and storage licenses cannot discriminate among the parties with equal rights and cannot violate the free trading fare competition rules. In this regard, the license holding entities are obliged to act in accordance with the below stated rules as per their license relevance.*

a) … publishing information to the system users all at the same time,

b) Providing reliable information about the already booked and available capacities in the system to existing and potential system users,

c) Providing reliable information related with balancing actions, curtailments and results arising from those,

d) Non-discriminatory approach for the capacity allocations and capacity transfers, …

The Article 21 of the regulation has a provision stating that *"The transmission license holders should prove to the Regulatory Authority their economic, efficient and safe operatorship."*

A new article was added to the regulation in 2017 requiring the transmission license holder to operate its industrial control systems and IT systems in accordance with the standards defined by ISO/IEC 27001 Information Security Management System.

The article 37 of the regulation defines the obligations of license holders to share information related with their licensed activity.The article states that entities acting in Natural Gas are obliged to provide information about their activities and share those with other system operators and/or users. The transmission license holder is required to carry out coordinated actions with other transmission system operator and they are obliged to provide information requested by the regulatory authority.

5.4.1.3 BOTAŞ Gas Transmission Network Code and the Electronic Bulletin Board

Establishment of commercial operations systems for gas transmission systems is a common application in all liberalised gas markets and those are mainly used to conduct the relations between the Transporters and the Shippers. The systems need to be designed to reflect the requirements of the existing regulatory framework which

in practise mainly covered in the gas transmission network code. In most cases such Commercial operation systems for gas transmission systems is one of the essential requirements of a liberal gas market.

BOTAŞ owns and operates dedicated telecommunication system for gas transmission network. The system is fibre optic cable communication system which has connection to all entry and exit points providing on line field data transfer to the SCADA system installed in the National Gas Dispatch Centre in Ankara.

Following the entry into force of the BOTAŞ Transmission Network Code (shortly "the ŞİD") in 2004, the first installation of the Electronic Bulletin Board (shortly the EBT) was done in 2005. In later term, BOTAŞ has installed a new EBT in 2015 with improved features, such as, integration with the SCADA System. The system is accessible by Shippers through BOTAŞ Web Site with dedicated user name and passwords.

The EBT is defined in the ŞİD as stated below.

"Electronic Bulletin Board (EBT)'': an electronic announcement board established for the parties performing activities in the Natural Gas market to monitor market movements, operated by the Transporter, and accessed at https://ebt.botas.gov.tr"

The main information announced through the EBT is stated below.

- Entry and Exit Points
- Maximum technical capacities, current allocated capacities and available capacities at the Entry and Exit Points
- Nominations and approved programs (Shipper specific)
- Allocations at the end of the Gas Day (Shipper specific)
- Imbalances of the Shippers at the end of the Gas Day (Shipper specific)
- Transmission network line pack (stock) amount
- Rectifications for metering systems
- Planned maintenance schedules
- Occurrence or possibility of an Emergency Case a Difficult Day, a Limited Capacity Day

The EBT is also used as a means for the notifications from Transporters to the Shippers; such as the Interruption/Curtailment/Increase Instructions.

Instant and daily gas flow information is announced for the Entry and Exit Points where at least three Shippers have booked capacity. Such limitation is due to confidentiality concerns of the Shippers.

During the Day:

- Instantaneous Flow Quantity
- Instantaneous Gross Calorific Value
- Instantaneous Delivery Pressure

At the end of the Day:

- Daily Total Quantity
- Daily Average Gross Calorific Value (Flow weighted)

-Daily Average Delivery Pressure (Flow weighted)

Transactions related with the available capacities and capacity transfers between the Shippers are carried out through the use of the EBT. However, the system has not been equipped yet with a tool to serve for a "Capacity Secondary Market" for the use of Shippers for capacity trading among themselves.

ŞİD Article 2.3.2. "The Transporter shall publish regularly on the EBB the capacities requested additionally by the Shippers or the capacities determined as available. In accordance with this information, the Shippers among whom capacity transfers will be made shall apply together to the Transporter for the approval. In line with the transferred capacity quantity, rights and obligations at the Primary Exit Point or Entry Point shall be re-determined."

Purchase of the Own Utilisation Gas by the Transporter is an important element of the gas market. Such purchase is required to be carried out in a competitive manner in any liberal gas market. The EBT serves for such purpose and the ŞİD has the following provision related with the issue.

"4.1.3. Prior to each gas day, the Transporter shall announce through the EBT its estimated amount of Own Utilisation Gas which is going to be purchased in the following day and such amount shall be purchased by the Transporter in accordance with the Article 4.1.2. The Transporter shall publish the amount of the purchased Own Utilisation Gas pertaining to the last month in the EBT.

The ŞİD includes a special section; " Section 23 - Correspondences and Notifications" where the EBT related subclauses reads:

23.2. 2 Except the provisions stated as otherwise in NOP, all notifications and proceedings deemed necessary under this ŞİD regarding Natural Gas Transmission including Nominations, Revised Nominations, approval notifications, Programs, Allocations, Capacity Applications, Capacity Transfers, Capacity Switching, Daily Imbalance Settlements, Day After Trading, Interruption/Curtailment/Increase Instructions, Management of Difficult Days and Limited Capacity Days shall be made through EBB. The Transporter, the Market Operator and the Shipper shall establish their infrastructure to communicate through the EBT and the Continuous Trading Platform.

23.3. On the case that EBB is not functional, notifications and communications shall be made in accordance with the EBB Breakdown Procedure.

23.5.All the records in EBB (including the reconciled ones) and the information about all the proceedings made by the parties shall be kept by the Transporter.

The Organised Wholesale Market Regulation is in force since 1st September 2018. The ŞİD had certain amendments accordingly and some below stated clauses of the Regulation are related with the EBT. The ŞİD Article 25 states that actions of the Transporter in the Continuous Trading Platform (the STP) as a residual balancer and reasons behind shall be published through both in the EBT and the STP.

EMRA's Access to the EBT:

EMRA is allowed for a full access to monitor all the transactions through the EBT. On the other side, regular reporting for gas transmission activities is carried out by BOTAŞ using the data templates which EMRA requires.

5.4.1.4 The Organised Wholesale Market Regulation

The regulation is in force since 1st September 2018 and the purpose of the Regulation is stated in the first article as follows:

"The purpose of this Regulation to provide the pricing of natural gas in the market under objective and transparent conditions."

The responsibilities of the Market Operator (EPİAŞ) in terms of transparency and non-discrimination are stated in the sub clauses of the Article 9, "Responsibilities of the Market Operator"

Article 9 – (1) The Market Operator is required to show non-discriminatory approach to all parties in a transparent manner

…

(6) The Market Operator is responsible for the confidentiality of the data and info provided by the market participants (other than the ones required to be published by legislation) and should take necessary measures for this purpose

For an efficient operation of the Organised Wholesale Market, the Regulation further details the responsibilities of the Transmission System Operator in terms of its interactions through the Organised Wholesale Market.

The Responsibilities of the Transmission System Operator

Article 10 – (1) *The transmission system operator should be transparent and non-discriminative when carrying out the below specified tasks*

a)To estimate the daily demand and the level of linepack in accordance with the nominations prior to gas day and publish those in the EBT and STP,

…

f)To provide necessary information to the market Operator for the settlement of the transactions and the imbalances, within the time schedule stated in the PUE,

g) To publish gas flow and pressure data pertaining to specified points and the regions of the transmission network in the EBT and transmit this info to the Market Operator in order to be published through the STP,

ğ) To inform the Market Operator at the same time with the system users about any condition that may adversely affect the gas flow

ı)To provide the confidentiality of the gas transmission relevant data and info provided by the market participants (other than the ones required to be transparent by legislation) and should take necessary measures for this purpose,
…

Market Operating Principles-PUE

The Market Operating Principles (shortly the PUE) was published by EMRA on 23.09.2017 with a view to create a fair and transparent platform for gas traders. The PUE details the information to be announced through the Continuous Trading Platform (the STP) and transparency requirements under the Article 12.

Article 12 – Transparency, the Reports, Statistics, Information and Documents to be Published

12.1 *The Market Operator shall be responsible for preparing and publishing the below stated (not limited to) data, reports and information to be shared:*

a) The reports required by EMRA related with the Organised Whole Sale Gas Market activities,

b) Submission of the information to the TSO as per the requirements of the ŞİD and Market Delivery Contract,

c) On line publish of the market prices and other OTSP relevant information,

d) Publish of Daily Reference Price (the GRF),

e) The information, data and reports prepared by the TSO in accordance with the Regulation requirements as to be announced to the market participants,

f) The statistics related with the transactions in the OTSP,

g) The quantity and price information related with the matched settlements; subject to keeping the identity of the participants,

h) Balancing gas sale and purchase prices determined by the Transporter for those Shippers who are in unbalanced position.

EPİAŞ Transparency Platform

Energy Markets Operating Company-EPİAŞ publishes the following data related with the gas market through its transparency platform.

Natural Gas Transmission

- Nominations (as the aggregate of the Shipper's nominated quantities)
- Virtual Trading
- Capacity
- Capacity Reservations
- Realizations
- Line pack amount
- Storage

Natural Gas Continuous Trading Platform

- Price
- Matched Quantity
- Traded Volumes
- Residual Balancer Actions
- Allocation data
- Imbalances
- BAST
- GDDK Amount

- Operational Flow

All those above stated data published through the STP are on daily basis and accessible by everybody. An example as snap-shot screen is given in the following page.

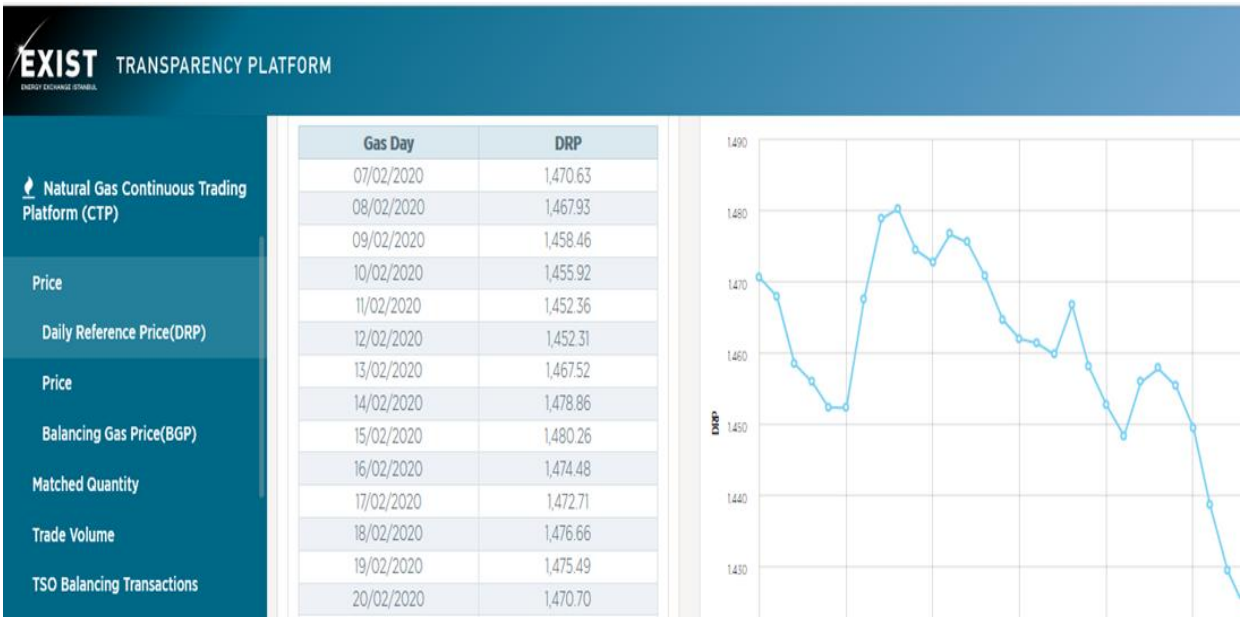


Figure 5.5 – A visual exhibition from EPİAŞ Transparency Platform indicating Daily Reference Prices

5.4.1.5 Regulation on Notifications in Energy Markets

The following table shows the information requested from TSOs under the Regulation.

Table 5.1 –Information requested from the TSO under the Regulation on Notifications

Responsible	Notification Name	Notification Period
Transmission Company	Transmission License (Pipe Line)	Monthly
	Transmission License, Electronic Signature	Yearly
	License Fee, formal letter	Yearly
	Participation Fee, formal letter	Yearly
	Industrial Control Systems Risk Mitigation Follow Up	6 Months

With the publish of the Regulation on 27.05.2014, the notifications of the market operators were started being realized through EMRA Electronic Notification System (EBİS) as electronic means, step by step. As of 01.01.2016, notifications for all markets are being realized through the EBİS. The notifications are carried out by the authorised representatives of the license holders with electronic signatures.

The system is accessed by the authorised representatives via a special web address (https//bildirim.epdk.org.tr)

5.5 Identified Gaps and Barriers with EU and Proposed Changes to EMRA's Monitoring System

Monitoring duties of the NRA's as per relevant Turkish and EU legislation in a wider context was summarised in above sections. In this section monitoring duties of the regulatory authorities will be assessed specifically in terms of application of an incentive basis gas transmission tariff regulation. In this sense, the following areas are the limited subjects of the concern:

- Transparency obligations of the TSO
- Reporting Obligations of the TSO
- Complaints
- Security of Supply
- Quality of Supply
- Implementation of Ten-Year Network Development Plan

5.5.1 Transparency Obligations of the Transporter

The Article 18 of the Regulation 715 requires transmission system operators or relevant national authorities publish reasonably and sufficiently detailed information on tariff derivation, methodology and structure, in order to ensure transparent, objective and non-discriminatory tariffs and facilitate efficient utilisation of the gas network.

Each transmission system operator should make public information on technical, contracted and available capacities on a numerical basis for all relevant points including entry and exit points on a regular and rolling basis and in a user-friendly and standardised manner. On the other side, the relevant points of a transmission system on which the information is to be made public should be approved by the competent authorities after consultation with network users.

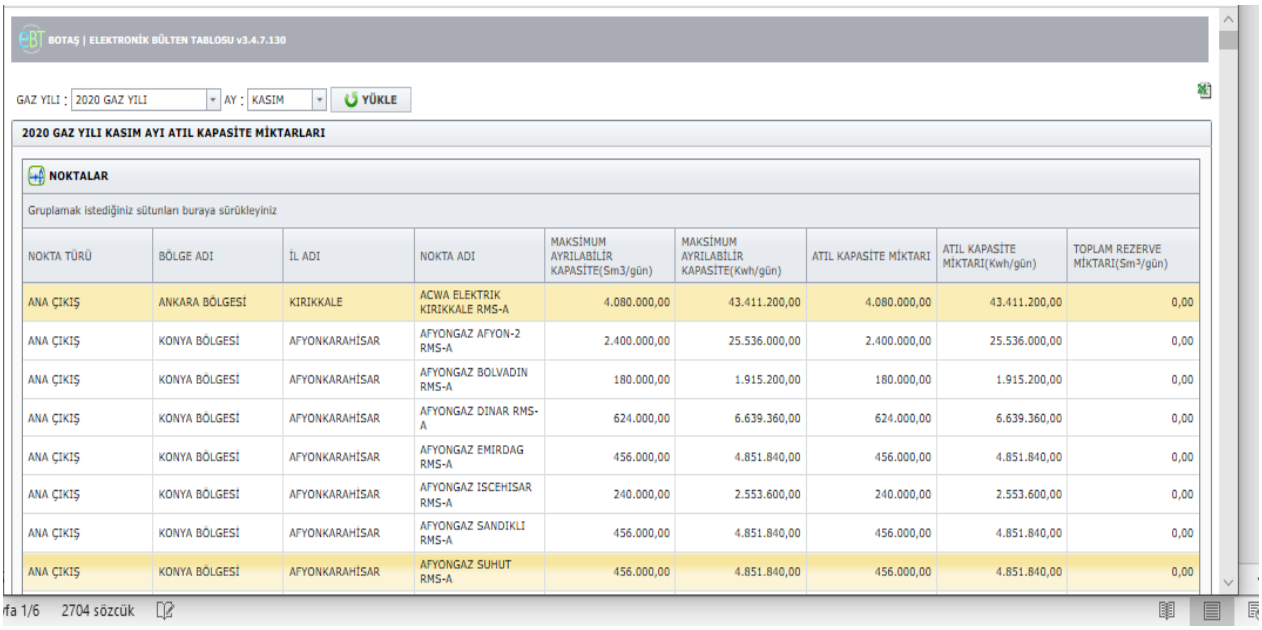
System operators should keep information in relation to available to capacity reservations, nominations and realised flows and easily accessible by the competent authorities for a fixed period of time.

The ENTSOG Tariff Network Code emphasizes the necessity for setting out the requirements for publishing the information related to the determination of the revenues of transmission system operators and to the derivation of different transmission and non-transmission tariffs. These requirements should enable network users to understand better the tariffs set for both transmission services and non-transmission services, as well as how such tariffs have changed, are set and may change. Additionally, network users should be able to understand the costs underlying transmission tariffs and to forecast transmission tariffs to a reasonable extent. The Code states that the transmission system operator should decide the most efficient way of flowing gas through the system. Hence, in order to achieve and ensure a reasonable level of cost reflectivity and predictability, transmission tariffs need to be based on a reference price methodology using specific cost drivers. The guiding principles in order to apply a consistent and transparent reference price methodology should be set out. The obligation to consult on the proposed reference price methodology should be laid down. Where the proposed reference price methodology is other than the capacity weighted distance reference price methodology, the latter should serve as a counterfactual for comparison with the proposed reference price methodology.

The secondary legislation published by EMRA is sufficiently detailed with the general terms and principles for setting out transmission tariff. However, in relation to the gas transmission tariff derivation of BOTAŞ, it is observed that this is kept as a non-transparent process conducted by EMRA. EMRA announces each year the approved cap for the investment expenditures and also the rate of return. Other than this, no specific explanatory document is published through BOTAŞ or EMRA Web Site for the tariff applicable for that year, clarifying underlying elements.

The Electronic Bulletin Board (the EBT) is the main media of BOTAŞ in fulfilling transparency obligations of the TSO as outlined in the Network Code itself and regulations for licensing and transmission system operation. Evaluations for the sufficiency and frequency of gas flow data and other expectations are not handled in this part. Limited to the requirements of the regulatory authority in relation to the transmission tariff, the follow of capacity bookings, publication of booked and available capacities and the requests by the Shippers for additional capacities has great importance. This has been already addressed in the secondary legislation and practical application is carried out through the EBT. Other relevant action is the purchase of balancing gas by the TSO and the transactions for that purpose are visible through both the EBT and EPİAŞ STP.

EMRA has full access to the EBT and is able to access all the live data and transactions. It can be stated that the monitoring requirements of EMRA in relation to gas transmission activities. However, the EBT would need to be further developed in the case of application of an incentive basis transmission tariff allowing EMRA track certain efficiency related parameters.



NOKTA TÜRÜ	BÖLGE ADI	İL ADI	NOKTA ADI	MAKSİMUM AYRILABİLİR KAPASİTE(Sm3/gün)	MAKSİMUM AYRILABİLİR KAPASİTE(Kwh/gün)	ATIL KAPASİTE MİKTARI	ATIL KAPASİTE MİKTARI(Kwh/gün)	TOPLAM REZERVE MİKTARI(Sm³/gün)
ANA ÇIKIŞ	ANKARA BÖLGESİ	KIRIKKALE	ACWA ELEKTRİK KIRIKKALE RMS-A	4.080.000,00	43.411.200,00	4.080.000,00	43.411.200,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ AFYON-2 RMS-A	2.400.000,00	25.536.000,00	2.400.000,00	25.536.000,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ BOLVADIN RMS-A	180.000,00	1.915.200,00	180.000,00	1.915.200,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ DINAR RMS-A	624.000,00	6.639.360,00	624.000,00	6.639.360,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ EMIRDAG RMS-A	456.000,00	4.851.840,00	456.000,00	4.851.840,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ ISCEHISAR RMS-A	240.000,00	2.553.600,00	240.000,00	2.553.600,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ SANDIKLI RMS-A	456.000,00	4.851.840,00	456.000,00	4.851.840,00	0,00
ANA ÇIKIŞ	KONYA BÖLGESİ	AFYONKARAHİSAR	AFYONGAZ SUHUT RMS-A	456.000,00	4.851.840,00	456.000,00	4.851.840,00	0,00

Figure 5.6–The EBT Transparency Platform, Available Capacities in the transmission system[71]

The EU legislation requires that the network users are able to trade for their unused capacity via transparent secondary markets and the network operators are required to facilitate such secondary trading. Such mechanisms are generally established as special tools included in the commercial operation systems of the TSO's.

In terms of transparency obligations in the EU, both the regulatory authorities and TSOs are required to publish information (especially relating to the transmission tariff methodologies and applications) through their web sites in English language, as well. This is seen in a limited extent in EMRA and BOTAŞ web sites.

[71] Source: BOTAS Web Site.

5.5.2 The Reporting obligations of the TSO

The 3rd Gas Directive requires the Regulatory Authorities observe and monitor the internal market in natural gas and its short, medium and long-term evolution, including aspects such as supply and demand, transmission and distribution infrastructure, quality of service, cross-border trade, congestion management, investments, wholesale

and consumer prices, market liquidity and environmental and efficiency improvements. The NRA's should monitor compliance with and review the past performance of network security and reliability rules and set or approve the standards and requirements for quality of service.

ENTSOG TAR NC Article 32 states that each update of the transmission tariffs should be accompanied by information indicating the reasons for the changes in their level.

Reporting obligations of the TSO's in the EU member states vary in terms of the contents of such reports in relation with the respective tariff mechanisms. For an incentive-based tariff mechanism, the TSO is expected to submit specific reports related with efficiency targets and incentives. The obligations of the TSOs in the UK in terms of reporting is a good example for the issue.

5.5.2.1 Ofgem Requirements for TSOs for Reporting under RIIO[72]

It is a requirement for TSOs to publish an annual report, on its company website. The report should be published by the 30 September. The report should cover the following as a minimum:

- Executive Summary Revenue Impact - actual revenue versus allowances for reporting year
- Incentive – performance in the year against targets with potential future highlights
- Innovation – summary of innovation projects, funding under NIA etc. to cover some of previous IFI reporting
- Outputs - performance in the year against targets
- Costs - performance in the year against targets for costs and workload where relevant, highlights of future performance, and expected outturn at the end of RIIO.
- Uncertainties (including Load Related) - a high-level commentary in relation to anticipated impact(s) of any uncertainty mechanism and how this has evolved from the expectations at the time of drafting the Business Plans. Comment on how these have affected forecast capex and output delivery.

Tables that should be published with / in the report are:

- Totex, actuals against allowances and forecast
- Consolidated Outputs, customer and stakeholder satisfaction, incremental capacity and gas constraints

Ofgem formatted the specific excel worksheets/templates for the completion of outputs that must be filled by the TSO; namely:

- financial issues worksheets
- the total expenditure worksheets
- operating expenditure worksheets
- capital expenditure worksheets
- gas network data worksheets
- the outputs worksheets

[72] RIIO-T1 Gas Transmission Price Control –Regulatory Instructions and Guidance: Version 6.2.

- gas system operator worksheets
- the revenue reporting worksheets

As the templates are a series of MS Excel workbooks, links and formulae have been included to limit, where possible, the amount of manual data entry required. The workbooks have not been "locked", **but NGGT must not change any formulae or formats (including insertion of deletion of rows or columns, moving any cells, or altering any text, figures, or formulae in any cells not shaded yellow) without instruction from Ofgem first.** If a change is necessary (to correct an error, for example), Ofgem will notify NGGT of the correction to be made.

In addition to annual returns, Ofgem require the System Operator to provide them with the following information:

- A monthly data pack, to be submitted five weeks after the end of each month, provided in the same worksheets format outlined in this chapter;
- A monthly written report, to be provided one week after the end of each month, providing a qualitative summary of its performance during the month including (but not limited to):
  - flagging any substantial variations in cost or incentive performance against the incentive targets;
  - details of any substantial variation and a commentary on why this has occurred e.g. changes to market conditions, a one-off event, etc;
- A quarterly written report, to be submitted five weeks after the end of each quarter, including a general System Operator report, providing qualitative analysis of its performance during the quarter concerned including:
  - an overview of its performance against each incentive;
  - a discussion of any changes to market conditions which may be affecting the System Operator's costs/role;
  - an explanation of any significant changes in System Operation costs/actions; and
- Presentations to Ofgem (as requested by Ofgem and on dates to be agreed between Ofgem and the System Operator) to highlight the main points relative to the System Operator's performance over the relevant period as specified by Ofgem. Such presentations will not be required at intervals shorter than a month.

The annual reports from NTS are grouped under the headings[73]:

- Safety
- Reliability
- Environmental Impact
- Customer and Stakeholder satisfaction
- Stakeholder Engagement Incentive Submission
- Connecting Customers Quickly and Efficiently

The NTS prepares below stated special reports related with specified efficiency targets and incentives.

- Operating margins cost report
- NTS shrinkage incentive report (revenue)
- NTS shrinkage incentive report (prompt volume and price targets)
- NTS Shrinkage (gas trades analysis)
- NTS shrinkage (electricity trades analysis)
- Residual gas balancing incentive report (overview)

[73]Source: National Grid UK Web site.

- Residual gas balancing daily price incentive payments and daily linepack incentive payments
- Demand forecasting incentive report (overview)
- Greenhouse gas emissions incentive report (incentive revenue)
- Greenhouse gas emissions venting data
- Maintenance incentive report

A key element of providing transparency on the performance of NTS is having targets for the service levels they will provide. In annual RIIO-1 performance reports, it is explained each year how well NTS has performed against its outputs. This will be continued throughout RIIO-2.

The secondary legislation published by EMRA does not detail the reporting obligations of the gas transmission system operator in terms of tariff derivation. There is no published "Regulatory Accounting Plan" for the TSO (although the one is specified for the DSOs) and the transmission tariff derivation looks as a non- transparent process between EMRA and BOTAŞ.

The Article 21 of the licensing regulation has a provision stating that *"The transmission license holders should prove to the Regulatory Authority their economic, efficient and safe operatorship."*BOTAŞ has been publishing the annual activity and market reports through its web site until 2016. As per the requirements of "Public Finance Management and Control Law (law no 5018)", BOTAŞ has prepared its "Strategic Plan 2015-2019" and the report is published in its web site. The Strategic Plan contains mainly the issues:

- The long and medium term goals;
- Essential policy and principles;
- Priority targets;
- Performance criteria, methodologies and resource allocation in achievement of the performance goals; and
- Performance planning in relation to the BOTAŞ' mission, goals and vision.

The Organised Wholesale Market Regulation requires the TSO prepare and publish its "Transmission System 10 (Ten) Year Capacity Projection Report" each year latest by end of June. Although more than 2 years passed over the publish of the Regulation, no such report has been visible in BOTAŞ Web site.

5.5.3 Complaints

The 3rd Gas Directive Article 41 (Duties and powers of the regulatory authority) states that the NRA's should act as a dispute settlement authority and should issue a decision within a period of two months after receipt of the complaint against the TSO. The regulatory authority's decision should have binding effect unless and until overruled on appeal.

The sub article 12 specifically refers to the complaints about the tariffs.

12.Any party who is affected and who has a right to complain concerning a decision on methodologies taken pursuant to this Article or, where the regulatory authority has a duty to consult, concerning the proposed tariffs or methodologies, may, at the latest within two months, or a shorter time period as provided by Member States, following publication of the decision or proposal for a decision, submit a complaint for review. Such a complaint shall not have suspensive effect.

Considering the role of the TSO's in liberal gas markets, the complaints against the TSO by Shippers and other connected system operators is the point of concern. On the other side, complaints related with the applied transmission tariff methodology and unit rates could be raised towards the regulatory authority. Claims related with the discrimination among the shippers might be the cases also to handle. Track of such complaints against the TSO

and decisions of the NRA upon the dispute handling process between the Shippers and the TSO might be among the subject matters in an efficiency-based tariff.

The 3rd Gas Directive also require the Member States ensure that the transmission system owner including, in the case of a combined operator, the distribution system operator, and the remaining part of the undertaking do not use joint services, such as joint legal services, apart from purely administrative or IT functions. Considering the unbundled status of BOTAŞ; although a provision exists in the ŞİD requiring the Transporter treat BOTAŞ Gas Trading departments like any other shipper, EMRA would still be expected to apply certain auditing mechanism for this matter to accommodate for complaints from the shippers.

5.5.4 Security of Supply

Monitoring of the market activities in terms of security of supply is one of the main tasks of the regulatory authorities. There are many areas need to be handled in relation to the matter some of which can be specified as:

- Investments by TSOs to meet the extra capacity needed
- Operational safety and reliability
- Preventive action plans and emergency plans
- Supply Diversification, resilience against major supply source disruptions
- Assurances in supply (import) contracts of the shippers

The matter is handled in the EU with the revised Gas Security of Supply Regulation (amended to Regulation (EU) No 994/2010) came into effect in November 2017 for both national wise and union wide scales. The NRA's are required to regularly monitor preventive action plans and emergency plans.

…The competent authorities shall ensure the regular monitoring of the implementation of the preventive action plan and the emergency plan.

"Each Member State shall designate a competent authority. The competent authorities shall cooperate with each other in the implementation of this Regulation. Member States may allow the competent authority to delegate specific tasks set out in this Regulation to other bodies. Where competent authorities delegate the task of declaring any of the crisis levels referred to in Article 11(1), they shall do so only to a public authority, a transmission system operator or a distribution system operator. Delegated tasks shall be performed under the supervision of the competent authority and shall be specified in the preventive action plan and in the emergency plan."

The Article 5 of the Regulation sets out the expectations from the infrastructure.

Article 5- Infrastructure Standard

1.Each Member State or, where a Member State so provides, its competent authority shall ensure that the necessary measures are taken so that in the event of a disruption of the single largest gas infrastructure, the technical capacity of the remaining infrastructure, determined in accordance with the N – 1 formula as set out in point 2 of Annex II, is able, without prejudice to paragraph 2 of this Article, to satisfy total gas demand of the calculated area during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years. This shall be done taking

into account gas consumption trends, the long-term impact of energy efficiency measures and the utilisation rates of existing infrastructure.

…

2. The obligation to ensure that the remaining infrastructure has the technical capacity to satisfy total gas demand, as referred to in paragraph 1 of this Article, shall also be considered to be fulfilled where the competent authority demonstrates in the preventive action plan that a disruption of gas supply may be sufficiently compensated for, in a timely manner, by appropriate market-based demand-side measures…

The NRAs should incentivise investments by the TSOs in fulfilling requirements related with N-1 scenarios stated above:

…

6. National regulatory authorities shall take into account the efficiently incurred costs of fulfilling the obligation set out in paragraph 1 of this Article and the costs of enabling bi-directional capacity so as to grant appropriate incentives when fixing or approving, in a transparent and detailed manner, the tariffs or methodologies in accordance with Article 13 of Regulation (EC) No 715/2009 and Article 41(8) of Directive 2009/73/EC.

…

8. The competent authority shall ensure that any new transmission infrastructure contributes to the security of gas supply through the development of a well-connected network, including, where appropriate, by means of a sufficient number of cross-border entry and exit points relative to market demand and the risks identified.

…

The Article 9 of the regulation is related with the contents of the Preventive Action Plans among which there must be information on the economic impact, effectiveness and efficiency of the measures contained in the plan and must include the information on all public service obligations that relate to the security of gas supply.

There is no specific regulation published by EMRA to define obligations of the natural gas undertakings in terms of security of gas supply. The Regulation on Licensing requires the suppliers to book certain capacity in the underground storage facilities. Besides, the import contracts should provide certain assurance for gas supply security. The Regulation on Wholesale Market requires the TSO to prepare 10 Year Capacity Projection Plan which could be considered as relevant to the matter in meeting the needed extra capacity. However, there is no specific obligations defined for the TSO to carry out N-1 scenarios and prepare investment plans accordingly.

There is a specific Article (the Article 8/1) in the "Principles for the Determination of Revenue Caps of the Transmission License Holders" stating that the TSO is allowed to request to increase the already approved revenue cap when a certain investment is deemed to be necessary for the security of supply of the transmission grid.

In terms of operational safety and reliability, a well-functioning SCADA system has utmost importance. BOTAŞ has a very powerful infrastructure for that purpose since it owns and operates a dedicated fibre optic telecom network laid down in parallel to transmission lines. Here come the concerns relating to the cyber security threat for the SCADA System which could be seen as a damage to the hardware, software or electronic data, as well as from disruption or misdirection of the services that the system provides. The same threat needs to be considered also for the control systems in the compressor stations and overall IT infrastructure of the company. A new article was added to the licensing regulation in 2017 requiring the transmission license holder to operate its industrial control systems and IT systems in accordance with the standards defined by ISO/IEC 27001 Information Security Management System. BOTAŞ has proceeded accordingly and obtained the certificate.

5.5.5 Ten Year Network Development Plans

The Article 22 of the 3rd Gas Directive states that, every year, transmission system operators should submit to the regulatory authority a ten-year network development plan, based on existing and forecast supply and demand after having consulted all the relevant stakeholders. That network development plan should contain efficient measures in order to guarantee the adequacy of the system and the security of supply. The regulatory authority should consult all actual or potential system users on the ten-year network development plan in an open and transparent manner. Persons or undertakings claiming to be potential system users may be required to substantiate such claims. The regulatory authority should publish the result of the consultation process, in particular possible needs for investments.

The regulatory authority should monitor and evaluate the implementation of the ten-year network development plan. In the case that the investment plan is not implemented, the regulatory authority is required to take at least one of the following measures to ensure that the investment in question is made.

(a) to require the transmission system operator to execute the investments in question;

(b) to organise a tender procedure open to any investors for the investment in question; or

(c) to oblige the transmission system operator to accept a capital increase to finance the necessary investments and allow independent investors to participate in the capital.

As stated above, the Regulation on Wholesale Market requires the TSO to prepare 10 Year Capacity Projection Plan which is based on the capacity demand forecasts of the shippers for long term informed to the Transporter. The Projection Plan, of course, should include the investment planning of the Transporter in parallel with capacity expansion requests. BOTAŞ has not published yet this plan through its web site.

Table 5.2–Recommendations on Key Issues in terms of Monitoring by the Regulatory Authority

Key issues	EU Practices	Turkey Practice	Recommendation
Reporting Obligations of the TSO	-NRAs should monitor supply and demand, transmission and distribution infrastructure, quality of service, cross-border trade, congestion management, investments, wholesale and consumer prices, market liquidity and environmental and efficiency improvements -TSOs should provide data and reports pertaining to their networks related with above stated issues -The NRA's should monitor compliance with and review the past performance of network security and reliability rules and set or approve the standards and requirements for quality of service. -Each update of the transmission tariffs should be accompanied by information indicating the reasons for the changes in their level. -TSOs prepares special reports for their efficiency performances for specific targets and those are published in their web sites	- No methodology is in place yet for the determination of the "Efficiency Parameter" and no special reporting by BOTAŞ to the EMRA relating to efficiency requirements and targets. -Other reporting requirements of BOTAŞ in terms of regulatory accounting are not detailed in the secondary legislation	- Preparation of a specific methodology by EMRA for the involvement ofthe "Efficiency Parameter" in gas transmission revenue allowance. Define special reportings by the TSO for the TSO accordingly. - Specify the "Regulatory Accounting Plan" for the TSO in the secondary legislation like the case for the DSOs.
Complaints	- Any party who is affected and who has a right to complain concerning a decision on methodologies and the Regulatory Authorities have a duty to consult -The TSOs and the remaining part of the undertaking do not use joint services, such as joint legal services, apart from purely administrative or IT functions.	- Transmission tariff derivation has limited transparency and no specific complaint handling procedure for tariff -BOTAŞ has not been unbundled yet and the legal services for the TSO department and trading department are not separated	The Natural Gas Market Law defines ownership unbundling for the TSO. Until the implementation of the of this provision of the Law an internal auditing procedure can be set out for the purpose.
Security of Supply	- NRA's to monitor the requirements of the Security of Supply regulation; Preventive Action Plans and Emergency Procedures in accordance with the regulation, - Technical capacity of the remaining infrastructure should be sufficient for total demand under N-1 scenario (disruption of the single largest gas supply infrastructure), - National regulatory authorities shall take into account the efficiently incurred costs of fulfilling the obligation for N-1 scenarios.	-No specific regulation similar to the EU Security of Supply regulation, -Even the TSO carries out N-1 scenario studies internally, no special reporting is required yet, -The TSO prepares 10 Year Network Capacity Projection Plan.	Preparation of a new regulation focusing onto security of supply which would cover the issues as the preparation of Preventive Action Plans, Emergency Plans, N-1 Scenario studies and investment plans accordingly by the TSO.
10 Year Network Development Plan	- Every year, TSOs should submit to the regulatory authority a ten-year network development plan, based on existing and forecast supply and demand, - The regulatory authorities should consult all actual or potential system users on the ten-year network development plan in an open and transparent manner, - The regulatory authority should publish the result of the consultation process, in particular possible needs for investments - The regulatory authority should monitor and evaluate the implementation of the ten-year network development plan. In the case that the	-The Regulation on Organised Wholesale Market requires the TSO prepare 10 Year capacity Projection Plan -The TSO has not published yet such plan through its web site	Amendment to the Regulation on Organised Wholesale Market which would require preparation and finalization of the 10 Year Capacity Projection Plan together with the associated investment plan of the TSO via a transparent procedure in consultation with the market stakeholders.

Key issues	EU Practices	Turkey Practice	Recommendation
	investment plan is not implemented, the regulatory authority is required to take measures.		

5.6 Identification of Data Requirements for Monitoring

For the application of an incentive-based transmission tariff it is important to identify the relevant data and reports to be prepared by the TSO. When preparing a methodology for the determination of "Efficiency Parameter", such study would be expected to include details relating to:

- Templates (Excell Worksheets) developed by EMRA for regulatory accounting;
- Templates developed by EMRA for the monitoring of certain performances of the TSO; and
- Performance and Output Reports by TSO relating to the realization of certain incentives and innovation targets.

The UK applications for gas transmission activities have been generally regarded as good reference by the other nations and the experience of the Ofgem is always respected. The table given below denotes the main data parameters defined by the UK Regulatory Authority - Ofgem relating to gas transmission tariff.

Table 5.3–The Data and Reports required by Ofgem under RIIO T1[74]

Finance	
	1.4 Reconciliation to Regulatory Accounts
	1.5 Net Debt, Interest & Tax Clawback
	1.6 Disposals
Totex	
	2.1 Provisional Price Control Financial Model (PCFM) inputs
	2.2 Totex forecast
	2.3 Forecast_allowances
	2.4 Published Totex
	2.5 Published Outputs
Opex	
	3.1 Opex summary - cash controllable costs
	3.2 Year on year movement in controllable costs
	3.3 Asset management opex
	3.4 Business support - group costs
	3.6 Business support - supplementary detail
	3.7 Operational training
	3.8 Total transmission salary and FTE numbers
	3.9 Analysis of excluded, consented and de minimus services
	3.10 Provisions
	3.11 Related party transactions
	3.12 Innovation Rollout Mechanism (IRM) expenditure
	3.13 Network Innovation Allowance (NIA) expenditure
	3.14 Network Innovation Competition (NIC) expenditure
	3.15 Physical security upgrade programme (PSUP) opex
	3.16 Quarry and other loss of development claims
Capex	
	4.1 Capex summary
	4.2 Project listing
	4.2a Asset health projects
	4.3 Capex unit cost

[74]Source Ofgem Document - RIIO-T1 Gas Transmission Price Control –Regulatory Instructions and Guidance: Version 6.2.

	4.4 Primary assets projects - compressor stations and pipelines
	4.4 Primary asset projects - compressor units
	4.5 TO Non operational capex
	4.6 SO capex
	4.7 N/A
	4.8 Physical security capex
Network data	
	5.1 System characteristics
	5.2 Activity indicators
	5.3 Utilisation and performance
	5.4 Demand and capability
	5.5 Compressor utilisation
	5.6 Environmental
	5.7 Asset data
	5.8 Forecast scenarios
Outputs	
	6.1 Customer satisfaction
	6.2 Business carbon footprint (BCF)
	6.3 Gas incremental capacity
	6.4 Gas constraints & TSS
	6.5 Physical capability of NTS connectees
	6.6 Condition & risk - entry points
	6.6 Condition & risk - exit points
	6.6 Condition & risk - compressors
	6.6 Condition & risk - pipelines
	6.6 Condition & risk - multijunction
System operator	
	7.1 Operating margins cost report
	7.2 NTS shrinkage incentive report (revenue)
	7.3 NTS shrinkage incentive report (prompt volume & price targets)
	7.4 NTS shrinkage (gas trades analysis)
	7.5 NTS shrinkage (electricity trades analysis)
	7.6 Residual gas balancing incentive report (overview)
	7.7 Residual gas balancing daily price incentive payments and daily linepack incentive payments
	7.8 Demand forecasting incentive report (overview)
	7.9 Demand forecasting day ahead incentive revenue and two to five day ahead incentive revenue
	7.10 Demand forecasting day ahead incentive: demand forecasting adjustment
	7.11 Greenhouse gas emissions incentive report (incentive revenue)
	7.12 Greenhouse gas emissions venting data
	7.13 Maintenance incentive report

NGGT is required to submit a commentary alongside its templates. The main purpose of the commentary is to:

- provide an executive summary of performance and detail of the drivers behind it, covering totex performance and outputs (the SPO).

- provide a summary of the key outputs NGGT has delivered during the year and set them in context of the delivery of overall RIIO-T1 price control outputs. This should include a forecast out to the end of the price control. The commentary should explain the reasons for any material differences between the planned

- price control and actual/forecast performance, and any differences in movement of forecasts from the previous year.
- provide an appropriate narrative that explains the reasons for actual/forecast spend and workload and the material differences between allowances and NGGT's actual spend.
- The appropriateness and materiality of the commentary provided should be at a level that avoids the need for Ofgem to ask supplementary questions.

Requirements for the commentary

The below list of requirements shows the minimum content that NGGT should provide. In some areas there may be nothing to report in a given year. Where this is the case, NGGT should state this.

- Table-by-table comments and any further explanation of significant movement in the information, including:
  - Outputs – narrative on the outputs achieved in the year; discussion of secondary outputs; whether NGGT believes it will achieve the required outputs at the end of RIIO period; if not, why not.
  - Costs – narrative on the cost movements in the year. This may be done table-by-table.
  - Project Workload – narrative about changes in workload, impacts on business now and in the future.
  - Uncertainties – a critical assessment of how uncertainties may affect performance in the future and project delivery.
  - Excluded services - how the costs reported have been calculated. Any difference between reported revenue and that in the Revenue Return Pack.
  - Allocation methodology – any changes to the submitted methodology and the rationale for any changes.
- Real price effects – NGGT's view of the real price effects it has faced in the year and may face in the future. This will only be included by exception when significant changes are being experienced or forecast.
- Benchmarking / performance improvement / efficiencies – details of what NGGT has undertaken in the year or proposes for the future. This will only be reported where significant activity has been undertaken.
- Commentary on updated forecast investment and output delivery.

In developing the performance monitoring framework, the first task was to identify and define the key performance areas. In the report under Task 1.1, those new areas where efficiency related performance indicators are to be defined was recommended as follows.

- Reliability and availability,
- Critical Maintenance,
- New commercial arrangements to facilitate trading,
- Environment,
- Safety.

Efficiency in specified OPEX items (Cost Efficiency) can be added to above categories for the track of certain efficiency indicators like the amount of fuel gas burned in compressor stations.

The table given below shows the proposed categories, their sub items, the monitoring type and potential data sources related with the proposed incentives.

Table 5.4–Potential Data Sources for the Proposed Incentives

Category	Incentive	Performance Criteria	Performance Area	Monitoring Type	Sources
Cost Efficiency	Own Use Gas	Reducing the amount used by the Transporter	Efficiency in OPEX	Benchmark with past data with similar conditions	SCADA System Logs of the TSO
	Unaccounted for Gas	Decreasing the percentage with respect to annual throughput	Cap, typically 0,5 %	Tracking regularly	Regular reports by the TSO for UAG calculations
Critical Maintenance	Maintenance	Timely implementation of critical maintenance (like smart pigging, compressor overhauls)	Not delayed critical maintenance	Tracking; Comparing the Planned dates and actual implementation	TSO Reporting
Reliability and Availability	Maintenance	Reducing the number of planned maintenance works that require capacity reduction	Minimum capacity reduction due to planned maintenance	Tracking; the amount of reduced capacity due to planned maintenance	The announcements of the TSO through the EBT
	Service Interruptions (shortfalls)	Shortfalls attributed to TSO defaults	Minimum shortfalls in gas transport obligations	Tracking; Amount of Service Interruption Fee paid by the Transporter	The invoices of the TSO
	Compressor Stations Outages	Reducing the outages arising from operational defaults and line pack level reductions	Minimum compressor station outages	Tracking; Number of outages recorded	The SCADA system logs of the TSO
Environmental	Vented Gas	Reducing the vented amount (recorded in the compressor stations)	Reduced amount of vented gas in each compressor station	Benchmarking with past data in each compressor station	SCADA System Logs specific for each compressor station
Commercial Arrangements	Demand Forecasts	Successful day ahead demand forecasts by the Transporter	Accuracy of the forecasted demands by the TSO	Tracking for specified Cap	The EBT and the STP
	The cost of the OUG	Unit average price of the Own Use Gas paid by the Transporter	Low unit cost of the OUG	Benchmarking with the average Daily Reference Gas price in Turkish Gas Market	The STP

5.7 Guidelines for Harmonization and Data Standardisation for Monitoring

Taking into account the actual case in Turkey that the national gas transmission system is being operated by a single TSO, such guideline would be considered as not applicable for gas transmission activity monitoring by EMRA. The SCADA system of BOTAŞ has on line access to all exit points measurement data. Although those exit points interface with different distribution companies, the technical norms for the measurement systems and their data transfers to BOTAŞ SCADA system are standardised by BOTAŞ.

The reliability of the data submitted from BOTAŞ becomes the subject matter since the options for cross checking of such data are either very limited or non-exist at all. In determining the "Efficiency Parameter" for gas transmission tariff of a certain year, the TSO's special annual reporting for the incentives set by EMRA would be providing most of the required data and some measures need to be taken into consideration for the reliability of those reports. Such measures are actually very much related with internal check or audit mechanisms to be applied by BOTAŞ (TSO).

Those mechanisms should ensure the integrity, accuracy, continuity, and completeness of data and the data should be kept up-to-date. Before submitting the data to the regulator, data assurance activities to be structured with the consecutive phases, Planning, Review and Sign-Off.

Accessing to the Gas Transmission SCADA System would provide EMRA with a very useful instrument for monitoring the activities of the TSO and verifying the special data submitted by the TSO as per EMRA requirement. Since the system has utmost importance in term of security of supply and regarded as critical infrastructure, strong measures need to be taken in order to prevent third party intrusion and cyber attacks. Other than providing gas flow data all throughout the gas transmission network, the system may also provide EMRA with detailed information related with gas transmission network assets by integrating a Geographical Information System. Such access of EMRA to the SCADA System can be set as a completely passive monitoring mode in order to avoid interventions. Similar approach can be followed for EMRA's access to the STP.

As a special case regarding the interconnections at the EU borders, adaptation by the TSO for the use of edig@s protocol for nomination process might be a step to be taken by the TSO in terms of standardisation.

5.8 Proposed Amendment Options for Secondary Legislations Regarding Data Submission Procedures

Suggested amendment options for each secondary legislative document and the BOTAŞ Network Code are listed down. Beside of those proposed amendments, there is a special issue of yet unbundled status of BOTAŞ where EMRA would consider to take certain action in order to enhance confidence for non-discriminatory approach of the TSO (BOTAŞ Gas Transmission Division). This might seem at first related with the market monitoring duty of EMRA but it might be useful as well to help EMRA in distinguishing gas transmission specific expenditures of BOTAŞ. Currently, there is no specific provision in the secondary legislation regarding the matter. The ŞİD itself includes a specific Articles in Part I, Section A reading that:

5.1. The Natural Gas transmission activities to be performed by the Transporter shall be carried out independently from the other activities of BOTAŞ, particularly from Natural Gas wholesale/import/export activities.

5.2. BOTAŞ shall apply the same transmission and dispatch control prices to all Shippers as those applied to its own Natural Gas wholesale/import/export activities.

There are also relevant clauses in Part 24 – Temporary Provisions section which read

24.1 Until BOTAŞ is restructured as a horizontally integrated legal entity pursuant to Provisional Article 2 of the Law;

24.1.2 BOTAŞ shall accept that the department carrying out gas transmission activities shall regard the Natural Gas import/wholesale and sales/export departments as any other Shipper. Within this context, the departments of BOTAŞ performing Natural Gas import/wholesale and sales/export shall be subject to the provisions of the ŞİD, except for awarding STC and Delivery Contract, the financial liabilities of Shippers and Transporter to each other. BOTAŞ shall apply the same prices and fees that are applied to other Shippers within the context of the ŞİD also for its own import/wholesale/export activities.

Although as per the requirement of Natural Gas Market Law, BOTAŞ should has been unbundled by 2009, this has not been realized and yet there is no clear road map for the required restructuring for BOTAŞ. In that sense, in order to sustain the confidence of other market players for non discriminatory approach of the TSO, there can be added some provision to the Temporary Provisions section of the ŞİD which would further enhance the intention. Defining an internal auditing mechanism for this purpose would be an option. As it was the case in other country examples

during the phase of unbundling, assignment of an "Compliance Officer" within BOTAŞ organisation dedicated for this purpose could also be considered. Such officer may be authorised with sufficient power to check for the proper cost allocations relating to each licensed activity of BOTAŞ and non discriminatory approach of the TSO, especially in the case of congestion managements. The Officer may act as a authorised body within BOTAŞ organisation to handle the complaints from the Shippers against the TSO.

In light of all above stated, the other proposed amendments are stated below.

The Regulation on the Notifications:

The notification table for the licensees in gas sector can be updated to detail the data requirements from the TSO.

Principles and Procedures for Determining the Revenue Caps to be taken as basis to the Tariffs of natural Gas Transmission License Holding Companies:

The document can be revised by specifying the "Regulatory Accounting Plan" for the TSO like the case for the DSOs.

In parallel to preparation of the specific methodology for establishing the "Efficiency Parameter", a guidelines document needs to be prepared by EMRA for the preparation of special reports and data by the TSO under such performance basis application.

Determination of Methodologies for the specified implementation period for the transmission and shipping tariffs of BOTAŞ:

Transparency could be provided for the market players in terms of transmission tariff derivation and a consultation process might take place prior to release of each methodology by EMRA.

Regulation on Organised Wholesale Market:

The regulation can be amended to require the preparation and finalization of the 10 Year Capacity Projection Plan together with the associated investment plan of the TSO through a transparent procedure in consultation with the market stakeholders. Such consultation process would provide the TSO with the most updated information related with the capacity expansion expectations from the market players. On the other side, it would assist EMRA in further evaluating the rationale behind the planned investments of the TSO.

BOTAŞ Network Code:

The Nominations section of the ŞİD can be amended to allow the use of edig@s protocol for nomination processes at the interconnections with the EU (ie the interconnections with Greek and Bulgarian TSOs).

The articles related with the functionalities of the EBB would be further defined to provide a secondary capacity trading platform for the Shippers among themselves.

Use of similar reference conditions to the EU norms for gas measurement together with the reference conditions already applied for Turkey could be adopted and this would be applied as limited to the interconnection points with the EU countries. Similar approach can be applied for capacity booking unit terms.

Respecting the confidentiality terms of the arrangements with the interconnected systems, the TSO may provide certain transparency related with the interconnection agreements through the EBT. In parallel to the applications in the EU, below stated additional information would be published by the TSO through the EBT.

- Information related to the determination of the revenues and to the derivation of different transmission and non-transmission tariffs,
- Business rules, part of Interconnection Agreements
- Actual physical flows at the Entry and Exit Points (on line data from SCADA)
- Information on secondary trading
- Harmonized conditions for secondary capacity transactions
- Information on the aggregated amounts of capacities offered and contracted on secondary market
- Technical capacity calculation methodology - National Gas Transmission Network
- Methodology on converting measured natural gas quantities from volume units into energy units

(New) Security of Supply Regulation:

In parallel to the application of the Security Supply Directive in the EU, a new regulation focusing on the security of supply in gas market can be prepared and published by EMRA.The new regulation would focus onto the security of supply which would cover the issues as the preparation of Preventive Action Plans, Emergency Plans, N-1 Scenario studies and investment plans accordingly by the TSO. A special “Gas Emergency Plan” can be integrated with such a regulation and such plan would set out an action plan on the occurrence of extreme gaps between the supply and demand due to supply disruptions and/or infrastructure failures. The plan could be decided to be put into application on the occurrence of certain supply demand gaps for a certain duration (or when it is so decided by EMRA) that application of the ŞİD provisions would not be proper for the management of such emergency case. Such a scenario would also come on board in the case of a need for extremely increased electricity production out of gas fired power plants on certain day. The responsibilities of the parties including the payment obligations between the Transporter and Shippers need to be redefined during the application of such Gas Emergency Plan.

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