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Task-1: Improvement of Performance- based Tariff Setting for Transmission and Distribution System Operations at Turkish Electricity and Natural Gas Markets

Activity 1.2 Final Report

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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 Energia Reti 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 Assessment Framework
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 Energia Eléctrica - 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
EMRA	Energy Market Regulatory Authority (EPDK)
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	Liquefied Natural Gas
LP	Low Pressure
LV	Low Voltage
MAR	Market to Asset Ratios



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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



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XML
YTBC

Extensible Markup Language
Load Dispatching Information System





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1 Introduction

Princeton Center for Data, Analytics and Reporting¹ identifies data model as the model, that organizes data elements and standardizes how the data elements relate to one another, where any data unit is defined as a data element. Because a data model explicitly determines the structure of data, sometimes it can be stated as a data structure.

Data model creating is the process of designing databases according to the business requirements, because the data needed are created by the business processes. After data requirements are defined, entities are identified. Then, details to each entity are determined, as their names, types and their relationships - associations, inheritance, aggregation, composition, and dependency-, especially from functional requirements. It is essential to get the level of detail right, because it has a significant impact on the usage of database and its maintenance. Also, any additional information from business requirements which could affect the design are noted.

An organization should have standards and guidelines applicable to data modelling which lowers the harmonization efforts to minimum.

An entity should depict one concept, if it would have corresponded two concepts, or two entities would have corresponded one concept, modelling those entities would become confusing and the same information are stored in several places. By depicting only one concept, data redundancy can be avoided and the possibility of having inconsistent data is reduced.

In addition, data modelling is an iterative and incremental process, so the systematic feedbacks from stakeholders are needed to have a data model that is fit to business requirements.

This report deals with Data Requirements and Harmonization and Standardization of Data. Three key activities are foreseen within the scope of this subtask that are:

- Identification of data requirements necessary for the proposed performance-based tariff structure.
- Guidelines for harmonization and standardization of the data coming from different sources to make them possible to be used in the tariff calculations.
- Preparation of amendment options for relevant secondary legislations regarding data submission procedures necessary to fulfil the identified data requirements.

In this regard, report is divided into four chapters, namely electricity-distribution, electricity-transmission, gas-distribution and gas-transmission, where each activity is analysed; as a summary for some chosen countries and in more detail for Turkey.

In addition, for the proposed tariff methodology stated in the Task 1.1 report, the already collected and additional required data are presented and discussed.

¹ Source: <https://cedar.princeton.edu/understanding-data/what-data-model>



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2 Harmonization and Standardization of Data and Monitoring Rules - General Overview

Data and information play an increasingly important role for all organisations and their business processes. Data harmonization and standardization is an approach to data quality, and it improves the governance and usefulness of data across companies & institutions. Standardisation allows organisations to re-use and improve upon components and building blocks, improving governance of systems and implementations. On the other hand, data harmonization brings together data of varying file formats, naming conventions, and columns, and transforms it into one cohesive data set. Data quality is improved by taking data from disparate sources, clearing away any misleading, inaccurate or inconsistent items, and finally “harmony” between different sources of data is created for a complete, cohesive picture.

In general, similar procedures are applied in terms of data collection and dissemination of information at the final stage.

For instance, Eurostat defines the general methodology for organization of data and statistical process as follows²:

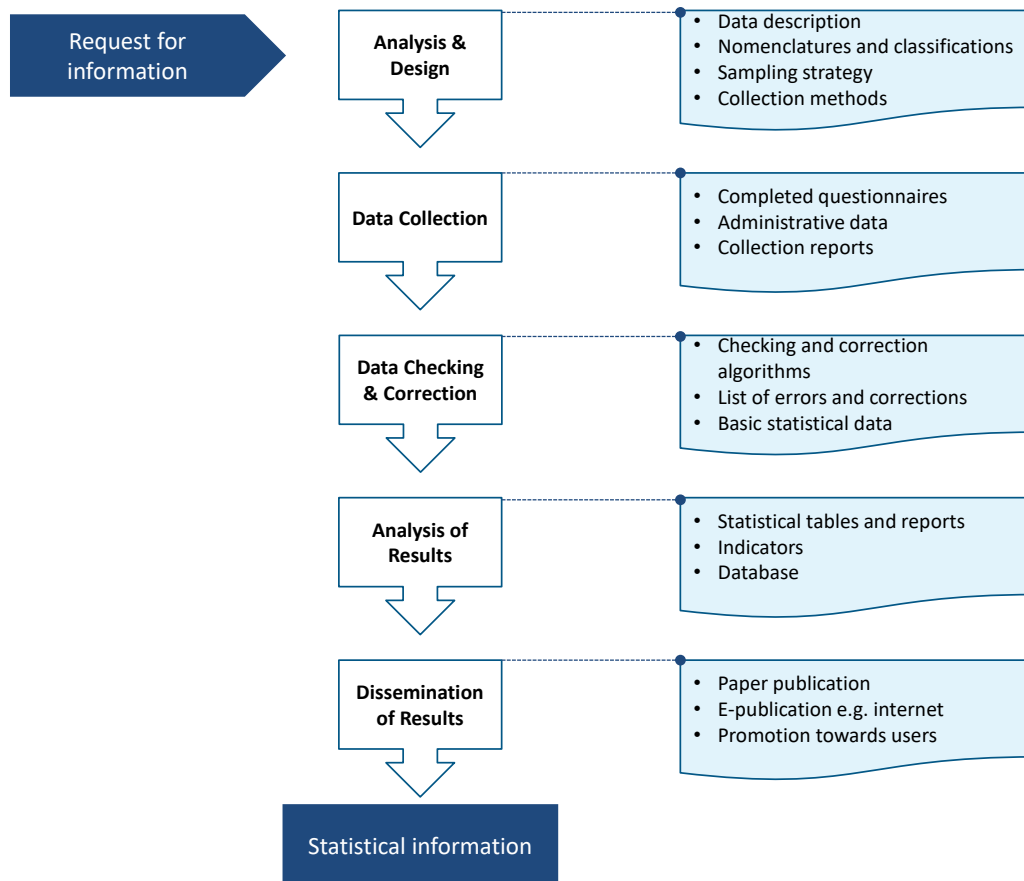


Figure 2.1 – Organization of Data and Statistical Process

Data checking and correction step stated in the above figure might be linked with data quality. ISO 8000-8 defines three categories for data quality measurements that are:

- Syntactic quality: the degree to which data conforms to its specified syntax, i.e. requirements stated by the metadata (e.g. data types, legal values, business vocabulary, any defined business rules)
- Semantic quality: the degree to which data corresponds to what it represents, i.e. if a passenger list shows 162 passengers, there should also be exactly 162 passengers in the actual real world situation

² Source: <https://ec.europa.eu/eurostat/documents/3859598/5926413/KS-RA-13-002-EN.PDF/69c1a2d4-335e-4579-bc7b-42db1c691ae2>



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- Pragmatic quality: the degree to which data is suitable and useful for a particular purpose. It validates data users' perceptions of fitness for purpose.

Syntactic and semantic measures are related to data quality verifications, which is the evaluation of whether or not a product, service or system complies with a requirement, regulation, specification or imposed condition. On the other hand pragmatic measurements are related to data quality validations which is the assurance that a product, service or system meets the needs of the customer and other identified stakeholders.

It is generally recommended to make an initial evaluation corresponding to consequences in the first step and then generating risk matrixes for data quality related risks.

Similar to many other sectors, data harmonization and standardization becomes more important in energy sector since different types of unstructured data or data in varying formats are pouring in from sensors, online, and traditional databases from different market players.

ACER describes the business validation rules applicable for the reporting of trade data in energy sector as follows (described in the **ACER Technical Specifications** for Registered Reporting Mechanisms-RRMs)³:

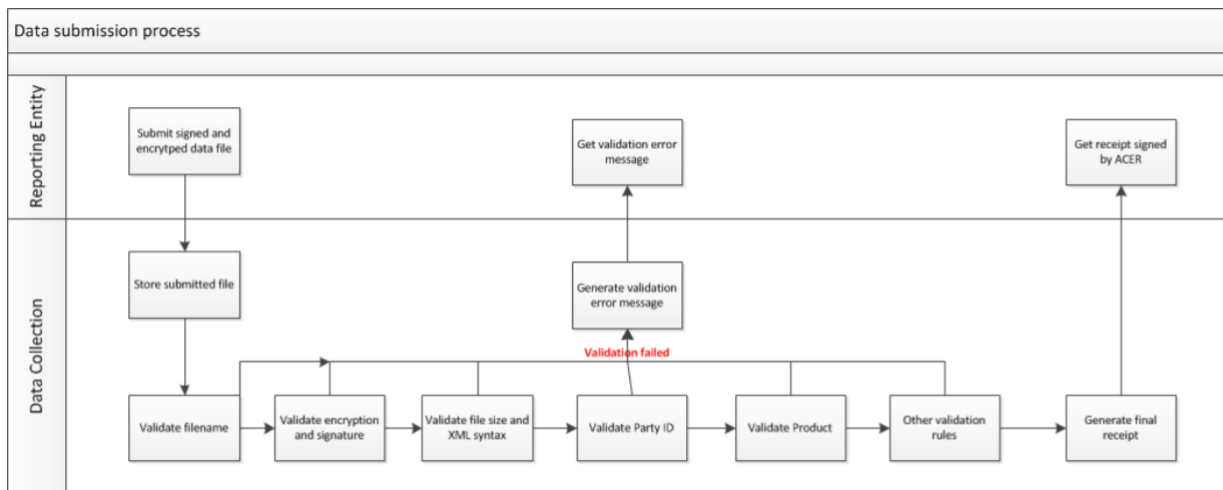


Figure 2.2 – Business Validation Rules for Trade Data

It can be seen from the figure that data validation is a significant components of data collection process.

Norway at a Glance

As mentioned in previous reports, in Norway, NVE is responsible for ensuring that network operators, generators and power suppliers act in accordance with the Energy Act and underlying regulations. Efficient regulation is dependent on high quality of data, and compliance monitoring is a necessity in achieving that. NVE uses data collection and control to verify whether network operators are acting in compliance with laws and regulations. In addition, NVE carries out inspections and data analyses, and conducts thematic supervisions.

The revenue caps are based on data collected from network operators. There are two main annual data collections that are:

- The Economic and Technical Report (via eRapp system) that provides economic data for both the cost base and cost norm, as well as technical data for the local distribution grid operators
- The TEK-report that provides the technical data to calculate the correct revenue cap for the regional distribution grid operators.

³ Source: https://documents.acer-remit.eu/wp-content/uploads/ACER_REMIT_MoP-on-data-reporting_V6.pdf



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eRapp - Economic and Technical Report

- All licensees are required to complete required information using web-based reporting system, eRapp. eRapp was first used in 2001, but submission of economic and technical reports in electronic formats has been an annual requirement since 1993.
- The network operators report information regarding company ownership, income statement, balance, transferred volume and revenues, excess and deficit revenues, R&D costs, cost of transmission services, cost of salaries and pensions, other operating expenses, depreciations on assets, principles for allocation of common costs and assets, investments, cost of energy not supplied (CENS), number of km of lines and cables, transformers, meters and more. Data is reported as a company total as well as for the individual business areas: electricity sales, power production, transmission, regional distribution, local distribution, telecom business and other activities.
- To prevent errors, there are *200 automatic checkpoints in eRapp*. These automatic controls check for continuity, incoherence, logical flaws and lack of explanations in the report.
- The system also requires an *auditor control*. The auditor has to complete a checklist and comment on any discrepancies, before approving the report and transferring it to NVE. NVE then runs through a set list of checkpoints. The manual checklist changes somewhat on an annual basis, but consists of approximately 40 checkpoints. NVE's manual control of all of the network operators takes roughly five months to complete.

TEK – Technical report for regional distribution assets

- All transmission and regional distribution grid operators must report all changes in TEK-data since 2005.
- TEK contains information about the number of grid km (overhead lines, underground cables and submarine cables), voltage level, material selection, grid interface, number of transformers and their performance, percentage of ownership and operational responsibilities, etc.
- The network operators must confirm the TEK-data even if no changes have been made during the past year. When the TEK reports are received, NVE checks each individual amendment to ensure the data is correct.

Regulation on Wholesale Energy Market Integrity and Transparency (REMIT)⁴

Pursuant to Article 8 of REMIT, the Agency for the Cooperation of Energy Regulators (ACER) shall collect the data for assessing and monitoring wholesale energy markets, develop technical and organisational requirements for submitting data in order to ensure efficient, effective and safe exchange and handling of information and it shall take all necessary measures to prevent any misuse of, and unauthorised access to, the information maintained in its systems.

For this purpose, ACER developed and published Requirements for the registration of Registered Reporting Mechanisms (RRMs). ACER uses ARIS as REMIT Information System.

There are two levels of data validation, an initial data validation performed on a technical level as part of the initial data quality checks from Tier 1 and a further in-depth analysis performed at the level of Tier 2 where integrity checks across data and reporting is performed. Data validation rules that will be used by ACER to ensure the data quality provided by RRM are grouped as:

- Technical data quality validation
- Functional data quality validation
- Data corrections validation
- Validation of late reported transaction data

Failure of the validation is handled in three ways:

⁴ Source: ACER, 2018, Agency's REMIT Information System Data Validation.



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Rejection of an Invalid Data Set

If an invalid data set is provided, i.e. the data is technically non-compliant with the specified data format and therefore can't be interpreted by the system, the data set is archived and a notification of rejection for the entire data set is sent to the RRM.

Rejection of an Invalid Record

If an invalid record is rejected, it will be archived and a notification of rejection for that particular record is sent to the RRM. Invalid records should be shared with NRAs if they can be allocated to the respective NRAs according to the rules laid down in the data sharing agreement.

Flagging of a Record with warning message

A record that does not overcome specific validation rules can be flagged in the database with a warning message. The flag contains a reference to the relevant validation rule so that the flag of a record is comprehensible. The record is not considered invalid and no error notification is sent to the RRM.

Validation types are as follows:

1. Technical Data Validation (Each report can be technically validated against the schema defined for the data type and technically against the data contained within the supplied report.)

File Naming Convention Validation

- ✓ File Name Component Check
- ✓ Date Format Check
- ✓ Schema Name Check
- ✓ Valid Schema Version Check
- ✓ Party Identifier Check
- ✓ Sequence Number Check

Signature and Encryption Validation

- ✓ Valid Encryption Type
- ✓ Data can be decrypted
- ✓ Signature Matches Participant

Data Duplication Checks in a Single File

- ✓ Standard / Supply Contract Duplicates Check
- ✓ Transportation Contract Duplicates Check
- ✓ Fundamental Data Duplicates Check

Schema Compliance Validation

Database Schema Compliance

2. Standard Contract Functional Data Validation (The following detailed validation checks will be applied to transactions on standard contracts only, i.e. any contract which is traded through an organised market place, an exchange venue or through registered channels on a contract which is recognised and registered with ACER.)

Field Integrity Compliance

- ✓ Transaction Identification
- ✓ Party Identifier Validation
- ✓ Embedded Contract Integrity

Sequencing and Logical Data Compliance

- ✓ Organised Market Place (EXC) Sequencing Data Compliance
- ✓ Organised Market Place (EXC) Logical Data Compliance
- ✓ Organised Market Place (BRK) Sequence Data Compliance
- ✓ Organised Market Place (BRK) Logical Data Compliance
- ✓ Auction Sequence Data Compliance
- ✓ Auction Logical Data Compliance
- ✓ Non-Venue / Off Market or Bilateral Sequence Data Compliance
- ✓ Non-Venue / Off Market or Bilateral Logical Data Compliance

Functional Data Quality Compliance

- ✓ Valid Price Validation

Double Reporting Validation Checks

3. Non-Standard Contract Functional Data Validation: Non-standard contracts have a more limited validation set than that of standard contracts.

Field Integrity Compliance

- ✓ Delivery Product Validation
- ✓ Participant Code Validation
- ✓ Contract Identification Validation
- ✓ Delivery Profile Validation

Functional Data Quality Compliance

- ✓ Counterparty Identification
- ✓ Matching Transaction Identifier



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4. Transportation Contract Functional Data Validation: Transportation contracts have a more limited validation set than that of standard contracts.

Field Integrity Compliance

- ✓ Delivery Product Validation
- ✓ Participant Code Validation
- ✓ Contract Identification Validation
- ✓ Delivery Profile Validation

Functional Data Quality Compliance

- ✓ Counterparty Identification
- ✓ Matching Transaction Identifier

5. Fundamental Data Functional Data Validation: Fundamental data has several unique types, but has several underlying requirements for the representation and understanding of the data.

Field Integrity Compliance

- ✓ Participant Code Validation
- ✓ Time Period Validation

Fundamental Field Data Validation

- ✓ Valid EIC Code Format
- ✓ Valid EIC Codes Received
- ✓ No Duplicated Time Series

Functional Data Quality Compliance

- ✓ Geographical Location Representation Validation
- ✓ Fundamental Data Type Validation

Fundamental Field Level Validation

- ✓ Reporting entity ID

6. Data Correction Validation: There are additional validation checks that will be performed when data is submitted as correction to existing data. These validations only apply if a RRM has received notification that some of the data that they reported are invalid and must be corrected.

7. Late Report Transaction Validation: Those are the additional checks, on top of those performed for technical data validation and functional validation, for transactions which are reported late. This applies to any transactional report that is submitted for a date outside of the reporting window for reporting transactions. It includes Duplicate Reporting Transaction Validation and Transaction Linking Validation.

2.1 Data Harmonization and Standardization and Guideline for Monitoring

In order to access quality data, harmonization and research protocols are established that support the Regulatory Authorities' goals and objectives. General procedure to collect data and store data/disseminate results might be defined as follows:

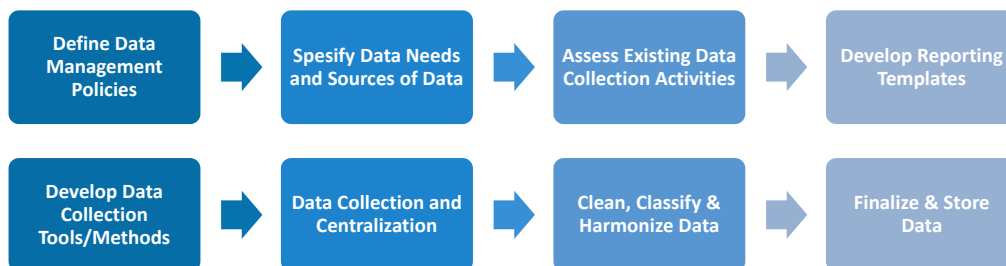


Figure 2.3 – Data Collection and Dissemination Steps

In terms of harmonization and data integration, data quality will be explained in more detail in the following steps.



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Step 1: Define Data Management Policies

Data management policies should be defined according to the data governance management by organizations. Such policies cover a wide range of aspects like organisation and management, responsibilities of relevant departments, data quality control, control and maintenance of the system. Data protection requirement prescribed by Turkish Personal Data Protection Law should be obeyed since distribution companies collect personal data. Thus, the requirements in the relevant data protection laws and regulations related to personal information security shall be followed.

Step 2: Define Data Needs and Sources of Data

Data to be collected for analysis, relevant sources of micro data for collection and the acquiring of data to form data sets are identified. Data will be mainly collected from all licensees acting in the electricity sector as well as other related institutions acting in the electricity sector such as EPIAS. In addition surveys might be sent to licensees or end-users of electricity to measure customer satisfaction etc.

Standard terminology and definitions shall be used during the process of defining data needs and data gathering because the same technology or terminology, even when referring to the same concepts is not always used. On the other hand, the meaning of a data element shall be addressed since the identical meaning of different words can be understood by human beings but not by different computer applications built on different platforms. Without reconciling different data elements of identical meaning, electronic sharing and integration of data becomes complex and costly.

Data required from electricity distribution and retail sales companies are listed in Annex I.

Step 3: Assess Existing Data Collection Activities

All organisations that may already be collecting data like utilities, institutions or associations shall be analyzed to see what data is already being collected. This would help to compare and cross-check the data published by different institutions. In addition, data already collected by other institutions might be utilized for analysis too.

Step 4: Develop Reporting Templates

Internationally agreed definitions, IDs (e.g. ENTSO-e codes), boundaries and units for energy statistics shall be used to the maximum. In addition, standard templates for reporting shall be used and they shall cover major priorities in sufficient detail. At present report templates are provided via EBIS.

Step 5: Develop Data Collection Tools/Methods

In line with the Energy Markets Notification Regulation published in the Official Gazette dated 27th May 2014, and number 29012, all of the licensees that has notification responsibility have to submit related data via EMRA Notification System (EBIS). There are three channels to log in to the system that are

- Electronic signature
- Mobile signature
- E-devlet

File including the data is submitted in .xlsx format. Excel file to be uploaded to the system shall be in the form of the template defined in the system.

Data can also be collected through surveys. In addition, estimation methods might also be used to generate data required.

To summarize, in order to make the data usable now and in the future, it is essential that at the point of data collection, the source, methodology, timescale and scope are specified.



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Step 6: Data Collection and Centralization

Extract, transform and load operations are used to get the data all in one place. These are three database operations responsible for actually moving the data into a common database. Extraction reads the data in the original database, transformation changes the format so it's ready for querying and analysis, while loading writes the data to their destination database. To harmonize the data, platform used needs to have a data model that blends the data together.

Step 7: Clean, Classify and Harmonize Data

This step is linked with data quality and validation. The data cleaning process consists of identifying incorrect, inaccurate, inconsistent, broken or erroneous parts of the data and modifying, correcting or moving them. Classifications are the field names in the data that help segmenting the data, filter it and drill in or zoom out, and these names should be made the same since they describe the data and refer to the same concepts. This is done in order to improve Data Quality and produce a clean, uniform, and consistent data set for harmonization which makes the fundamental aspects of data all the same.

Validation is the process of checking data quality and, where possible, working with the providers of the data to make improvements and clarifications. Various controls and procedures have to be implemented to collect data with sufficient quality and to provide integrity such as:

- All files must comply with the file naming convention
- All data must be correctly formatted in accordance with the template prepared for the data type being submitted
- All data must be correctly signed and encrypted in accordance with the secure data exchange protocols.

If the data submitted to EMRA's data collection system complies with technical requirements, content validation shall be performed based on a set of pre-defined business rules. Data that does not pass the validation process or for which the integrity cannot be confirmed shall be marked as invalid, flagged with a warning message or rejected. A receipt might be generated and provided to the reporting party with an error message describing the reason for failure.

EMRA might request additional information or resubmission of the information, following or before validation of the data.

It shall also be noted that data quality is not only related with the system of the Regulatory Authority. In the first phase licensees should take the responsibility for the integrity and assurance of the data they collect and submit to EMRA. They must meet the specified standards when reporting data to EMRA in terms of the submission of reports and their content. To ensure accuracy and completeness, reporting entities must have appropriate systems and controls in place to enable them to comply with their regulatory obligations. Licensees' reporting shall contain the required information and they must provide the data in the correct format. Data integrity shall be ensured by a digital signature of the reports sent to EMRA (e.g. via EBIS).

In the Energy Market Notifications Regulation (Regulation) Article 7/6, it is stated that for the incorrect notifications EML article 16 (Sanctions) is applied. In the EML Article 1/a it is stated that if the required data of the EMRA is submitted incorrect or missing, the DSOs are warned and given 15 days to correct the data. In contrary to the warning letter if the data quality is not satisfied 888.397 TL punishment is applied to the company⁵.

With the data assurance activities, EMRA will aim to reduce the risk of inaccurate, incomplete or misreporting submissions. Data assurance activity of a data should be proportionate to the importance of the data. Therefore, impact of the submitted data should be evaluated and classified by its importance. For this reason, all Risk Assessment of the submitted data should be conducted. Secondly, data assurance activities related to the risk level

⁵ For 2019. Each year the punishment is increased by revaluation ratio.



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should be implemented. Within the scope of the risk assessment and data assurance activities, methodology of Ofgem might be taken as a base, as described in Annex 6 in more detail.

Quality Check

A quality check is run on the data to make sure it has maintained an acceptable level of integrity and validity. Mainly duplicated data entry, inconsistent, or inapplicable data are controlled.

Data validation and editing is an essential process for assuring the quality of the collected data. It is the systematic examination of data collected from respondents for identifying and eventually modifying inadmissible, inconsistent and highly questionable or improbable values according to predetermined rules. Therefore, validation criteria that clearly and systematically confirm whether or not the data satisfy the requirements shall be defined. On the other hand, to prevent out-of-range responses and inconsistencies, appropriate response ranges might be defined.

There are mainly 7 dimensions of data validity that has to be followed and some example metrics are provided:

- Accuracy
 - o each value shall fall within an allowed set of values,
 - o each value shall fall between maximum and minimum levels,
 - o only numbers are allowed for data such as installed capacity, generation etc.,
 - o each value shall conform to the defined level of precision,
 - o licensees full name must include at least one space and no figures allowed,
 - o only first letters must be capitalized.
- Completeness
 - o data shall be presented in required fields,
 - o licensees full name must not be N/A.
- Consistency
 - o data shall be used in the same way across EMRA, MENR or Licensees,
 - o totals can be checked,
 - o comparison with the same period of the previous year and the previous period can be made,
 - o sequence that must follow each other can be controlled.
- Currency
 - o data shall be up to date.
- Integrity
 - o data elements shall be uniquely identified.
- Conformity
 - o data elements shall be stored as assigned data types,
 - o text is not stored in a telephone number field.
- Duplication
 - o duplicate records shall not exist.

Data Quality Tools

Gartner names the following categories as data quality tools:

- Parsing and standardization tools: break the data into components and bring them to a unified format.
- Cleaning tools: remove incorrect or duplicated data entries or modify the values to meet certain rules and standards.
- Matching tools: integrate or merge closely related data records.
- Profiling tools: gather stats about data and later use it for data quality assessment.
- Monitoring tools: control the status-quo of data quality.
- Enrichment tools: bring in external data and integrate it into the existing data.

It shall be decided what tool to be used. One or a combination of those tools might be used following a detailed technical analysis.



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Step 8: Finalize and Store Data

The data is processed, converted to a common format where needed, and pooled. Metadata (information about the data, like where it came from, what year and area it covers) is very important as it allows to use the data in the future and be more confident about the quality of the data. Data can be stored for use as needed such as generation of periodic reports on energy markets or monitoring the activities of the licensees.

Data that has been harmonized is not static; it can be updated, either periodically or in real time to ensure that it is of use for each problem. Usually it is necessary to ask more questions about the data if:

- There seem to be errors in the data or data is missing
- The data provider has not given all the information on the data (e.g. units are missing)



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3 Electricity Distribution

3.1 International Benchmarks

3.1.1 Germany⁶

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. In order to determine the revenue caps, the regulatory authority collects the necessary data from the network operators in perspective as follows:

- to carry out the determination of the initial level of the upper revenue limit and the capital cost deduction,
- to determine the general sectoral productivity factor,
- to determine the efficiency values,
- to determine the quality element,
- to carry out efficiency comparisons and relative reference network analysis.

Hereof, the network operators are obliged to provide information, or the regulatory authority determines the necessary facts in particular to adjust the revenue ceiling, to design the expansion factor, to determine the adjusted efficiency values and the individual efficiency requirements, to the requirements for the reports on investment behaviour, and to approve investment measures.

In accordance with the Ordinance on Incentive Regulation of Energy Supply Networks, in terms of tariff determination, the network operators inform the regulatory authority about:

- the adjustments to the revenue ceilings and the changes underlying the adjustments to cost portions that cannot be influenced in each case, on January 1st of the calendar year,
- the data necessary to check the network charges,
- the adjustment of the network charges due to changed revenue caps annually on January 1st,
- deviations from the key figure specifications,
- investments actually made and their cost-effectiveness in the regulatory period for exhausting the flat-rate investment surcharge applied for and the transfer of networks, network mergers and splits, in particular the transfer or addition of revenue caps
- the transfer of network operations if there has been a change in the responsible network operator.

The network operators must also notify the Federal Network Agency and the responsible state regulatory authority annually as of March 31st of the number of customers directly or indirectly connected on December 31st of the previous year as well as the situation of the electricity and gas distribution network in relation to the federal states.

For the purpose of achieve efficient network access and the purposes, the regulatory authority can make decisions by specifying or approving data in perspective as follows:

- on the revenue ceilings, in particular on the determination of the amount, on the adjustment, on the form and content of the requests for adjustment,
- for the design and settlement of the regulatory account,
- to determine the general sectoral productivity factor,
- for the use of other parameters for determining the expansion factor,
- the capital surcharge, including the formal design, content and structure of the application,
- the areas that are subject to effective procedural regulation, the determination is made for the duration of the entire regulatory period,
- on volatile cost shares, in particular on the procedure used to incentivize network operators or a group of network operators that ensure that volatile cost components are only taken into account efficiently in the revenue cap, as well as on the conditions under which cost components are considered to be volatile costs,
- on the assertion of costs including the obligation to adjust flat-rate costs,

⁶ The Ordinance on Incentive Regulation of Energy Supply Networks.



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- to carry out a comparability calculation,
- about the start of the application, the detailed design and the procedure for determining the quality element,
- on the formal design, content and structure of the report on investment behaviour,
- on investment measures including the formal design, content and structure of the application as well as financial incentives, whereby the summary of projects may also be required, as well as on the implementation, more detailed design and the procedure of the reference network analysis,
- to calculate the capital and operating costs resulting from approved investment measures,
- for an amount or flat rate for operating costs that deviates from grid expansion measures that serve to connect power generation systems, insofar as this is necessary in order to take structural features of investments for which investment measures can be approved, or to adequately take into account the actual amount of the necessary operating costs,
- the amount of the flat-rate operating costs, whereby the actual amount of the operating costs required for the approved investment measures must be taken into account appropriately,
- to participate in the simplified procedure and to the scope, time and form of the application,
- on the formal design, content, and structure of the application and on the date of submission of the application,
- on the formal design, content, and structure of the application and on the upper portion of the revenue and the scope, timing, and form of the data to be collected and communicated, in particular the permissible data carriers and transmission channels.

3.1.2 Norway

In order to determine the revenue framework, NVE shall carry out analyses that are used to calculate the company's cost norm and the Norwegian Water Resources and Energy Directorate (NVE) needs information on technical facilities in the regional network to make this analysis. Associated database is called TEK (weighting system for regional networks). Network companies receive a formal order related to reporting at the end of April/May each year. The reporting is about overhead-lines, ground cables and sea cables and the costs of the facilities are also considered in regional networks. The companies also report about transformers, circuit breakers and compensation systems for regional grids.

In the means of financial reporting and tariffs, all licensees are required to submit financial and technical reports to NVE under the Regulations on Financial and Technical Reporting, revenue framework for network operations and tariffs. Reporting may be delayed up to 4 weeks if this does not impede the implementation the regulation. The deferred deadline cannot be set later than 1 August. An application for a deferred deadline is sent to NVE within 3 weeks after the company's annual accounts have been approved.

The annual accounts, the annual report and the auditor's report are sent to the NVE together with the reporting. Licensee's auditor verifies and certifies that the reporting has been done in accordance with the rules of the related Regulation.

Licensees report complete profit and loss account in accordance with the Accounting Act and good accounting practice. Within the scope of income statement,

- Energy sales to end users (for the business area of power sales)
- Energy purchase for resale (for the business area of power sales)
- Revenue from the sale of network services and the basis of calculation (for transmission, regional and distribution networks)
- Purchase of network services (for power generation, transmission, regional and distribution networks)
- Network companies' purchase and sale of system services (for transmission, regional and distribution networks)
- Net losses (for transmission, regional and distribution networks). For grid losses in public networks, each of the participating grid companies report grid loss in their facility
- Revenue and costs for customer handling, measurement, and settlement (for network operations and competitive operations)
- Gains or losses on disposals of fixed assets (for each business areas)



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- The licensees shall also report a complete balance sheet. Tangible fixed assets, account receivable, inventory and accounts payable are reported. Higher and lower revenues shall also be distributed on transmission, regional and distribution networks.
- Book value of property, plant and equipment is shown as gross initial historic acquisition cost less accumulated depreciation, write downs and any subsidies.
- Fixed assets are reported at book value. If the book values in the financial statements are not in accordance with the values reported for the business areas, differences must be accounted for.
- Gross initial historical acquisitions cost should be amortized on a straight-line basis. everyone who submits income statement must also submit depreciation information as a rule. In this regard, depreciation of assets used for different business segments such as power sales, transmission, regional and distribution networks is reported separately. As a minimum the annual income ceiling, incoming and outgoing balance for excess and lower income, any collection and amortization of lower income or reversal of excess income in the period, operating profit, return basis and return must be disclosed.

NVE may further request information on matters related to financial regulation and a socially rational exercise of system responsibility.

In violation of the abovementioned reporting issues, a violation fee might be charged to licensees.

Data Analysis regarding Revenue Cap: NVE notifies the revenue cap for the coming year in November, and the network companies set their tariffs accordingly. All data, benchmarking results and revenue cap calculations, are published on NVE's web page once the calculations are finished. This is to increase the transparency of the methodology and data used in the calculation of the revenue cap. In principle, the notified and the final revenue cap for one year will only differ due to differences between estimated and actual electricity prices, inflation and WACC. In addition to this, any errors in the companies' costs or technical data discovered after the notification are corrected in the revenue cap.

Preparation of the revenue cap decision includes analysis of the data basis. The analysis looks at annual fluctuations and incoherence in the industry and individual companies. The network operators must explain or correct any deviations that NVE discovers. In addition, 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. It also looks at variations between groups according to size, geography, organizational structure, etc. Any abnormalities or incoherencies in the data basis for the revenue cap calculations discovered in the process must either be corrected or confirmed by the network operators.

3.1.3 Portugal⁷

Tariff Regulation and Complementary Financial Reporting Standards are two main documents in Portugal that describes the rules for monitoring of costs and performance of regulated electricity companies. The financial information sent by the regulated companies for the purpose of calculating allowed revenue, is a fundamental part for ERSE to fulfil its objectives, as the sector regulator. In line with the regulation, regulated accounts must comply with complementary rules, standards and methodologies that are approved by ERSE. On the other hand, entire information sent to ERSE must be submitted in electronic format.

The reports under the complementary norms of financial reporting are made annually based on real and audited information. In the year of the beginning of a new regulation period, the reports under the terms of "Supplements" are added since they provide the forecasts for each year of the new regulation period.

For instance for the reporting of information to be made in 2019, the delivery of the regulated accounts verified in the year t-2, accompanied by the respective audit report must be made, in relation to the tariff year 2020, until May 27, 2019.

In Portugal, the list of tables collected for the tariff calculation (actual values) are as follows:

⁷ Source: ERSE website.



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- Balance at t-2 and t-3
- Income statement for t-2 and t-3
- Intangible assets - gross value and accumulated amortization
- Investment subsidies and t-2
- Work for the company itself
- External supplies and services
- Other expenses and losses
- Allowed income
- Map of changes to equity

List of tables collected for the tariff calculation (forecast values) are as follows:

- Income Statement
- Balance sheet
- Map of Changes to DSO's Equity
- Operating Income Statement
- Breakdown of operating cost items
- Breakdown of Regulated Assets items (includes residual value of concessions)
- EBIT and RoA
- Breakdown of Tariff and Interest Adjustments (t-2)
- Operating Income Statement
- Sales of accesses to MR (regulated market) and ML (liberal market) customers
- Breakdown of operating cost items
- External supplies and services
- Personnel Costs and Income
- Operation and Maintenance Costs
- Investments (includes residual value of concessions)
- Fixed assets in progress
- Fixed assets in operation (includes residual value of concessions)
- Fixed assets fully amortized
- Amortization of Fixed Assets (includes residual value of concessions)
- Amortization of Fixed Assets
- Breakdown of Regulated Assets items (includes residual value of concessions)
- Calculation of DEE (Distribuição de Energia Eléctrica - Electricity Distribution) adjustments
- Calculation of CVAT (Compra e Venda do Acesso à Rede de Transporte - Access to Transmission Network) adjustments
- Compensations provided for in the Quality of Service Regulation (RQS)
- Electricity balance
- Number of the customers - end of year and average
- Number of staff on December 31
- Cost drivers
- Works completed in t-2, Works completed in t-2, broken down by primary costs and structure and management charges
- SISE information – Fixed Asset in Operation Details (Gross value of fixed assets in operation, Net value of fixed assets in operation, Accumulated amortization and repayment statistics)

Details of the data collected is provided in Annex 1: Excel Sheets for the Data Collected in Portugal (in Portuguese) as an example.



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Data regarding tariffs is mainly collected through excels. For each electricity DSO, different excel sheets are published for the data to be collected by ERSE. Data templates ensure that the format of data submission is consistent and harmonized with other DSOs.

On the other hand, for retail segment, there is an online portal, the Consumer Portal, where a set of information and charge simulation tools are shared for the consumers. Tariff regulation and its supportive documents are the main documents where the format of the data to be shared by the market participants is defined.

As for the metering, Portugal has a centralized data management system called SGL. The system that aims to store the energy consumption data from all the DSOs in the Continental Portugal, is managed by the main DSO in the country. It gathers data from smart meters as well as telemetered data every day. For conventional meter without an updated reading in the SGL in the last 24 hours the consumption is estimated. Each DSO has to provide its readings to the central data hub which stores the data in an easily accessible format. DSOs and Suppliers has compulsory web portals for the customers to have access to their own historic validated consumption data. They can also access data through their bill or the central data hub.⁸

3.1.4 UK

In the country, Distribution Network Operators (DNOs) report information regarding price control in line with the Regulatory Instructions and Guidance (RIGs). This information is required to administer, and check compliance with the electricity distribution licence and RIIO-ED1 final determinations. RIGs provide detailed information on what to report and offers guidance on how to complete the reporting templates, thus provides standardization among the different data. In addition, DNOs report to Ofgem on an annual basis by 31 July, following each Regulatory Year. RIGs for ED1 is used to collect actual data from 1 April 2015 to 31 March 2023 as well as to forecast data further into the future. DNOs follows this document to submit reporting packs and commentaries to Ofgem. These templates have also been designed to have single data entry where possible in order to avoid duplication and to facilitate reconciliations and balance checks.

Table 3.1 – Scope of the Regulatory Instructions and Guidance

Reporting Pack	Period	Submission Deadline
Costs and Volumes	Regulatory year	31 July
Revenue	Regulatory year	31 July
Secondary Deliverables	Regulatory year	31 July
Reinforcement Load Index (LI)	Regulatory year	30 September
Interruptions - QoS Interruptions	Regulatory year	30 April
Interruptions - QoS Interruptions Stage Data	Regulatory year	30 April
Interruptions - Guaranteed Standards of Performance	Regulatory year	30 April
Interruptions - Occurrences not Incentivised	Regulatory year	31 July
Interruptions - QoS HV Disaggregation	Regulatory year	30 November
Connections – Connections	Regulatory year	31 July
Connections – Connections Guaranteed Standards (SLC 15A)	Quarterly, starting April to June	31 July
Connections – SLC 12 and 15	SLC 12: regulatory year SLC 15: quarterly, starting April to June	31 July
Customer Service	Complaints and customer satisfaction – quarterly, starting April to June Telephony-monthly	31 July
Environment and Innovation	Regulatory year	31 July
Pensions	-	July and September 2017,2020,2023
RIIO Regulatory Financial Performance Reporting (RFPR)	Regulatory year	31 July

⁸ Source: Asset, 2018, Format and procedures for electricity (and gas) data access and exchange in Member States Final Report.



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Documents that consist of instructions on how to collect information about price control and excel formats used to collect data are attached as Annex 7.2 to this document^{9 10}.

Under Article 37(1)(u) of the related Regulation, Ofgem is required to contribute to the compatibility of data exchange for the most important market processes. All licensed suppliers and network operators must comply with industry codes in order to operate in the electricity markets. Currently, Ofgem collects much of the core data through an online portal. In addition, in some cases face-to-face communication or Q&As through e-mails might be required for clarification.

Although Ofgem does not have direct remote access to data from the market, it has powers to request information from licensees and industry data providers. As an example, access to consumption data from smart meters is managed centrally, through the Data and Communications Company (DCC), which is licensed by the Department of Business, Energy and Industrial Strategy (BEIS) and regulated by Ofgem. The licence came into effect on 23 September 2013 and is valid for 12 years. The DCC has its own price-control and is responsible for linking smart meters in homes and small businesses with energy suppliers, network operators and energy service companies. As part of its role in monitoring DCC compliance, Ofgem also reviews a number of regulatory submissions received from DCC such as the annual report and regulatory account for each year.

In terms of data security, each network company recently performed a short to medium term cyber-security improvement plan, aiming to be completed under the RIIO-1 timeframes in line with the requirements of Network and Information Systems (“NIS”) Regulations 2018 and the associated National Cyber Security Centre (“NCSC”) sector-agnostic Cyber Assessment Framework (“CAF”). Ofgem has developed a detailed set of Cyber Resilience Guidelines for gas and electricity network companies for RIIO-2.¹¹

All DNOs in the UK use Data Assurance Guidance document¹² as a guide to the data assurance requirements relating to data submissions that they make to Ofgem. Ofgem might take action in case any licensee does not take measures to ensure its data submissions are accurate, complete and on time. In this case, Ofgem might send warning letters and investigations (which may involve an Ofgem audit) to full licence enforcement action and the imposition of fines. In extreme circumstances, licence revocation might happen.

Within the scope of the RIIO framework, data assurance guidance conditions were introduced for all network Licensees including electricity distribution companies. 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. Data assurance might be subjected to different reviews such as second person review, internal expert review, internal data audit, internal submission process audit, external data audit, external submission process audit.¹³

In the country, Ofgem is in the process of developing its data exchange system in order to allow:

- Secure upload of data files in CSV format using a web browser interface
- The option to automate the uploading of these files for regular submissions, including via API
- Instant notification that the files have been received by Ofgem in the Data Exchange
- An audit trail of the submissions data providers has made, when and by whom
- Ability to easily resubmit resubmission of data files, to correct errors or omissions

Data exchange handles only files in CSV format at present, however Ofgem is working on more complex data submission like multi-sheet Excel workbooks, into CSV. In addition other functionalities such as improvements to

⁹ Source: <https://www.ofgem.gov.uk/publications-and-updates/direction-make-modifications-regulatory-instructions-and-guidance-rigs-riio-ed1-version-50>

¹⁰ Source: Ofgem, 2014, RIIO-ED1 electricity distribution price control – overview of the regulatory instructions and guidance.

¹¹ Source: https://www.ofgem.gov.uk/system/files/docs/2020/04/riio2_cyber_resilience_guidelines.pdf

¹² Source: <https://www.ofgem.gov.uk/ofgem-publications/98746>

¹³ Source: Ofgem, 2016, Data Assurance Guidance for Electricity and Gas Network Companies.



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the audit trail about data sent to Ofgem, improved validation and error reporting about submissions, notification messages relating to submissions, the ability to submit additional file types and user account administration will be provided in the future.

Historical values are also considered within the scope of analysis. All historical expenditure should be input in nominal terms, (e.g. in the prices of the year to which the data relates). The Costs and Volumes Reporting Pack requires data to be submitted for years prior to RIIO-ED1. Where a previously submitted value has been changed the DSO notifies Ofgem of this change and the reason for it by recording in the “data change log” in the relevant reporting pack.¹⁴

In terms of data digitalization the independent Energy Data Taskforce is commissioned by the Department for Business, Energy and Industrial Strategy (BEIS), Ofgem and Innovate UK. With the aim of a modern, digitalised energy system and to enable modern best practice use of data, in its report published in 2019, Taskforce has made five recommendations that are about¹⁵;

- Digitalisation of the Energy System
- Maximising the Value of Data
- Visibility of Data
- Coordination of Asset Registration
- Visibility of Infrastructure and Assets

In addition, within the scope of the report a collective market-wide vision for how the sector can maximise the value of data and digitalise the energy system in support of the energy transition is mentioned. Overall, the Taskforce urges digitisation of Britain’s energy system and openness when working with its data. Through this the energy system will deliver better services for consumers. Ofgem asked network companies (gas TSO and DSO and electricity TSO) to include their Digitalisation Strategy as part of their business plan submission for the next network price control period (RIIO 2).

Ofgem developed a validation tool, which is a python tool to report errors in a data file using a json schema. The schema details expected columns, data-types and valid entries for each column in the file. Error reports are automatically generated in three forms, csv, html and json.¹⁶ The tool provides an automated report of data issues such as missing fields of information or data fields with incorrect datatypes e.g. numeric instead of text. In addition, “business rule” errors, such as checking if submitted numeric values exceed allowable value ranges e.g. it might be non-sensible for particular data numbers to be outside the range 0 to 100 is identified with the tool. Moreover, if data should only contain words from a specific set of acceptable words, it checks that this is the case. e.g. it automatically checks that data matches one of the region names from a list of all the distributor regions in the country.¹⁷

As part of the environmental performance metrics for the network companies, carbon emissions and other environmental metrics are recorded and reported. Regulatory instructions and guidance (RIGs) for RIIO-ED1 refers to a collection of documents, and the reporting packs and commentaries the electricity distribution network operators (DNOs) have to fill out. The purpose of the Environment and Innovation Reporting Pack – a part of RIG - is to collect information in order to monitor DNOs’ actions and performance in RIIO-ED1, and to provide information for the next price control review. DNOs are also required to fulfill the worksheets in the reporting pack as part of their Environment Reports. This requirement provides stakeholders a view for DNOs’ environmental activities. The purpose of Environmental Reporting is to record the costs and volumes relating to environmental activities and their impact, as well as collecting data on compliance with environmental legislation. The environmental performance metrics and collected data items could be listed as follows:¹⁸

- Contaminated Land Clean Up

¹⁴ Source: RIIO-ED1 electricity distribution price control – overview of the regulatory instructions and guidance.

¹⁵ Source: <https://es.catapult.org.uk/reports/energy-data-taskforce-report/>

¹⁶ Source: https://gitlab.com/ofgem/ofgem_validation_tool

¹⁷ Source: <https://www.ofgem.gov.uk/publications-and-updates/we-ve-published-digital-tool-lowering-cost-regulation>

¹⁸ Source: RIIO-ED1 regulatory instructions and guidance: Annex J – Environment and Innovation



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- Environmental Civil Sanction
- Fluid-Filled Cables
- Fluid-Filled Cables in Service
- Fluid Recovered
- Fluid Used to Top Up Cables
- Noise Pollution
- Non-Undergrounding Visual Amenity Schemes
- Oil In Service In Cables
- Oil Pollution Mitigation Scheme - Cables
- Oil Pollution Mitigation Scheme - Non-Operational Sites
- Oil Pollution Mitigation Scheme - Operational Sites
- Persistent organic pollutant Remedial Asset Changes
- Persistent organic pollutant Oil Testing
- Persistent organic pollutant Remedial Oil Changes
- SF6 Bank
- SF6 Emitted
- SF6 Emitted Mitigation Schemes
- Undergrounding for Visual Amenity.

3.2 Turkey

3.2.1 Data Requirement - Revenue Requirement (OPEX, CAPEX, TOTEX)

3.2.1.1 TOTEX Recommendation

Currently EMRA tariff methodology uses separate budgets for OPEX and CAPEX. However, there is transitivity between operational and investment costs. For example, a CAPEX cost like asset replacement/refurbishment can be replaced or delayed with proper maintenance costs which are OPEX costs. Similarly, meter reading costs (OPEX) by staff can be replaced by AMR meters (CAPEX), or vehicle purchase costs (CAPEX) may be replaced by vehicle rental costs (OPEX) based on the optimal decision of the DSOs. In order to incentivize DSOs to choose the best solution between OPEX and CAPEX, there should be a TOTEX methodology in effect.

Data Already Requested by EMRA: Regulatory Account Plans are collected by EMRA to see the DSO expenditures based on their trial balances. These balances show the total expenditures about the CAPEX (i.e. network investments, environmental/security investments, software investments, etc.) and OPEX expenditures (i.e. staff costs, vehicle costs, fuel costs, material costs, etc.). However, the transitivity between the CAPEX and OPEX costs cannot be observed from these data. For example, for the vehicle costs, distinction between the vehicle investment costs, rental costs and operational costs cannot be made.

Additional Data Requirements: Budget realization of items included within TOTEX, such as IT/OT hardware and software, vehicle, acquisition of new buildings should be collected from the DSOs.

Table 3.2 – Realizations of budgets

TOTEX Cost Items	Initial CAPEX (EPE _t) ₺	Annual OPEX (EPE _t) ₺
IT/OT Hardware and Software		
Vehicle		
Buildings		

3.2.1.2 Business Plans

EMRA requires DSOs to submit their OPEX offers before the related implementation period. However, there is no standard template or minimum requirements for these reports. Therefore, it is difficult for EMRA to distinguish the DSOs for their expenditures and their future plans. Since the problems faced by the DSOs are different and their



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expenses will differ based on their goals, each DSO should prepare a well-defined business plan to reason their expenses.

Data Already Requested by EMRA: OPEX offers are required, however the report contents are not defined.

Additional Data Requirements: A well-defined business plan should be required from the DSOs, as stated in Task-1.1 Report Annex [Business Plans].

3.2.1.3 Cost Accounting

Currently requested data from the DSOs include Account Plans, which give only the total amount of DSO expenditures. If only the services are outsourced separately, then the cost discrimination between the operations can be seen. However, the costs of operations held within the company cannot be observed from this Account Plans. For example, there is a single cost item for Staff Costs, Vehicle Costs, Fuel Costs, etc. and it is impossible for EMRA to separate these costs based on the operations and this makes it impossible to compare the DSOs efficiency by activity. Therefore, account separation for the main DSO activities are recommended.

Data Already Requested by EMRA: Regulatory Account Plan: This data is collected by EMRA, based on the trial balances. However, account separation between the processes (meter operations, network operations, etc.) is not available.

Additional Data Requirements: The accounts should be separated at least for the following activities:

- Network operations (O&M)
- General (Street) Lighting operations (O&M)
- Meter operations (meter reading, connect/disconnect, meter replacement)
- New connection
- Non-technical loss operations
- IT Expenditures
- Call-center costs
- Security costs

For the account separation, current cost items such as staff costs, vehicle costs, fuel costs, material costs should be distributed to each activity by the DSOs.

3.2.1.4 Connection Fees

In Turkey, one-time connection charges are applied as the other EU countries. However, deep or shallow connection charges differ in EU practices. In some countries, connection charges do not include network reinforcement costs (shallow pricing), whereas in other countries, new connection customer also shares the burden of these costs. If the connection costs are socialized, then the generation/consumption facility investments cannot be optimally (minimizing total costs) located by the investors. Therefore, separate connection charges, reflecting the real cost of each DSO, for each connection is recommended.

Data Already Requested by EMRA: New connection investment costs (standard and non-standard) are collected by EMRA via forms ESDF-04-G and ESDF-04-T. The connection costs are determined by connection length based on the voltage level, LV (0-15 kW, 15-50 kW, 50-100 kW, >100 kW) and MV, and also differs for overhead lines and underground cables. These costs are applied equally for each DSO and therefore socialized.

Additional Data Requirements: Each DSO should prepare their own connection fee methodology and submit it to EMRA for approval, for LV and MV, overhead lines and underground cables. In this methodology,

- Connection asset costs (which will be equal for all DSOs based on EMRA unit prices),
- Network reinforcement costs (specific to new connection application category, separate for each DSO and connection),



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- OPEX costs (accepting applications, document control, site visits for energy permission, reviewing projects, distribution connection agreement works, final acceptance) related to new connection application (which may be similar for all DSOs) shall be included

3.2.1.5 Network Assets Replacement Costs

In the current legislation about the asset replacements/refurbishments, in general, if the asset life is above 30 years and the refurbishment is done fully for a group of assets (i.e. refurbishment project can be prepared and approved by TEDAS, then the replacement costs are covered by CAPEX budget. However, if the assets fail and need to be replaced individually, then this replacement is done by OPEX budget. Since the failure rates differ each year and by the ages of the assets, it is difficult to forecast the asset replacement costs and this causes uncertainty for the OPEX budgets. For this reason, asset replacement costs are recommended to be corrected based on the number of replacements.

Data Already Requested by EMRA: EMRA do not collect data about the asset failures and replacements in the context of OPEX.

Additional Data Requirements: Number of replaced network assets should be collected by EMRA.

Table 3.3 – Realized Network Assets Replacement Costs

Network Asset Replacement Category	Type	Sub-Type	Quantity of Replacements
Transformers	Building-type/Pole-top	400 kVA, 630 kVA, ... etc.	
Poles	Wooden, Concrete, Steel	LV, MV	
Marshalling Kiosk			
Conductors	Overhead / Underground	Conductor type	
Secondary Systems in transformer buildings			
Compensation Units			

These data can be gathered with a table similar to “Information on Previous Year's Investments” (Ek-6).

3.2.1.6 Refurbishment Cost Estimation:

Since the replacement/refurbishment costs will be determined ex-ante and corrected after the realizations in t+2 year, there is a need for replacement/refurbishment cost estimation methodology.

Data Already Requested by EMRA: EMRA do not collect data about the age profiles and conditions of the assets via the EBIS system. Required data is age and condition of the network assets.

Additional Data Requirements: Because the refurbishment requirement will be higher for older assets and it changes based on the current age of the network, this data should be taken to estimate the refurbishment costs. To estimate the cost, firstly a network assessment methodology should be prepared, where the Health Index groups and criticality groups are defined. Health index definition is expected to be determined based on the outputs of site visits and planned maintenance activities in line with the asset management policies of DSOs. Health index criteria may include aging, environmental factors, level of corrosion, level of oxidation, distortion of protective equipment, etc.. Health index is calculated as initial and final indexes with respect to rated values of assets and sample results gathered via site visits respectively. Thus, maintenance models and asset management tools of DSOs should be enhanced with health index calculations and criticality measurements with clear field observations. To estimate the refurbishment costs, below table should be filled for each asset category.



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Table 3.4 – Estimating refurbishment Costs

Network Asset (i.e. Wooden Poles)	Health Index Group 1	Health Index Group 2	Health Index Group 3	Health Index Group 4	Health Index Group 5
Criticality Group 1	Number of assets within this group (Health index =1 and Criticality=1)				
Criticality Group 2					
Criticality Group 3				Number of assets within this group (Health index =4 and Criticality=3)	
Criticality Group 4					

The asset categories are:

- | | | |
|---------------------------|---------------------------------------|--------------------------------------------------------------|
| 1. LV Overhead Conductor, | 13. Lighting Poles, | 24. Modular Cells, |
| 2. MV Overhead Conductor, | 14. Armatures, | 25. Open Switchgear Cells, |
| 3. LV Wooden Poles, | 15. LV Marshalling Kiosk, | 26. Secondary Systems (Battery/inverter group, relay, etc.), |
| 4. LV Concrete Poles, | 16. MV Cable, | 27. Transformer Buildings (for structural repair), |
| 5. LV Iron Poles, | 17. LV Cable, | 28. Distribution Centers (for structural repair), |
| 6. LV Steel Poles, | 18. Transformer (Pole-type), | 29. LV Groundings (Pole), |
| 7. LV Galvanize Poles, | 19. Transformer (Building type, dry), | 30. MV Groundings (Pole, Building), |
| 8. MV Wooden Poles, | 20. Transformer (Building type, oil), | 31. Compensation Units. |
| 9. MV Concrete Poles, | 21. Power Transformer, | |
| 10. MV Iron Poles, | 22. LV Box (outdoor), | |
| 11. MV Steel Poles, | 23. LV Box (indoor), | |
| 12. MV Galvanize Poles, | | |

For the starting point, criticality groups may be ignored, and only Health Index groups may be collected, until the DSOs establish required IT systems to define criticality groups (i.e. number of customers affected or the health/safety risk in case of a failure for each asset).

3.2.2 Data Requirement - Performance Indicators

3.2.2.1 Supply Continuity

For the supply continuity, SAIDI and SAIFI are the most common used indicators in EU countries and these indicators may continue to be utilized in Turkey too. Besides, it is a known issue that network performance indices in Turkey are way above those in average EU figures. Due to lack of sufficient monitoring infrastructure, it is recommended to apply these two indices only on medium voltage levels, as a first stage.

Data Already Requested by EMRA: EMRA collects the below data to measure supply continuity indicators of the DSOs:

- Outages (Table 1¹⁹): This data contains the reason, duration and effected customer number from each outage. These data are used to calculate Table 5²⁰ values and sufficient to calculate SAIDI and SAIFI measures.

¹⁹ Table 1 of the Electricity Distribution and Retail Sales Service Quality Regulation.

²⁰ Table 5 of the Electricity Distribution and Retail Sales Service Quality Regulation.



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- Supply of Continuity System Installation: The distribution companies are required to have a system to measure the supply of continuity.
- Quality Indicators (regarding the supply of continuity) (Table 5): As one of the quality indicators, SAIDI and SAIFI are calculated in these table.

Additional Data Requirements: Data collected by EMRA is sufficient to measure supply continuity. However, reliability of the LV data is weak due to the lack of perfect integration between GIS and outage data. 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.

Also, since the disconnected power is also important together with the number of disconnected customers, ASIDI (average interruption time weighted by the rated power) and ASIFI (average interruption frequency weighted by the rated power) indicators may be utilized in Turkey. Usage of ASIDI and ASIFI will give more importance to high-consumption (i.e. industry) customers and put low consumption (esp. rural households) customers on the back burner. To avoid this problem, ASIDI/ASIFI and SAIDI/SAIFI for worst served 5% customers should be used together. In this case, below data should be collected in addition to the existing data.

Table 3.5 – Supply Continuity (Disconnected Power)

Outage Cases	(Current required data)	Disconnected Power (kW)
...

Table 3.6 – Supply continuity (Worst Served Customers)

SAIDI for worst served 5% Customer	SAIFI for worst served 5% Customer
...	...

On the other hand, force-majeure events should not be counted in SAIDI/SAIFI calculations. Currently, DSOs are asking EMRA for accepting a specific event as a force-majeure with supporting documents, then EMRA decides to exclude that case from supply continuity calculations. In other words, there exists a bureaucracy to count an event as force-majeure. However, a specific number of data should statistically be exempt from supply continuity calculations. As in the UK case, force-majeure events may be defined by the number of outages in a given day (i.e. 8 times higher than the average outages/day). Thus, need for the existing bureaucracy will be no longer in charge and force-majeure concept will be more simplified and automated. For this purpose, no new data is required from the DSOs, but available outage data should be used to calculate average outages per km of LV and MV.

Summary of the recommendations of supply continuity data recording and reporting (including force-majeure events):

- Distribution transformer level outage records longer than three minutes - i.e. MV outages and LV outages at busbar level of distribution transformers - should be taken into account.
- The previously announced periods for planned maintenance and repair activities should not be taken into account.
- Following items should be excluded from SAIDI/SAIFI calculations:
 - o Earthquakes and forest fires not under the responsibility of DSOs as force-majeure events
 - o TSO based outages



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- Worst ten days or the days having 4 times worse than the average value (excluding outage-free days)
- 3rd party-based outages

3.2.2.2 Commercial Quality

In Turkey, commercial quality indicators are defined in Table 6 of the Regulation on the Service Quality of Electricity Distribution and Retail Sales. Standard due dates to response customer requirements and the penalty amounts are defined in the table. This is a negative side table and there is no bonus. There are two reasons for this; one is because the bonus comes from the customer satisfaction points which is mentioned above in the Procedures and Principles of Quality Factor Application. Another reason is that these limits are worst case limits, and DSOs must satisfy these time limits in normal operation conditions.

However, incentives may be defined for the DSOs who increase the level of customer satisfaction ahead of the mandatory due dates. For this measure, one missing point in Turkish system is the customer satisfaction levels. To measure this, customer satisfaction surveys should be held

Data Already Requested by EMRA: In the EBIS system, via the form EPF-03-D, all customer applications and closure dates for the requests are collected from the DSOs. Summary of this table is required from the DSOs via for EPF-04-D. Also, complaint numbers arriving to EMRA is collected as a quality indicator (number of complaints per 50,000 customers).

Besides, for the call center services;

- Number of calls to call center
- Number of calls reaching call center
- Number of calls in the operator queue
- Number of calls initiated by the operator within 20 seconds
- Number of voice calls with operator

are collected, which are sufficient to measure call-center quality level.

Additional Data Requirements: Current collected data of EMRA is sufficient to measure the commercial quality levels. However, based on the DSO activities and the collected data, customer satisfaction surveys should be held each week by an independent survey company, which is contracted by all the DSOs. The survey questions, answering options, selection methodology of the survey customers should be determined by EMRA.

DSOs should supply the survey company the information about the customers who have experienced an activity specified in the questionnaire, in a weekly period. The data should include:

- New connection customers,
- Loss of supply customers,
- Other complaints.

By applying these surveys, customer satisfaction level and complaints can be analysed. Also, some questions to measure customers' willingness to accept and willingness to pay may be added in order to calculate value of loss load.

3.2.2.3 Technical Quality

Currently, voltage quality is measured by the request of customers and power analysers set by EMRA instructions. If the EMRA instructions are completed successfully, there is a bonus for technical quality. In addition, voltage quality parameter could be defined by metering data that will be gathered from the smart meters installed on



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distribution transformers. To achieve this goal, AMR meters roll out at all DSO-owned distribution transformers should be completed. Operating hours out of the accepted voltage level limits – i.e. to be determined by EMRA - will be registered on AMR meters, and will be proportioned to the total operating hours. Finally, this rated value is desired to be under 5%, and DSOs meeting the 2% rate or below will gather a bonus.

Data Already Requested by EMRA: In Turkey, nominal voltage levels and voltage fluctuation limits are also defined for different levels and DSOs are required to install power analysers when required by the customer and correct the issue. The distribution companies are also required to install technical measurement devices and obliged to inform the results on time and completely.

Additional Data Requirements: No additional data is required for additional parameters that could be derived from the existing data sheets with simple proportions. On the other hand, AMR meters that will be used to register the operating hours out of the accepted voltage levels should be installed on each DSO-owned distribution transformers. Thus, data requirement for recommended additional voltage quality parameter will correspond to the operating hours of the distribution transformers out of the accepted voltage limits.

3.2.2.4 Investment Realization

Investment expenditures of the DSOs give signals for future service quality satisfactions. If the investments decrease below a critical level, then the supply continuity targets may not be satisfied in the near future. Distribution System Revenue Regulation Article 12/4 states that, investment expenditure of a year should not be below 65% of the approved CAPEX of that year. Also, there is a bonus for DSOs, who realize more than 90% of their investment budgets.

EMRA collects the relevant CAPEX expenditures for this subject and there is no additional data requirement.

3.2.2.5 Health and Safety at Work

As an important quality parameter, EMRA collects the number of deadly work accidents from the DSOs and uses the “0” death as a general performance indicator for the DSO. There is no additional required data for this issue.

3.2.2.6 Street Lighting Performance

Street lighting activities are the responsibility of the DSOs in Turkey. on the contrary to municipalities in benchmarked EU countries. General Lighting Regulation defines the time limits to repair burnt bulbs and Electricity Market Law Article 16/8 defines the penalty for unrepaired bulbs in time. Therefore, DSOs have to replace the burnt-out bulbs within the defined time limits. Penalties are imposed for each bulb, regardless of the importance of its location or whether there is a single lamp problem or all the lamps in the same region is not working. For example, if there is a single burnt-out lamp in a village, a team of two/three staff with a vehicle with basket have to repair it in two days. If another lamp burns-out in the same location a few days later, same team have to go there again. This approach causes inefficiencies for the DSO activities. As an alternative, street lighting outages may be grouped by their criticality (single lamp, feeder failure, etc.) and given appropriate due dates for each case. Instead of applying penalties for each case, there should be performance indicator for general lighting. Total reward/penalty of the DSO should be added/subtracted to/from its revenue cap.

Data Already Requested by EMRA: The data is collected and assessed by TEDAS, therefore EMRA does not collect data about this topic.

Additional Data Requirements: Criticality of the lamp faults and total number of achievements may be measured using the following table.



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Table 3.7 – Street Lighting Additional Data

Criticality Cases	Causes	Total Number of Outages	Number of Repairs within Time Limits
Low Criticality	i.e. single lamp in a line
Medium Criticality	i.e. several lamps in a line
High Criticality	i.e. feeder failure

3.2.2.7 Value of Loss Load (VOLL)

VOLL is the economic value for the absence of 1 kWh energy in a region. It is higher in regions, where electricity is used as an intermediary product to create value (i.e. industry, commercial regions), and lower if it is used only for daily needs. Therefore, improvement of SAIDI in an industrial region creates more value than improvement of SAIDI of a rural region. This relationship can be used for determining bonuses/penalties for these improvements and forms a reasoning between quality improvement and OPEX. In order to achieve this goal, instant load of consumption points that are affected by outages. This data should be measured via surveys for each DSO region. Registering such a data may lead difficulties, instead, use of TIEPI and NIEPI indexes might be more effective since these indexes are based on installed capacity.

3.2.3 Data Requirement - Efficiency

EMRA uses Data Envelopment Analysis (DEA) for the purpose of comparing DSO efficiencies. This method is also used in benchmark EU countries. Other options may be usage of SFA, MOLS, COLS, etc. Common point of these methods is the necessity of relevant data usage. Relevant data should be chosen such that they are most relevant with the OPEX costs of the DSOs.

Data Already Requested by EMRA: The following data are used as input into the DEA benchmarking model:

- Line length (total of overhead and underground lines),
- Number of transformers (total of building-type and pole-mounted),
- Number of subscribers,
- Energy entering the distribution system,
- Geographical Area,

Other data to be utilized for comparative analysis is also collected by EMRA, as such;

- Energy entering the distribution system: These data are collected for the previous year as realizations and forecasted values for the next 10 years to be used in the calculation of investment plans and amounts. These data have the following details for each distribution region:
 - o Residential, Commercial, Industry, Irrigation, Lighting
- Customer Number: The number of customers in each distribution region are requested for the previous year as realizations and forecasted values for the next 10 years to be used in the calculation of investment plans and amounts. These data have the following details:
 - o Residential, Commercial, Industry, Irrigation, Lighting
 - o Connection Levels: Medium Voltage, Low Voltage

Total customer numbers are also requested for the quality indicators in Table 5 of Electricity Distribution and Retail Sales Service Quality Regulation, which can be used to cross-check as a validation rule.

Also, in Consumption Information table, number of customers are requested for each province with the following details:

- General lighting
- MV Double Term Industry



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- MV Double Term Commercial
- MV Double Term Residential
- MV Double Term Irrigation
- MV Double Term Lighting
- MV Single Term Industry
- MV Single Term Commercial
- MV Single Term Residential
- MV Single Term Irrigation
- MV Single Term Lighting
- LV Single Term Industry
- LV Single Term Commercial
- LV Single Term Residential
- LV Single Term Martyr Families and Veterans
- LV Single Term Irrigation
- LV Single Term Lighting
- Transmission System User – Industry
- Transmission System User – Commercial
- Transmission System User – Residential
- Transmission System User – Irrigation
- Transmission System User – Lighting

The quantity of network assets in each distribution region are requested with the following details:

- Transformer: The number of transformers in the following details:
 - o Property: Company, Private
 - o Voltage Levels: MV, LV
- Overhead Line Length: The length in km of overhead lines in each operation center's service area, in the following details:
 - o Voltage Levels: MV, LV
 - o Property: Company, Private
- Underground Cable Length: The length in km of underground cables in each operation center's service area, in the following details:
 - o Voltage Levels: MV, LV
 - o Property: Company, Private

These data can be compared and checked with the investment realizations of the previous years and plans for the next year.

- Peak Demand: For each distribution region, peak demand data are collected for the previous year as realizations and forecasted values for the next 10 years to be used in the calculation of investment plans and amounts.
- Investment Plans for the Next Year (Annex 3) and Investment Realizations of the Previous Year (Annex 6): These data are used for CAPEX calculation.
- Meter Replacement: The number of meters replaced for a given period are requested again in the context of investment by meter type (monophase, triphase, meters reading reactive energy (combi, primer X5, seconder X5), AMR) due to
 - o New connection
 - o Fault
 - o Expiration of stamp
 - o Within the scope of Temporary Article 2 of the Communiqué on the Meters to be Used
 - o Within the scope of external intervention
 - o Power Increase/Reduction



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- Within the scope of the second paragraph of Article 13 of the Procedures and Principles Regarding Tariff Applications of Distribution Licensee Legal Entities and Supply Companies
 - For AMR
 - Other Reasons
- Financial Tables

Additional Data Requirements:

Environmental Factors as Z-Scores: Similar to Norwegian efficiency calculation, two-phase calculation methodology where environmental factors can be incorporated after DEA calculation is recommended. These environmental factors can be as following:

- Average slope of the region,
- Proportion of forest area,
- Seaside index,
- Ice load index,
- Humidity index

These metrics should be collected from related public institutions to gather reliable data – e.g. slope of the region data from Chamber of Survey and Cadastre Engineers, proportion of forest data Ministry of Agriculture and Forestry, seaside and ice load indexes are already publicly defined per regions, humidity index from Turkish State Meteorological Service.

Load Relation: Currently, distributed energy is used as a parameter for the DEA analysis. However, with the increasing level of distributed generation, distributed energy is reducing but the distribution workload is increasing. Therefore, distributed energy may be negatively correlated with the OPEX in the near future. To avoid this deficiency, rather than the distributed energy, (1) peak load, (2) connected capacity or (3) total transformer power may be utilized in the efficiency analysis. Peak load and transformer power data are already collected by EMRA. If utilized, connected capacity should also be collected from the DSOs.

Data Equivalence: Currently, distribution assets are required by the main groups, such as transformer, overhead lines, underground cables. However, workload and OPEX requirement of asset types differ and there is a need for defining equivalent asset types. For this reason, to run the efficiency models, in addition to new data requirements, available data should also be 'corrected' before using as an input to the model. For example, metering workload of rural customers are on the average three times of urban customers, because of the travel time and dispersed settlement. Therefore, number of rural customers should be multiplied by 3 and added to urban customers, to calculate 'normalized number of customers. DSOs should be compared upon this normalized number. In addition, building-type transformers (including the building and cells) have workload about 3 times of a pole-mounted transformer, therefore number of transformers should be corrected as 3 x Building-type transformer + pole-mounted transformers. For this purpose, data should be collected in below detail:

- Number of Customers: Urban Customers, Rural Customers
- Meter Types: Monophase, Triphase, Primary-X5, Secondary-X5 and Combi-other
 - Meter types also determine the customer types. X5 meters are used for high consumption customers and these customers require more often visit for theft detection. Also, meter replacement and disconnection costs are higher for these consumers.
- Meter Technology: Automatic Meter Reading (OSOS) by customer type
 - Since digitalization supposed to decrease manual work, such as meter reading and disconnect/connect, these numbers can be considered in OPEX calculation.
- Network Assets: In addition to the details currently collected by EMRA, the following data should also be collected for maintenance and repair cost calculations:



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- Wooden Poles: The number of wooden poles in the following details:
 - i. Voltage Levels: MV, LV and Common
 - Concrete Poles: The number of concrete poles in the following details:
 - i. Voltage Levels: MV, LV and Common
 - Steel Poles: The number of steel poles in the following details:
 - i. Voltage Levels: MV, LV and Common
 - Iron Poles: The number of iron poles in the following details:
 - i. Voltage Levels: MV, LV and Common
 - General Lighting Pole: The number of general lighting poles
 - Armature: The number of armatures used for general lighting
 - Transformer: The number of transformers in the following details:
 - i. Configuration: Building-type Transformer, Pole-top Transformer
 - ii. Type: Cast Resin Transformer, Oil Immersed Transformer, Power Transformer
 - iii. Installed Capacity
 - Cell: The number of cells in the following details:
 - i. Open Switchgear Cells
 - ii. Modular Cells
 - Transformer Building: The number of buildings in the following details:
 - i. Open Switchgear cells and transformer
 - ii. Modular cells and transformer
 - Marshalling Kiosk: The number of marshalling kiosks.
- Peak Demand: Rather than only one value as peak demand, we recommend collecting it for winter and summer.

Age Profile: Age distribution of the assets is related with the OPEX expenditures, especially for replacement/refurbishment costs and fault workloads. Therefore, proportion of network assets over economic life (30 years) or the number of assets for each Health Index Group can be collected and used in DEA analysis.

Activity Volume: EMRA divides the OPEX into two parts, 50% constant and 50% variable. Constant part remains same between years (only CPI is applied) and variable part is updated based on the network expansion (number of customers, line length, transformer count and distributed energy). In order to switch this mechanism with the volumetric cost drivers, below data should be collected:

- Connection/Disconnection: The number of connections/disconnections by customer type in the following details:
 - Disconnections due to unpaid debt in three categories, for LV and MV,
 - i. households,
 - ii. commercial customers,
 - iii. industry customers,
 - Disconnections other than debt,
 - Connections after disconnection,
- New connection: The number of approved/disapproved new connection project applications and the number of meters in related projects for a given period.
 - Number of new connection applications (projects),
 - Number of new connection meters,



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- Distributed Generation: The number of approved/disapproved application of distributed generation plants for a given period.
 - o Number of new connection (generation) applications,
 - o Number of accepted connections,
- Electric Vehicle: The number of approved/disapproved application of electric vehicle charging stations for a given period.
 - o Number of EV charge station applications,
 - o Number of EV charge station connections,
- Maintenance and Repair: Number of network assets that went through maintenance and/or repair processes for a given period in the following details:
 - o Poles: Wood, Concrete, Steel, Iron in the following detail:
 - i. Voltage Levels: MV, LV or Common
 - o General Lighting Poles,
 - o Armatures,
 - o Overhead Lines in the following detail:
 - i. Voltage Levels: MV, LV
 - ii. Property: Company, Private
 - o Underground Cables in the following detail:
 - i. Voltage Levels: MV, LV
 - ii. Property: Company, Private
 - o Cells in the following details:
 - i. Open switchgear cells,
 - ii. Modular cells,
 - o Transformer Building that contain:
 - i. Open switchgear cells and transformer
 - ii. Modular cells and transformer
 - o Marshalling Kiosk: The number of marshalling kiosks in each operation center's service area.
- Meter Reading: The number of meters read for a given period in the following details:
 - o Irrigation
 - o AMR
 - o Others
- Theft Detection: The number of meters controlled for a given period for theft detection by meter type (monophase, triphase, meters reading reactive energy (combi, primer X5, seconder X5))

3.2.4 Data Requirement - Losses

In EU practises, DSOs or suppliers are responsible from the losses. In Turkey, it is the DSOs responsibility to lower the losses. EMRA sets targets for the DSOs, based on the loss reduction formula, which lowers the target by 2%-3% of the average of the previous three years each year.

Data Already Requested by EMRA: The energy entering the system and the accrued energy are collected for each distribution region.



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Additional Data Requirements: As stated in section 3.2.1.3 Cost Accounting, costs of loss reduction activities should be separated from the overall OPEX, to compare the loss reduction costs with the realized loss reductions. In preparation process for 4th Regulatory Period, EMRA has already requested costs of Loss Reduction activities separated in Cost Realization Tables of 3rd Regulatory Period from DSOs. This fact enables DSOs and EMRA to link the actual costs and change in technical and non-technical losses. This structure could be assisted with full implementation of business process-based cost accounting principles.

Besides, as stated in section 3.2.1.2 Business Plans, DSOs should submit loss reduction plans, expected costs and targeted loss ratios with the required OPEX budget. Based on the accepted Business Plan and the realizations, bonuses/penalties to the DSO should be defined.

3.2.5 Data Requirement - Network Tariff

In Turkey, network tariffs are applied generally as volume related charges (per kWh). Customers who choose the double-term tariff (capacity charge), pays a fee per kW connected capacity and a lower distribution fee per kWh. However, due to the increase of distributed generation, volumetric charges will not reflect the real cost of the customers. Therefore, capacity charges should be applied to balance the system and remove the cross-subsidy for the distributed generators.

Data Already Requested by EMRA: EMRA collects, demand forecasts by customer groups and by province from the DSOs.

Additional Data Requirements: Connection capacity of the customers and/or the peak loads for the MV customers should be collected by EMRA, to determine capacity charges.

3.2.6 Current Data Collected by EMRA through EBIS

Within the context of the existing Regulation on Notifications in the Energy Market, below data groups are collected from the DSOs for the main usage of specified departments:

Tariffs Department:

- Revenue Data
 - o Annual Revenue Correction (annual),
 - o Semi-annual revenue (half-yearly),
- CAPEX
 - o DSO CAPEX Forecast (Annual),
 - o DSO CAPEX Realization (Annual),
 - o DSO CAPEX incomplete within tariff period (5-years),
 - o DSO Investment Plan (5-years),
- R&D
 - o DSO Research and Development (case-dependent),
- Finance
- Financial Information (semi-annual),
 - o Credit Usage (semi-annual),
 - o Payment Liability (monthly),
- DSO Demand Forecast (annual),
- Meter install/uninstall information (annual),

Electricity Market Department:

- Continuity of Service
 - o DSO Outages (monthly),
 - o DSO Quality Indicators (annual),



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- Commercial Quality
 - o DSO Grid Quality Indicators (monthly, annual),
 - o DSO Commercial Quality Realizations (annual),
 - o DSO Commercial Quality Indicators (annual),
 - o DSO Call-Center (monthly),
- Technical Quality
 - o DSO Technical Quality Equipment (annual),
 - o DSO Technical Quality Equipment Measurements (quarterly),
- Unlicensed Plant Information (monthly),
- DSO Connect/Disconnect (quarterly),

Strategy Development Department

- General Statistics
 - o DSO Regional Information (quarterly),
 - o Unlicensed Plant Information (monthly),
 - o Consumption Information (monthly),
- DSO Call-Center (monthly),
- Security of Systems
 - o EKS Risk Reduction Activities (semi-annual),
 - o EKS Identification and Risk Assessment (Annual),
 - o EKS Inventory (Annual),
- License Fee
 - o License Fee (annual),

Details of the collected data via EBIS are provided in Annex-1.

3.3 Amendment of Secondary Legislation

Main legislation that regulates EMRA's data collection process is the Energy Market Notification Regulation. Within the scope of this regulation, procedures and principles of the data collection and the penalties for missing or false data are introduced. Data table formats, time periods and frequency of the tables are defined in the Notification System Usage Instructions, which is determined by the EMRA Board Decisions. Therefore, new data formats and frequency changes can be done via EMRA Board Decisions.

Since there is no binding rule for the data collection mechanism, and the new data can be added to the Notification System by EMRA Board Decisions, current legislation is sufficient to obtain additional data from the DSOs and Retail Cos.

On the other hand, the following alternatives regarding data harmonization and standardization can be presented for EMRA:

1. Maintaining the status quo.
 - In the current system data is received through EBIS, which uses standard templates which actually satisfies harmonization and standardization across companies. Also, bulk and granular data are transferred from all distribution companies' IT/OT systems.
 - The validation of relevant data can be provided via ad-hoc direct system access to all IT/OT systems of the companies and manual controls.
2. Improvement of data validation process.
 - Again, data can be received with the same approach.



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- However, some basic quality control and quality assurance rules, see Section 4, can be defined, and these pre-defined rules can be applied automatically. The occurrences where these rules are violated are flagged automatically and they can be managed through deeper analysis.
3. Advanced regulatory analytics and reporting automation.
- In this approach, some KPI's can be defined and these pre-defined KPI's are used to receive the data, in addition to some relevant reports which can be gathered through standard templates.
 - Pre-defined advanced quality control and quality assurance rules can be applied to satisfy automated validation. Again, the occurrences where these rules are violated are flagged automatically and they can be managed through deeper analysis, but not the bulk data.
 - Differently, in this approach the raw data is not audited, only the analytics processes should be audited.
4. Long -term CIM (Common Information Model) vision.
- Distribution companies can be enforced to apply CIM compatible data exchange definitions in the following 10 years period.

It is recommended to use alternative 3 approach for the short and mid-term. For long term, moving towards alternative 4 might be preferred.



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4 Electricity Transmission

4.1 Identification of Data Requirements

Data requirements and harmonization and standardization of data is set up by EMRA in compliance with Electricity Market Law (EML). TEIAS is obliged to provide both physical investment and specified commercial operational data specified by EMRA. For the purpose of establishing a performance-based tariff structure, EMRA needs to access to the relevant data for such tariff structure and accordingly establish procedures, standards and electronic formats for fundamental data reporting by the TEIAS. This section focuses onto the specific data requirements of the authority related with the proposed performance indicators in the Task 1.1, electricity transmission part.

The main data sources related with the electricity transmission activities can be stated as the TEIAS records, 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.

TEIAS has to comply with the statutory requirements of the Law on Public Finance Management and Control (Law no. 5018) and relevant Turkish accounting standards for taxation and accounting purposes. Such accounting records are necessary to ensure that all the revenues, costs, assets, liabilities and reserves are separately identifiable for electricity transmission activities. On the other side, operating in a regulated environment, TEIAS must cope with the accounting requirements specified by EMRA. These regulatory requirements are generally described as “Regulatory Accounts” and those are focused onto electricity transmission activities. The regulatory accounting principles are related with reporting rather than bookkeeping. From the regulation point of view, the main purpose of regulatory accounts is to monitor performance against the assumptions underlying price controls. So, these accounts mainly deal with the revenues and the expenditures related with electricity transmission activities and the TEIAS shall keep the records of the revenues and expenditures according to the Regulatory Accounts specified by EMRA.

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. TEIAS has already commenced to submit relevant data and reports through EMRA Electronic Notification System (EBIS) 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 4.1 – Information requested from the TEIAS under the Regulation on Notifications

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 January 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



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Name of Notification	Notification Frequency	Notification Time	Period of Notification
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

4.2 Revenue Requirement OPEX/CAPEX/TOTEX

4.2.1 TOTEX Recommendation

Currently EMRA tariff methodology uses separate budgets for OPEX and CAPEX. However, there is transitivity between operational and investment costs. For example, a CAPEX cost like asset replacement/refurbishment can be replaced or delayed with proper maintenance costs which are OPEX costs, similarly manual operation of Manned Substations costs (OPEX) by staff can be replaced by Unmanned Substations with automation investment (CAPEX), or vehicle purchase costs (CAPEX) may be replaced by vehicle rental costs (OPEX) based on the optimal decision of the TEIAS. In order to incentivize TSO to choose the best solution between OPEX and CAPEX, there should be a TOTEX methodology in effect.

Data Already Requested by EMRA: Regulatory Account Plans are collected by EMRA to see the TEIAS expenditures based on their trial balance sheets. These balance sheets show the total expenditures about the CAPEX (i.e. network investments, environmental/security investments, software investments, etc.) and OPEX expenditures (i.e. staff costs, vehicle costs, fuel costs, material costs, etc.). However, the transitivity between the CAPEX and OPEX costs cannot be seen from these data. For example, for the vehicle costs, distinction between the vehicle investment costs, rental costs and operational costs cannot be done.

Additional Data Requirements: Budget realization of items included in TOTEX, such as IT/OT hardware and software, vehicle, acquisition of new buildings should be collected from the TEIAS.

Table 4.2 – Realizations of budgets

TOTEX Cost Items	Initial CAPEX (EPE _t) ₺	Annual OPEX (EPE _t) ₺
IT/OT Hardware and Software		
Vehicle		
Buildings		

4.2.2 First Connection Fees

First connection charge is characterized as “Super-Shallow” types in Turkey. “Shallow/Super-Shallow” connection charges applied in the most of EU Countries such as in Germany, Italy, Portugal, Norway, UK. This applies to both generation and load and means that connection charges relate only to the costs of assets installed solely for, and only capable of use by, an individual user and all other assets are assumed to be shared and their costs are included in the wider transmission tariff. However, the first connection charges type in Sweden is characterized as “Deep” type; Generators or demand consumers connecting to the grid pay all costs related to this (lines, sub stations, etc.) system connection and system reinforcement.

Although Super- Shallow Methodology is compatible with the EU, due to very large geography of Turkey, there are investment and operation difficulties, which is like Sweden, deep first connection charges methodology shall be implemented. If the first connection costs are socialized, then the generation/consumption facility investments cannot be optimally (minimizing total costs) located by the investors. Therefore, a smooth transition period, at first shallow and then deep first connection methodology is recommended for Turkey.



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Data Already Requested by EMRA: First connection investment costs are collected by EMRA via a form EGDF-05 as a summary through “New Connection Investments” and “User Participations in New Connection Investments” items. However, there is no separate items for new connection investment in forms EGDF08Y1, EGDF08Y2, EGDF08Y3 and EGDF09 which are used to submit details of network investments.

These costs are socialized to all transmission connected users through System Usage Tariff.

Additional Data Requirements: TEIAS should prepare their own connection fee methodology and submit to EMRA for approval, for 380 kV, 154 kV and MV, Substations, feeders, compensation units, overhead lines and underground cables. In this methodology;

- Connection asset costs,
- Network reinforcement costs (specific to new connection application category, separate for each generators and load connections),
- OPEX costs (accepting applications, document control, site visits for tests and energy permission, reviewing projects, transmission connection agreement works, final acceptance) related to new connection application.

4.2.3 Refurbishment Cost Estimation:

Since the replacement/refurbishment costs will be determined ex-ante and corrected after the realizations in t+2 year, there is a need for replacement/refurbishment cost estimation methodology.

Data Already Requested by EMRA: EMRA do not collect data about the age profiles and conditions of the assets via the EBIS system.

Required Data: Age and condition of the network assets

Additional Data Requirements: Because the refurbishment requirement will be higher for older assets and it changes based on the current age of the network, this data should be taken to estimate the refurbishment costs. To estimate the cost, firstly a network assessment methodology should be prepared, where the Health Index groups and criticality groups are defined.

To estimate the refurbishment costs, below table should be filled for each asset category.

Table 4.3 – Estimating refurbishment Costs

Network Asset (i.e. transformers)	Health Index Group 1	Health Index Group 2	Health Index Group 3	Health Index Group 4	Health Index Group 5
Criticality Group 1	Number of assets within this group (Health index =1 and Criticality=1)				
Criticality Group 2					
Criticality Group 3				Number of assets within this group (Health index =4 and Criticality=3)	
Criticality Group 4					

The asset categories are as follows:

4.2.3.1 Network Assets Replacement Costs

In the current legislation about the asset replacements/refurbishments, in general, if the asset life is above 30 years and the refurbishment is done fully for a group of assets (i.e. refurbishment project can be prepared and approved by strategic budget presidency), then the replacement costs are covered by CAPEX budget. However, if the assets fail and need to be replaced individually, then this replacement is done by OPEX budget. Since the failure rates differ



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each year and by the ages of the assets, it is difficult to forecast the asset replacement costs and this causes uncertainty for the OPEX budgets. For this reason, asset replacement costs are recommended to be corrected based on the number of replacements.

Data Already Requested by EMRA: EMRA do not collect data about the asset failures and replacements in the context of OPEX.

Additional Data Requirements: Number of replaced network assets should be collected by EMRA.

Table 4.4 – Realized Network Assets Replacement Costs

Network Asset Replacement Category	Type	Voltage Level	Quantity of Replacements
Substations	Air Insulated Substations (AIS)/ Gas Insulated Substations (GIS)	380 kV, 154 kV and MV	
Over Headlines	Double Circuit / Single Circuit; No of Bundle, Cross-Sections of the conductor	380 kV, 154 kV and MV	
Transformers	400 MVA, 250 MVA, 100 MVA ... etc.	380 kV, 154 kV and MV	
Cables	Underground / Submarine	380 kV, 154 kV and MV	
Secondary Systems, Control Centers, Automation and Communication Systems			
Compensation Units	Series / Shunt	380 kV, 154 kV and MV	

4.3 Performance Indicators

4.3.1 Supply Continuity

The most common indicators for measuring continuity of supply in transmission networks are ENS (energy not supplied) and AIT (average interruption time). ENS gives the total amount of energy that would have been supplied to interrupted users had there been no interruption. AIT is expressed in minutes per year and is calculated as 60 times the ENS (in MWh) divided by the average power supplied by the system (in MW). 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. It is recommended that TSO should be subject to a far softer quality regulation which is only a simple penalty system.

Data Already Requested by EMRA: Data for events and delimitations (the reason, duration and interrupted power amount (in MW) from each outage) are collected by EMRA via forms EYTF-20 and EYTF-21.

Additional Data Requirements: Collected data of EMRA is not enough to measure supply continuity. Number of Users connected from each Substations and connectivity of each meter and related feeders should be confirmed by TEIAS SCADA and OSOS. Through this TEIAS infrastructure, ENS and AIT data should be submitted to EMRA.

On the other hand, force-majeure events should not be counted in ENS and AIT calculations. Force-majeure events may be defined by the number of outages in a given day.



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4.3.2 Commercial Quality

Commercial quality indicator defined for TEIAS in the Regulation on the Electricity Market License such as response time for connecting new customers to the transmission network. In Turkey, commercial quality indicators are limited compared to other countries.

In Turkey, commercial quality indicators are defined. Standard due dates to response for new applications requirements to be connected to the transmission network. However, the data collected via a form EPF-07 is not enough to measure response period.

On the other hand, incentives may be defined for the TEIAS who increase renewables energy connection capacity in Turkey, setting and monitoring a target ratio for connection of renewables should be the focus in 6th implementation period. For this measure, one missing point in Turkish system is the customer satisfaction levels. To measure this, customer satisfaction surveys should be held

Data Already Requested by EMRA: The data collected via a form EPF-07 by EMRA are relevant with the response for new applications which are positive or negative. However, this data collected via a form EPF-07 by EMRA is not enough to measure response period, consequently, to evaluate commercial quality of TEIAS defined in the regulation.

Additional Data Requirements: The form EPF-07 shall be revised to cover the response period for new applications.

On the other hand, based on the TEIAS activities and the collected data, transmission system user's satisfaction surveys should be held each yearly by an independent survey company, which is contracted by TEIAS. However, the survey questions, answering options, selection methodology of the survey customers should be determined by EMRA.

TEIAS should supply the survey company the information about the transmission system users who have experienced an activity specified in the questionnaire, in a yearly period. The data should include:

- New connection users,
- Loss of supply users,
- Other complaints,

By applying these surveys, customer satisfactions, complaints can be analyzed. Also, some questions to measure customers' willingness to accept and willingness to pay may be added in order to calculate value of loss load.

4.3.3 Technical Quality

Currently, technical quality data is not collected by EMRA, although relevant forms which are EYTF-22 and EYTF-22 regarding voltage quality are published in EBIS. There is no defined penalty or bonus for technical quality.

Data Already Requested by EMRA: In Turkey, nominal voltage levels voltage harmonics and voltage fluctuation limits are also defined in Electricity Market Network Regulation.

Additional Data Requirements: No additional data required.

4.3.4 Investment Realization

Investment expenditures of the TEIAS give signals for future service quality satisfactions. If the investments decrease below a critical level, then the supply continuity targets may not be satisfied in the near future. TEIAS' yearly investment expenditure to be realization ratio is not defined in Transmission System Revenue Regulation. However, it is recommended to evaluate realization of investment expenditure.

EMRA has already collected the relevant CAPEX expenditures for this subject via forms which are EGDF-05, EGDF08Y1, EGDF08Y2, EGDF08Y3 and EGDF09 and there is no additional data requirement.



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4.3.5 Health and Safety At Work

As an important quality parameter, EMRA collects the number of deadly work accidents from the DSOs and uses the “0” death as a general performance indicator for the TSO. There is no additional required data for this issue.

4.3.6 Value of Loss Load (VoLL)

VoLL is the economic value for the absence of 1 kWh energy in a region. It is higher in regions, where electricity is used as an intermediary product to create value (i.e. industry, commercial regions), and lower if it is used only for daily needs. Therefore, improvement of ENS and AIT in an industrial region creates more value than improvement of ENS and AIT of a rural region. This relationship can be used for determining bonuses/penalties for these improvements and forms a reasoning between quality improvement and OPEX. This data should be measured via surveys for each TEIAS.

4.4 Efficiency

In Turkey, although written in the secondary regulation, the target efficiency levels of the TSO has not yet defined by EMRA. It is recommended that efficiency factor for TEIAS should be defined. As a first stage, the controllable cost is reduced year by year by an efficiency target.

Data Already Requested by EMRA: The following data are submitted by TEIAS

- Energy entering and exit to/from the transmission system,

The existing reliable data are also submitted by TEIAS for following core duties:

- Transmission (T) duty through high voltage transformers, overhead lines and cables, through high voltage transformers, overhead lines and cables with the operational control and communication by SCADA System, metering, etc., as daily activities
- Interfaces with other entities; DSOs, generations or interconnections with neighbouring countries
- Activities; grid operation, maintenance (M) and planning (P)
- Indirect (I) support (partially); Central management, including CEO, Board of directors and equivalent; the residual assets for a TSO (e.g. office buildings, general infrastructure) are also explicitly included in the scope.

The OPEX cost items are derived directly from the TEIAS data per activity to aggregate. TEIAS has already submitted following data:

- The financial data and
- The asset data

A Financial accounting data report based on the audited financial statements is submitted by TEIAS. This way the costs reported in the investment stream align with the costs of investments in the audited financial statements and the reported expenses align with the expenses in the profit and loss account of the audited financial statements.

In addition:

- Personnel expenses: the non-capitalized expenses for internal and external personnel including all taxes, charges or fees related to salaries, pensions and other payroll items. This includes temporary personnel carrying out activities for the TEIAS.
- Energy expenses: the non-capitalized expenses for purchasing gas and/or electricity to operate machinery and buildings, for energy losses during transport, and for congestion management and redispatch.
- Expenses for landowner compensation, right-of-way and easement fees: the non-capitalized payments to third parties as a result of a legal process (e.g. expropriation or compensation agreement), procurement or negotiation, related to the damage, injury of land, and /or the right to use land, roads or waterways for the activities of the TSO. This includes the direct expenses for judicial assistance, court



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- fees etc. for legal processes (terminated or non-terminated) related to the use, damage or injury of land for the activities of the TSO.
- Expenses for taxes and levies: non-capitalized state, municipal and regional taxes, levies and public fees paid for the ownership of specific assets (e.g. property taxes, packaging), the use of specific processes (e.g. environmental levies), for investments and procurement (stamp taxes, legal fees, customs), for non-claimed value-added taxes (foreign VAT).

4.5 Losses

The costs for losses are passed on to consumers, giving system operators no incentive to reduce network losses in the most of EU Countries. Proper measures should be introduced to incentivise system operators to reduce losses in their grids or at least maintain them at low levels if they are already efficient.

As of 1/1/2016, transmission losses are purchased by TEIAS from the Day Ahead Market and / or through a bilateral agreement. The costs for losses are passed on to all transmission system users.

Data Already Requested by EMRA: In Turkey, transmission network losses are measured as the difference between metered input and metered output (MWh). Transmission losses are calculated as the difference between the settlement aggregation amount (UEVM) and the settlement aggregation withdrawal amount (UECM). In other words, the difference between the amount of production produced by the plants and the amount of consumption constitutes the transmission losses. This is the sum of the losses caused by the resistance of the conductors used in transmission lines, corona losses, copper and iron losses of power transformers and autotransformers.

Additional Data Requirements: The costs for losses are passed on to consumers, giving system operators no incentive to reduce network losses. Proper target should be introduced to incentivise system operators to reduce losses and costs in their grids or at least maintain them at low levels if they are already efficient.



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5 Gas Distribution

Data harmonization mainly aims the improvement of data quality, data management, and monitoring by the use of smart assessment capabilities. Data harmonization enables existing characteristics of data and action taken on data and uses that information to transform or suggest subsequent data quality improvements.

Data harmonization technology is applicable in a variety of business functions, particularly in energy sector for strengthening and supporting regulatory environment.

Data harmonization enhances the quality and utility of natural gas distribution sector market data. Moreover, data harmonization also let regulatory authorities to transform data and create new data analyses and visualizations without further technological involvement.

Decreasing the time to create and access market intelligence insights, while also lowering the total cost of data analysis is also achieved by data harmonization.

Data harmonization and standardization techniques are quite similar in European countries as well as in Turkey. Standard excel forms are seems as the backbone of data collection systems. As details explained in next sections this report, major European regulatory authorities are relying on standard excel forms in data collection. Online data submission platform, interfaces are also used as major interaction between market players, customers, and regulatory authorities. EBIS like platforms are quite common.

Data Requirements for the Performance Based Tariff Structure: As a general approach, European regulatory authorities do not make a clear distinction between the data collected for tariff structure or monitoring purposes. Regulations are flexible enough in giving mandate to regulatory authority to use the collected data at a wide scale from tariff assessments to conduction of inspections.

However, in our researches we have found out that, regulatory authorities are using customer satisfaction tools and network operations as major parameters in deciding performance-based tariff structures. Details and recommendations on these issues are discussed in next chapters of this report.

5.1 International Benchmarks

5.1.1 Italy

Data requirement, harmonization and standardization: ARERA collects data in the same format from all market operators actively operating in gas market. Though main topics are the same, collected data may change according to the specific features of the market and requirement of the activities.

Excel forms are widely used to standardize and harmonize data collection from market players. Like EBIS system of EMRA, ARERA also uses its own web-portal as main interface between regulator and companies to ensure secure data transfers.

In the following table it has been summarized the data collection, the frequency and the responsibility and the instrument used. As it is listed in the table, RAB, Unbundling, Grid Safety & Continuity related data is both used for tariff scope and market monitoring purposes by the Regulator. Especially, grid safety & continuity chapter offers penalty and award mechanism for the distribution companies.

Table 5.1 – Data Collected, Frequency and Responsibilities

Collected Data	Data typology and monitoring scope	Frequency	Who – subject obliged to provide the collection	Typology of transferring data used by ARERA
RAB	Variation of the assets and investments (economically and physically)	Every Year	TSO DSO	Excel file upload in the ARERA web portal



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Collected Data	Data typology and monitoring scope	Frequency	Who – subject obliged to provide the collection	Typology of transferring data used by ARERA
	Values of private and public contribution. Tariff scope			
UNBUNDLING	Official balance sheet values recorded according to the rules of separate accounting. Tariff scope Market monitoring	Every Year	TSO DSO	Excel file converted in xml files upload in the ARERA web portal
GRID SAFETY & CONTINUITY	Standards connected to the safety and continuity grid requirements Penalties and awards mechanisms	Every Year	TSO DSO	Excel file upload in the ARERA web portal
TECHNICAL QUALITY	Standards related to the technical services for whom, in case of non-conformity, the operator must pay the customer	Every Year	TSO DSO	Excel file upload in the ARERA web portal
COMMERCIAL QUALITY	Standards related to the commercial services for whom, in case of non-conformity, the operator must pay the customer	Every Year	Suppliers	Excel file upload in the ARERA web portal
GAS SETTLEMENT	Consumption data aggregated for energy provider Consumption for each POD	Every month Every Year	TSO DSO	SII (Sistema informativo Integrato)- Aquirente unico
RETAIL MARKET (PRICES, CONTRACTS, SWITCHING, FDD - FUI, COMPLAINTS, CONSUMPTIONS)	Prices of the commercial proposal Complains Invoices Number of last resort	daily Every month Annually reported by ARERA	TSO DSO Suppliers	Portale offerta Registro (SII) – Sportello Consumatore <i>Aquirente unico</i>

RAB and Unbundling: The obligation of administrative and accounting unbundling for the companies operating in the electricity and gas sectors has been introduced, among others, to exclude the companies operating in the electricity and natural gas sectors from carrying out resource cross-subsidies between the different sector activities. During 2018, the Authority did not initiate or conclude, in the gas sector, procedures for ascertaining violations of the regulations concerning administrative and accounting unbundling obligations²¹.

In these collections, information is provided annually related to operating costs (OPEX) and in capital invested (CAPEX) according to the schemes provided by ARERA. The RAB focuses on the annual variation of the investment separated per asset and for localities. The data collection relating to the RAB aims to collect the differences in the fixed assets and in the contributions received for the realization of public or private investments.

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.

²¹ Source: ARERA Annual Report 2019: https://www.arera.it/allegati/relaz_ann/19/AnnualReport2019.pdf



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Operators must have separate accounts by location and by activity (for example for the DSO distribution, measurement and marketing) which are transmitted with the accounting unbundling data collection annually, on the basis of the communicated accounting data and the RAB data, ARERA sets the reference tariff, in other words the revenues constraint of for each enterprises.

The reference tariff guarantees the costs coverage recognized to each operator for the service supply and determines the maximum revenue achievable by the enterprise (revenue cap).

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.

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 the following data:

- Length of the grid and grid materials (steel, cast iron, polyethylene);
- Inspected network length (inspection performed according to the technical specifications for the ARERA CIG and UNI);
- Number of plants with remote controlled cathodic protection;
- Length of cathodically protected grid;
- Number of continuous or non-continuous compliant potential measurements (according to the reference technical specifications for ARERA APCE and UNI);
- Number of remote monitored and measured comes from the grid systems;
- Number of odorization measures performed according to the technical specifications for the ARERA CIG and UNI);
- Odorant volume introduced into the network;
- Volume of gas distributed to the city gate;
- Number of gas outages with notice;
- Number of gas outages without warning;
- Number of leaks (on meter, overhead or underground connection system and / or network) on third party reporting;
- Number of losses (on meter, overhead or underground connection system and / or network);
- Classification of the type of dispersion based on the technical specifications for the ARERA CIG and UNI);
- Total number of calls to the emergency call center;
- Number of emergency interventions;
- Time to answer the call;
- Time of arrival at the emergency site;
- Safety setting time;



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- Number of occurred accidents.

ARERA monitors and collects the data necessary for the participation of the incentive mechanism and verifies operators' compliance with the service obligations relating to security and service continuity.

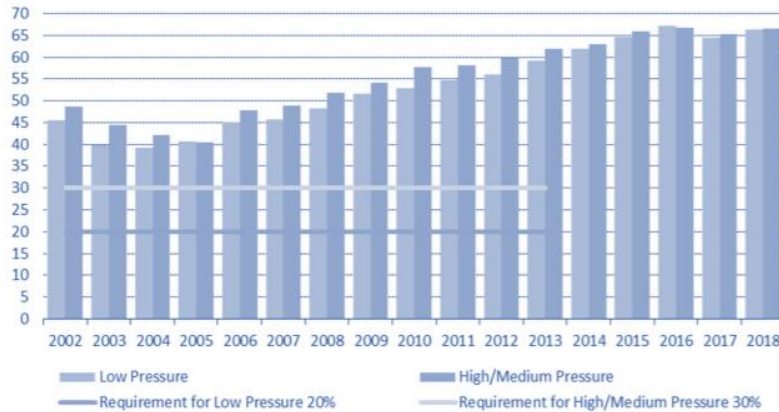


Figure 5.1 – Percentage of network inspected since 2012²²

The regulation provided a minimum annual obligation until 2013, then, in 2014, it introduced an inspection obligation equal to 100% of the network in the three years (high/medium pressure network, HP/MP) or in the mobile four year term (low pressure network, LP). There is an increase for 2018 compared to 2017. Network inspections have the general objective of intercepting leaks for greater citizen safety.

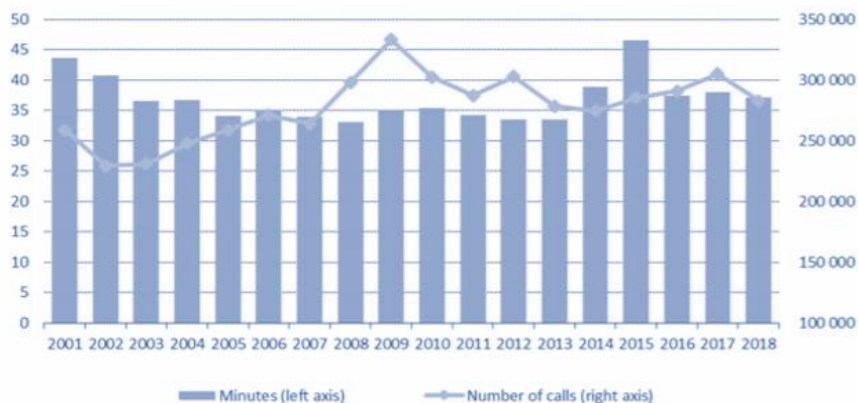


Figure 5.2 – Emergency intervention on distribution systems²³

Concerning the requirements in matters of emergency services, Figure 5.2 shows the arrival time on site after a phone call, for which an average national value of 37 minutes was recorded, slightly lower than in 2017. The regulation requires that the percentage of calls for emergency intervention for which the operators arrive at the call location within a maximum time of 60 minutes is equal to at least 90%. The obligation of recording the calls, introduced from 1 July 2009 and accompanied by control campaigns on gas emergency services, implemented with the help of the Guardia di Finanza (Financial Police), induces the companies to record the data precisely. We must also add that the companies obliged to participate in the premium penalty regulation related to safety recovery has gradually increased and the compliance with the emergency regulation is an essential requirement for acknowledgement of the bonuses.

²² Source: ARERA Annual Report 2019: https://www.arera.it/allegati/relaz_ann/19/AnnualReport2019.pdf

²³ Source: ARERA Annual Report 2019: https://www.arera.it/allegati/relaz_ann/19/AnnualReport2019.pdf



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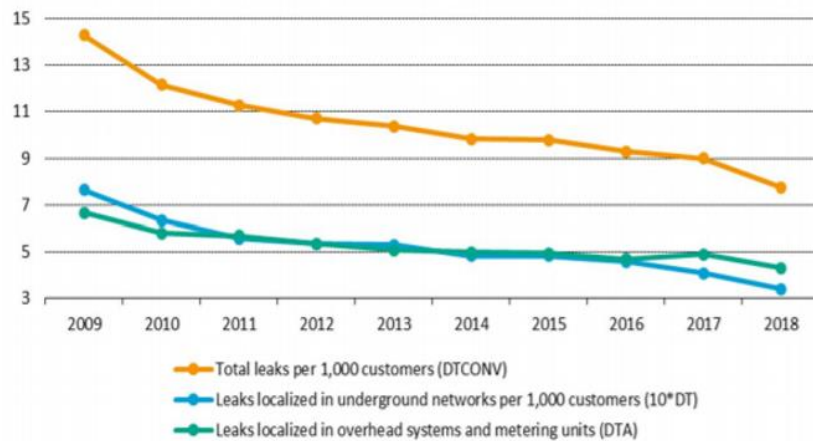


Figure 5.3 – Number of localised leaks following third party notifications every 1000 customers²⁴

Figure 5.3 shows the number of localised leaks following third party notifications per thousand customers for the distribution systems subject to the premium-penalty regulation: a significant decreasing trend was found both for the underground network and the aerial network in 2018, about three underground leaks and four aerial leaks per thousand customers were recorded.

Technical Quality: This data collection focalized on the commercial service 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.

The data to be collected are the time, the number of compliance to the standard imposed by ARERA, the cause of the out of compliance and the number of each compensation paid in the case of out of compliance due to the DSO of the following services:

- 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).

Commercial Quality: 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 followed are:

²⁴ Source: ARERA Annual Report 2019: https://www.arera.it/allegati/relaz_ann/19/AnnualReport2019.pdf



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- 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;
- Maximum time of complete and non-interlocutory response to the request for completion of the Consumer Counter (a virtual place, web portal, called *Sportello consumatori*, 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.

Gas Settlement and Retail Market: This data 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).

5.1.2 Spain

Data requirement, harmonization and standardization: The Regulator uses Oracle technology for the Internal Information System. There is no specific data requirements for tariffs until 2021. New data requirements for tariffs are under development. Data of revenue requirements and tariffs determination undergo independent auditors.

Data standardization is ensured thanks to the application of the regulated forms for each data provision requirement. Standardization is ensured through the application of regulated data submission templates, forms. All data requirements are clearly and detailed defined in the regulation together with data submission forms.

The Spanish regulator (CNMC) enables market participants to comply with its data submission requirements remotely. CNMC online site enables electronic certificate access. Market participants subject to regulated data



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requirements may upload the required data directly on the CNMC online site. Excel forms are still in use together with XML and web forms. Some excel templates are shared with the support documents.

The CNMC classifies each data information system security level as basic, medium, advanced. The information system for gas reporting is classified as Basic. During the uploading of data directly by market participants on the information system there is a validation process to ensure that submitted data is compliance with the data submission requirements. If the information submitted to the Information system directly by market participants is not compliance with the requirements a warning message appears. Periodically data received is reviewed to assess its completeness and coherence.

Additional data requests are issued to collect missing data from market participants. Data collection, processing and validation is done automatically with software. Data changes are not logged, reports only include final data. A coherence analysis is carried out automatically doing cross-checks for the data collected previous years and data recently received with several sources e.g. suppliers' data vs DSOs' data. The consistency between the versions of a particular data presented to the regulator at different times for different purposes and coherence analysis are done automatically by the information system developed with external IT support. There is a software in use for the harmonized the collected data of the CNMC.

There is no regulated incentive for upgrading digitalization level of market participants. Data submission requirements are pretty basic and even e-mail data submission is allowed.

Mainly customers complaints and commercial QoS data are collected in service quality monitoring. There is no QoS penalization, incentive regulation in place. Consequently, regulated QoS data submission requirements are scarce. Some indicators dealing with supply incidents and technical inspections are collected for Technical QoS.

Regulated data requirements for the retail market: distribution and supply companies: In 2008, data submission requirements for all active agents in the gas sector were approved through two resolutions of the CNMC. There exist different data requirements for suppliers, transmission and distribution companies but in this section, it is presented only the requirements affecting distribution and retail supply companies. Framework gas sector law (Law 34/1998 of Hydrocarbon sector) as amended in 2007 established that Spanish NRA (at that time the CNE) should elaborate a yearly report assessing the degree of development of competition in the hydrocarbon market. In order to prepare this report, it was necessary to have an organized and periodically updated information system and data base. To this aim, CNMC Circular 5/2008 established data requirements for the Spanish gas retail market. These data requirements affect supply companies, DSOs, transmission companies with final customers connected to their network and direct customers (active in the wholesale market).

Below is presented the full list of data forms (related to retail and distribution sector) that each stakeholder shall submit to the CNMC:

Table 5.2 – Detailed data requirements of gas distribution and supply companies (Spain)²⁵

Responsible Market Agent	Element	Contents	Frequency and submission data
Supplier	Consumption and prices by customer category	For each pressure level and consumption category: <ul style="list-style-type: none"> - Number of customers (#) - Average net price (€/kWh) - Average gross price (€/kWh) - Quantity supplied (MWh) 	Monthly (20 th of the M+1 for month M data)
	Consumption per province	For each region and customer category: <ul style="list-style-type: none"> - Number of customers (#) - Quantity supplied (MWh) 	Yearly (March 15 th of Y+1 for year Y data)
	Interruptible consumption	For each customer with interruptible supply contract: <ul style="list-style-type: none"> - Number of supply points (#) 	

²⁵ Source: CNMC Regulation (5/2008) and DGPYM (December 2008).



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Responsible Market Agent	Element	Contents	Frequency and submission data
		- Quantity supplied (MWh)	
	Firm/Interruptible supply	For each month: - Total consumption: firm/interruptible (MWh)	
	Gas Generation Supply	For each type of gas-fired generation plant (CCGT, thermal and cogeneration): - Average net price (€/kWh) - Average gross price (€/kWh) - Quantity supplied (MWh)	Monthly (20 th of the M+1 for month M data)
	Customers' number	For each pressure level and consumption category: - Number of customer at the end of each month (new and cancelled supply contracts)	
	Average duration of the supply contracts	Duration of the supply contracts for each customer category	Yearly (March 15 th of Y+1 for year Y data)
	Supply interruption due to non-payment	Per each customer category and supply company	
	Additional services	Per each customer category and service: - Number of contracts - Average price	
	Average monthly prices	For each pressure level and consumption category: - Average net price (€/kWh) - Average gross price (€/kWh) - Quantity supplied (MWh)	Monthly (20 th of the M+1 for month M data)
Distribution System Operator	Consumption by supply points category	For each pressure level and consumption category: - Number of supply point (#) - Quantity supplied (MWh)	Monthly (20 th of the M+1 for month M data)
	Consumption by supply points category	For each pressure level and consumption category: - Number of supply point (#) - Quantity supplied (MWh)	Monthly (20 th of the M+1 for month M data)
Distribution System Operator	Consumption per province	For each region and customer category: - Number of supply point (#) - Quantity supplied (MWh)	Yearly (March 15 th of Y+1 for year Y data)
	Supply points number	For each pressure level and consumption category: Number of customer at the end of each month (new and cancelled supply contracts)	Monthly (20 th of the M+1 for month M data)
	Supply switching requests	For each supply company and type of customers: - Requests received. - Requests accepted/rejected (status) - Average response time - Average activation time	
	New supply points activation	For each supply company and type of customers: - Requests received. - Requests accepted/rejected (status) - Average response time - Average activation time	
	Supply switching rejected requests	Number of switching request denied (and reason) per supply company	
	New supply points applications rejected	Number of supply point activation request denied and reason. Per supply company	



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Responsible Market Agent	Element	Contents	Frequency and submission data
	Supply interruption due to non-payment	Per each customer category and supply company	Yearly (March 15 th of Y+1 for year Y data)
	Supply interruption due to absence of supply company	Per each customer category and old supply company	
	Customers services data	- Number of urgencies - Number of inspections	
	Additional services	Per each customer category and services: - Number of contracts - Average price	
	Distribution Gas Balance	Per each distribution network: - Supply points - Entry quantities - Exit quantities (other networks and end users). - Losses	Yearly

Apart from data forms, Spanish regulatory framework also contains additional provisions related to data requirements and submission procedure.

Customers Complaints: Data Submission Requirements: Circular 2/2016 of the CNMC established the guidelines for the submission of complaints registers for supply and distribution companies.

A. Market participants required to submit data:

- Suppliers: last resort suppliers and suppliers with more than 1,000 customers in the open market.
- Distribution companies: all DSOs.

B. Data submission template:

Each regulated company may apply different internal procedures for customers complaints management. In order to harmonize data collection, the CNMC developed a unified data submission template based on standards codes to facilitate data processing and reporting.

On a quarterly basis, distribution and supply companies must send to the CNMC the complaints register according to the following template:

Table 5.3 – Customer complaints: data submission template (Spain)²⁶

Element	Contents
Sector	Electricity or Gas
Claimant Code	Customers, legal representative, etc.
Complain path	Customer-Supplier Customer-DSO Supplier-DSO
Complain code	Established by the receiving entity
Complain type code	Billing, connection, inspections, etc.
Supply point code or code	Supply point affected by the complaint
Tariff code	Identification of the access tariff
Region code	
Supplier code	
Distribution company code	

²⁶ Source: CNMC Regulation (2/2016).



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Element	Contents
Complaint requiring DSO actions	Yes/No
Channel	Customer-Supplier Customer-Supplier-DSO
Date	Initial submission date of the complaint
Status	Solved/pending
Action pending of each agent	Agents code
Time for resolution	Working days from the submission date until resolution date
Supplier resolution time	Working days devoted by the supplier to solve the complaints or response information requests by other agents related to the complaint.
DSO resolution time	Working days devoted by the DSO to solve the complaints or response information requests by other agents related to the complaint.
Customer resolution time	Working days devoted by the customer to response to information requests by other agents related to the complaint.
Other resolution time	Working days devoted by other agents to response information requests by other agents related to the complaint.

- C. Periodicity: data must be sent the first month of the quarter Q+2 with complaints data from quarter Q.
- D. Data submission format: data must be sent through the electronic information system of the CNMC.

5.1.3 UK

Data requirement, harmonization and standardization: Data collection has been through submission of reports, models, excel files by the companies to the regulator. For current regulatory review, much of the core data is submitted through an online portal, though supplementary analysis and clarification may be provided through bilateral communications (eg, email).

For data standardization, the main reporting packs are subject to an agreed set of Regulatory Instructions and Guidelines that the companies are required to follow when submitting information. Data templates also ensure the format of data submission is consistent.

The principles have been developed over a period of time alongside the companies drawing on issues raised by regulatory staff and expert advisors/consultants when reviewing and comparing regulatory submissions.

Regulatory reporting packs and associated instructions and guidance are standardized. Data templates have been designed to have single data entry where possible in order to avoid duplication and to facilitate reconciliations and balance checks. Separate narratives are required in Word format to support data submissions in templates. These should provide more detail on changes in performance, deviations from projections and implications for future activities as relevant.

Some aspects of data processing and assessment can be automated. For example, in the cost assessment process for network companies, there are processes to take the raw cost data and to normalize for benchmarking purposes through appropriate adjustments ahead of econometric or other benchmarking techniques.

Excel forms are commonly used in data collection. For example:

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



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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

All the updates in the data templates are logged via version submission control as explained in BPDT Instructions and guidance document for RIIO. (<https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-data-templates-and-associated-instructions-and-guidance>). While filling in the BPDTs and other data templates designed for the RIIO process. GDNs are required to enter the date of the submission and the dates of any re-submission the version number for each submission.

Consistency checking arises from having linked excel templates with detailed reference information included for tables (internal/external) Where data is harmonized there are adjustments made to the excel spreadsheets, often through application of macros.

There are pre-payment meter tariffs and a pre-payment meter tariff cap for people not on specific fixed-price deals that is regulated by Ofgem. Suppliers can price up to this cap or below. It is monitored regularly.

Ofgem does not have direct remote access to data from the market. Ofgem has powers to request information from licensees and there are several industry data providers. For example: Xoserve (<https://www.xoserve.com/services/consumer-switching/>) is the Central Data Service Provider for the UK gas market which remotely record switching of domestic customers when they change their gas supplier (transfer supply points) by analysing its supply point data.

Another example for remote data access can be collection of smart meter data via the Data Communications Company (DCC) which operates under the Smart Meter Communication Licence granted by BEIS to establish and manage the smart metering data and communications infrastructure and regulated by Ofgem. DCC is regulated by Ofgem and has its own price-control. It provides Smart products and services to enable efficient communication of energy data and information between consumers (homes and businesses), energy suppliers, network operators and other authorised DCC users.

Ofgem has developed a detailed set of Cyber Resilience Guidelines for gas and electricity network companies.

(https://www.ofgem.gov.uk/system/files/docs/2020/04/riio2_cyber_resilience_guidelines.pdf)

Ofgem encourages network companies to develop their digitalisation strategies and Network companies are required to make a “Digitalisation Strategy” publicly available, including on their websites and update it in line with the need to drive cost reductions for consumers. In 2019, Ofgem published an Energy Data Taskforce (EDTF) report (<https://es.catapult.org.uk/reports/energy-data-taskforce-report/>) to present a collective market-wide vision for how the sector –including network companies – can maximise the value of data and digitalise the energy system in support of the energy transition.

Data Assurance Guidance (<https://www.ofgem.gov.uk/ofgem-publications/98746>) sets the audit mechanisms required during the RIIO process (Eg. Data submission will be subject to an Internal Data Audit then that Internal Data Audit must be complete before the Data is submitted to Ofgem) GDNs may carry out additional assurance activities.

An understanding of these additional activities can provide increased confidence in the accuracy of the Data provided by the GDNs. Ofgem established the RIIO-2 Challenge Group in September 2018 with the objective of providing challenge to the energy network companies on their Business Plans for RIIO-2 and to Ofgem on its framework for RIIO-2, on behalf of existing and future consumers. GDNs are therefore encouraged more to have their Business Plans audited to provide assurance not only in relation to financeability but also Ofgem’s minimum requirements and providing Ofgem further statements of efficiency, robustness and ambition. As an example set of additional audit activities from RIIO-2 Challenge Group Report For Ofgem: Company Report of a GDN (Cadent) had three lines of defence including external parties in the second, as well as the third, stage: (1) management, project team and advisors (2) the company assisted by PwC and (3) internal audit and independent subject matter experts.



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The finance data is cross-checked with independent consultancies, investment managers and advisors by Ofgem.

E.g. For RIIO2, Ofgem proposes various cross-checks including the following:

- four cross-checks on CAPM evidence:
- Market to Asset Ratios (MARS),
- returns bid by investors in competitions run by Ofgem (OFTOs),
- professional forecasts from investment managers and advisors, and
- infrastructure fund discount rates.
- to estimate the raw equity beta by focusing on outturn data over long periods of time of at least 5 years, primarily using OLS, with GARCH as a cross-check.

The price controls apply to eight gas DNOs. Remaining small companies are not required to develop and submit detailed business plans, as this considers an undue cost burden and disproportionate requirement given the scale of their operation. Among these Ofgem considers different dimensions associated with whole systems thinking for the RIIO2, identifying the key interactions and dependencies between stakeholders from the perspective of a GDN by assessing the required tools and enablers, including the appropriate level of data management and sharing, to realise system coordination and deliver whole-system outcomes.

Energy Data Taskforce (EDTF) report present a collective market-wide vision for how the sector –including network companies – can maximise the value of data and digitalise the Energy System in support of the energy transition.

Carbon emissions data are kept. This is as part of the environmental performance metrics for the network companies, carbon emissions and other environmental metrics are recorded and reported.

Service quality relates to elements around customer interruptions, minutes lost, speed of reconnection, speed of complaint handling and resolution, connection offers and time to connect. There are quality of service and guaranteed standards of performance tables that GDNs are required to fill in as part of their Business Plans in RIIO process, including tables for Broad Measure of Customer Satisfaction (BMCS) and reporting performance against Standard Licence Condition D10. The Quality of Service Guaranteed Standards are guaranteed standards of service levels that must be met by each distribution company. For example, in electricity distribution, the guaranteed standards cover 12 key service areas, including supply restoration, connections and voltage quality. In case the distribution company fails to meet the level of service required, it must make a payment to the customer subject to certain exemptions. The amount paid to customers depends on many factors including the cause of the interruption and the amount of time the supply was interrupted. Payments under the guaranteed standards recognise the inconvenience caused by loss of supply. They are not designed to compensate customers for subsequent financial loss.

5.1.4 Germany

Data collection process of BNetzA comprises annual MS Excel questionnaires that are provided to market participants. As in the EBIS system, 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.

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.



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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.

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 (MonEDa²⁷). 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.

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.

5.2 Turkey

5.2.1 Current Data Collected by EMRA

Similar to European examples, EMRA collects data via standard excel forms and EBIS portal. Please see below the table summarizing collected data by EMRA and its frequencies.

Table 5.4 – Data collected by EMRA and frequencies

Declaration Code	Declaration Name	Forms Included in Declaration	Declaration Period
DPB-09	Distribution License Declaration	DPF-02, DPF-06, DPF-11, DPF-44, DPF-45, DPF-66, DPF-77	Monthly
DPB-23	Distribution License Declaration-Forecasting	DTF-01 Forecasting	Monthly
DPB-13	Distribution Activity Report	DPF-59, DPF-60, DPF-61, DPF-62, DPF-63, DPF-64, DPF-73, DPF-76	Monthly
DPB-15	Correction coefficient table	DPF-41	Six Months
DPB-44	Distribution Progress Report	DPF-42, DPF-43, DPF-46, DPF-68, DPF-69, DPF-70, DPF-72	Six Months Period
DPB-45	Distribution License Declaration Due to the Conditions	DTF-06, DTF-08, DTF-09, DTF-10, DTF-11, DTF-12, DTF-13, DTF-14, DTF-15, DTF-16	Due to the Conditions
DPB-47	Natural Gas Price	DFP-01	Six Months Period
DPB-50	Natural Gas Financial Statement	DTF-04, DTF-05, DTF-07, DTF-18	Six Months Period
DPB-52	Distribution Companies Credit Usage	DTF-17	Six Months Period
-	Annual License Fee	-	Yearly
-	Participation Share Declaration	-	Yearly
BDB-01	Independent Audit Report	BDF-01	Yearly

²⁷ Source: <https://monitoring.bundesnetzagentur.de/moneda>



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Key Takeaways: For EBIS forms listed above, the amount of natural gas received by the distribution network and amount that of sold can be monitored closely in order to analyze if any material mistake is made in billing or if any material level shrinkage is actualized within distribution region. If empirical evidence of shrinkage is found out, duly measures can be taken as recommended in the previous sections.

Another table can be designed to collect data on underserved areas within the distribution region. This can help in understanding how many prospected customers do not use natural gas, although they have this option. What efforts are made by the distribution company and what kinds of joint projects with relevant authorities are carried out to increase the number of served customers in these areas can also be asked with designed declarations.

Customer complaints classified according to topics and actions taken by distribution companies also can be collected for more understanding customer satisfaction level of the company. Collection of the data can be solely based on the EMRA's own customer complaints module and other sources conveying the complaints to EMRA (such as CİMER) or can also be based on the combined figures including complaints received by the DSO itself. For the conversion of the complaint statistics into satisfaction measurement, sectorial average per customer number can be used as a base point. In that manner, progress from year to year can also be another metric for using performance of DSO on the customer complaints as a proxy for the customer satisfaction.

Total cases of emergencies and actions by distribution companies can also be monitored with regular time intervals.

5.2.2 Data Requirements

As pointed out in the Task 1.1, EMRA can adopt a profit margin to incentivize shifting from price cap to revenue cap. In that alternative, a longer term of data will be needed by EMRA to find out a reasonable profit earned by the DSOs by keeping price cap methodology, instead of revenue cap. In that case, EMRA should determine a fair time period, in which net gains of DSOs can be observed, as fluctuations indispensably will occur and a single year data cannot be relevant to prove benefit of price cap methodology for a DSO. After getting long enough (for instance 5 years) period's data on prospected revenues (by the current tariff methodology) and actualized revenues (actually in the related fiscal years) of DSOs, EMRA can calculate a fair profit margin to be applied for DSOs agree with the revenue cap methodology. A table can be as below to collect data from DSOs to calculate deviations from prospected and actualized revenues, in which actual revenue should be well defined by EMRA before data collection as inflationary effects deteriorates the figures:

Actual Distribution Fee	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0-100.000 Sm ³												
100.000-1000.000 Sm ³												
1000.000-10.000.000 Sm ³												
10.000.000-100.000.000 Sm ³												
100.000.000 Sm ³ +												
Actual Revenue	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0-100.000 Sm ³												
100.000-1000.000 Sm ³												



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1000.000-10.000.000 Sm ³												
10.000.000-100.000.000 Sm ³												
100.000.000 Sm ³ +												

Average gains calculated from sectorial average over a time period then can be converted into reasonable profit to be allowed by EMRA.

In the Task 1.1, another recommendation that creates new data requirement was compensation of losses borne by the DSOs due to unexpectedly high interest rates, in which WACC is recommended to be constant but non-controllable OPEX component to be used instead. For monitoring such occasions closely and effectively, EMRA can collect data on actual loans of DSOs as a full data set and analyze interest rates, to check if nominal rate of return allowed is at least equal to these rates, before applying such method to reduce loss of DSOs due to unexpected conditions.²⁸ A simple table can be as below to collect full list of loans used by DSOs:

Loan	Amount	Annual interest rate (%)
1
2
...		

Also loans and payment over the years can be collected via a template table as below:

	20XX	20XX	20XX	20XX	20XX	20XX
Year Beginnig Balance						
New Loan						
Principal Payment						
Interest Payment						
Year End Balance						

Regarding the current depreciation period of 22 years, it was recommended to EMRA in the Task 1.1 to ask DSOs if they would prefer a differentiated depreciation period. This will require a one-time job for EMRA by asking for what depreciation period to DSOs. The data collected will point out a quick look over the DSOs for understanding their general and special thoughts over the issue.

²⁸ Foreign exchange denominated loans will be of special concern in these analyses, as all of the tariff methodology is based on assumption of TRY finance and TRY revenue earnings. As exchange rate fluctuations are relatively more common in Turkey in recent years compared to first periods of tariffs, EMRA can produce innovative methods to allow some additional compensations to the DSOs in order to ease exchange rate risks carried by DSOs to finance their CAPEXs.



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For the connections to the network, the risk of sister company relations of DSOs was pointed out in the Task 1.1. For gaining more insight towards this issue, EMRA can collect data on percentages of connection works completed by certified firms each and if any of these certified firms has got a shareholding relation either directly or indirectly with the DSO in question. Data collected for this purpose can help EMRA to decide on how to modify the existing scheme for increased customer satisfaction and improved competition in the connection works. A simplified example can be as below in data collection on this issue:

Certified firm	Market share in the year 20... (TRY)	Market share in the year 20...(number of works)	Has a shareholding relation with the DSO (Yes/No)
...	
...	

The Task 1.1 also includes integration of service quality into the revenue requirement model, which has priority in tariff methodology revision other than other actions. In data collection, service quality first requires finalizing which quality indicators are accepted as most appropriate and most urgent by EMRA. In that manner, call center performance and commercial quality indicators are recommended to be first service quality categories to be included. For the call center performance, accessibility rate, service level and answering rate indicators can be designed and can be related to performance targets, as done in the electricity distribution and retail sale sectors by EMRA. Data of these indicators should be collected via web services by EMRA directly through IT systems. For the commercial quality indicators, fast connection can be a good example, by which EMRA can set up standard duration of service, breach of which is subject to compensation payment and better performance compared to standard duration is rewarded within revenue model. Data collection can be via EBIS and should be subject to audits in order to prevent any incorrect reporting.

EMRA has published a mandatory sectorial chart of accounts, which aims to collect uniform and standardized, correctly classified data from each of the distribution companies. Also, a guideline of filling out tables that derived mostly from the chart of accounts for data monitoring, processing, and analyzing for the Authority's duties.

When the data sets of EMRA for natural gas distribution sector is assessed in detail, it is seen that some tables may be added to collect data on to what extent companies do business with their sister companies, for gaining more insight towards the way of doing business by distribution companies. This newly proposed sets may be designed for both the operational expenditures and the capital expenditures to precisely outline the transactions of each DSO. The data collected in this manner is also expected to support EMRA's regulations, even if regulation for merging the distribution companies is adopted in the future.

Accordingly, another set of tables may be designed to collect data on tenders carried out by distribution companies for procurement issues, such as what method of tender is carried out, the number of bidders approved, and the methodology for selecting the best bidder.

As the tariff methodology is the price cap methodology, large-scale consumers' consumption data is very crucial for EMRA's tariff determination calculations, and therefore, EMRA may collect data of these customers on a more frequent basis to monitor how consumption profiles are proceeding. More instant tariff revisions may be considered by EMRA if a large-scale consumer enters or exits from the consumption loop or pauses consumption for a certain time interval.

For financial analysis purposes, EMRA may collect data on debt/receivable relations between shareholders and distribution companies. Particularly, the receivables from shareholders' item would be closely monitored and may be deemed as capital reduction. Moreover, strict rules on the capital structure may be set by EMRA, and these rules may deal with both the capital accounts and receivables from shareholders' accounts as well.



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Another tool for monitoring and auditing tariff practices by natural gas distribution companies is providing a comparison tool for natural gas bills received by the customer via the EMRA website, which is currently available for electricity customers who buy electricity from EMRA retail tariffs.

However, as the wholesale price of natural gas suppliers to distribution companies is not set by EMRA, this is a relatively more complex task for natural gas bills. To overcome this challenge, a reporting tool from distribution companies to EMRA may enable setting up a comparison tool to some extends.

In monitoring the tariff practice of distribution companies with prepaid meters, a data collection table may also be designed to monitor replacement of prepaid meters with postpaid meters, deposit fees collected by these operations, and after-sale correction amount billed to prepaid customers due to price increases.

For the distribution activity progress reporting tables, it is considered that tables of DPF 68, 69, and 70 may be consolidated, and rearranged, for allowing DSOs to submit more relevant data for this purpose.

In addition, it is also seen that certified companies serving customers may be monitored closely to find out if competition issues are abode by the distribution companies.

5.3 Amendment of Secondary Regulation and Recommendations

- It is recommended in previous sections that adding service quality component both in positive (reward) and negative (penalty) ways into the revenue requirement model is essential. In that manner, related data collection needs can be as follows:
 - o Service quality regulation needs to be improved by EMRA to include customer interruptions, minutes lost, speed of reconnection, speed of complaint handling and resolution, connection offers and time to connect, customer service obligations, compliance with safety rules, and so on. After having an improved service quality regulation, company-wide quality factor and minimum guaranteed standards of commercial quality can be separately monitored in order to incentivise both improving average service quality and protecting worst served customers. Commercial quality standards those can be subjected to compensation payment by EMRA can include, inter alia, maximum time for response to written complaints, maximum billing adjustment time, maximum time for double billing correction, call center response time, accessibility to the service (the percentage of time in which at least one line is free), average waiting time (the time between the beginning of the response and the beginning of the conversation with the operator), service level (percentage of calls to which the customers who requested it actually speaks to an operator) and other relevant standards (call center reports can be subjected to confirmation of accredited institutions).
 - o Customer satisfaction surveys can be defined as an obligatory action to be taken by DSOs in order to monitor overall service quality level by EMRA, however, this action is recommended only for large DSOs with a number of at least 100.000 customers.
 - o Complaints received from customers can be a tool for analysing overall service quality of the DSOs. Putting the “average complaints per customer” indicator as a component of quality factor can help improving service quality in the DSO in question. Customer complaints module available at the EMRA homepage can be used for analysing complaints for designing service quality parameters (likewise ARERA has got also a similar module on its homepage, www.arera.it). Complaints can also guide EMRA for determining root causes of low service quality within a DSO region. In that manner, any specific topic that is complained by customers frequently for a single DSO can be a trigger for deep analysis of the situation, which requires a close look into complaint statistics and setting thresholds to use as a metric for frequency.
 - o Overall quality of connections works can be another company-wide indicator of customer satisfaction. In that manner, duration of completing such connections requests can be monitored with to what extent DSOs comply with EMRA’s instructions on informing customers on their options and not directing them to specific service providers by abusing their monopolistic power.
 - o If preferred by EMRA, proxy service quality indicators can also be monitored. In that case, some other data such as average time for connections completed, gasification date of certain districts given as performance target by EMRA, number indoor installations controlled by DSO, number of



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- low income customers connected with joint financing programs with other stakeholders, carbon footprint reduction, etc.
- Call center performance data, based on predetermined threshold values by EMRA.
- Parametric design of WACC has been recommended in section 1.1. In this methodology, data on interest rates of loans used by DSOs should be collected by EMRA. It is possible to cooperate with certain financial institutions as well.
- It is recommended to evaluate DSO requests on setting regulatory depreciation period shorter than fiscal period in section 1.1. For that reason, EMRA can collect requests of DSOs with their justifications and financing plans to decide on whether or not to approve such requests.
- In connection of lines other than service lines, consumers are free to choose between DSO and other firms for connection works. For ensuring protection of competition in these works, it is recommended collect data on details of connection works, in which inspection of DSOs whether or not they inform consumers duly on their options, direct consumers to certain firms, discriminate among service providers etc. can be done using sampled works. Also, relations of DSOs with their sister/parent companies in connection works should be inspected with data collected by questionnaires to be specially designed for this purpose.
- As recommended in section 1.1, if it is preferred to give DSOs the power of setting their connection fees, EMRA should set connection determination rules. For that purpose, samples of cost data on real life connections and proposals for the connection fee setting rules from biggest 10 DSOs should be collected for making a resolution on the subject.
- It is recommended in section 1.1 that EMRA should handle shrinkage issue not as a theoretically possible problem but as an empirically proven fact. As a result, EMRA needs to monitor actual shrinkage values of DSOs very closely, in order to decide whether or not an action should be taken regarding this issue. For that purpose, shrinkage volumes should be collected from DSOs quarterly, if possible.
- Regulatory Instructions and Guidelines are prepared and published by the regulators, Ofgem, ARERA etc. to ensure collection of standardized and harmonized data from DSOs. EMRA also publishes a guideline²⁹ and updates it for providing efficient guidance to the DSOs. EMRA can gain further efficiency by:
 - Conducting consultation on the guideline with DSOs before any structural change, in order to avoid any possible inconvenience that can be caused by heterogeneity among DSOs,
 - Differentiating in scope of data to be collected among DSOs based on their size, way of doing business, geographical location etc. if necessary,
 - Reviewing the total dataset periodically with the participation of DSO representatives to determine if there are any redundant data required and if there is any need to revise data collection methodology for better data management.
- Standard Data Templates are another widely used form of collecting standard data from DSOs. EMRA can enhance efficiency of data templates by:
 - Requiring separate Word format narratives to support data tables, for providing additional explanation regarding the nature of the submitted data, which can help reducing the risk of processing the data collected from different DSOs in the same data template but with wide apart realities behind.
 - Moving collected data on to XML files to make communication and data exchange more flexible and effective.

²⁹ Doğal Gaz Dağıtım Sektörü Tarife Tabloları Hazırlama Rehberi or Natural Gas Distribution Sector Tariff Tables Preparation Guide.



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- Crosscheck of collected data using past data of the same DSO or data provided by external data sources, also statistical consistency check should be carried out before using collected data for regulatory purposes. This is usually done by external IT support contracted with service providers.
- For data assurance, inspection of the submitted data and direct communication with appointed representatives within DSOs for EMRA are recommended through improving quality of data reported by DSOs. EMRA can define what internal audit needs should be met by DSOs before reporting related data to EMRA. Inspection of data reporting systems by EMRA can be both a insourced or outsourced activity, however, considering the number of DSOs in Turkey, EMRA can be positioned to manage inspection procedures instead of directly getting involved in the inspections on site. EMRA can define what powers the auditors will have as for accessing to physical or virtual media of the DSOs, what material of books, documents and software of DSOs to be controlled, how and to what extent copies will be made, rules and methods of interviews with related members of staff etc.





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6 Gas Transmission

6.1 Identification of Data Requirements Necessary for Performance Based Tariff Structure

The gas market legislations applied both in Turkey and the EU require the regulatory authorities to establish procedures, standards and electronic formats based on established industry standards for reporting of both physical and specified commercial operational data. For the purpose of establishing a performance-based tariff structure, EMRA needs access to the relevant data for such tariff structure and accordingly establish procedures, standards and electronic formats for fundamental data reporting by the TSO. This section focuses onto the specific data requirements of the Authority related with the proposed performance indicators in the Task 1.1, gas transmission part.

The main data sources related with the gas transmission activities can be stated as the TSO records, SCADA systems, commercial operating system of the TSO and gas trading platforms. Regarding the current status of the Turkish gas market, the required data classification and potential source of the data are summarised in the table given below.

Table 6.1 – Potential Data Sources for EMRA for Performance Evaluation of the TSO

Network Asset Replacement Category	Type
Operational Costs	TSO Records, TSO Reporting (to EMRA), SCADA System, Continuous Trading Platform (the STP)
Investment Costs and Status of the Investments	TSO Reporting
Physical Operations	TSO Records, the Electronic Bulletin Board (the EBT)
Commercial Operations	Commercial Arrangements of the TSO, TSO Reporting, the EBT, the STP

Detailed information about the above stated potential data sources are as follows:

TSO Records: For taxation and accounting purposes, the Transporter (BOTAS has to comply with the statutory requirements of the Law on Public Finance Management and Control (Law no. 5018) and relevant Turkish accounting standards. Such accounting records are necessary to ensure that all of the revenues, costs, assets, liabilities and reserves are separately identifiable for gas transmission activities. On the other side, operating in a regulated environment, BOTAS has to cope with the accounting requirements specified by EMRA. These regulatory requirements are generally described as “Regulatory Accounts” and those are focused onto gas transmission activities. The regulatory accounting principles are related with reporting rather than book-keeping. From the regulation point of view, the main purpose of regulatory accounts is to monitor performance against the assumptions underlying price controls. So, these accounts mainly deal with the revenues and the expenditures related with gas transmission activities and the Transporter should keep the records of the revenues and expenditures according to the Regulatory Accounts specified by EMRA.

TSO Reporting (to EMRA): Utilities in the Energy sector are required to submit regular reports and data related with their activities as per specified formats by EMRA. With the publishing of the Regulation on Notifications in Energy Markets on 27/05/2014, the notifications of the Market Operators were started, through EMRA Electronic Notification System (EBIS) as electronic means, step by step. As of 01/01/2016, notifications for all markets are being realized through the EBIS as mentioned in previous sections. 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 TSOs under the Regulation.



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Table 6.2 – Information requested from the TSO under the Regulation on Notifications

Responsible	Notification Name	Notification Period
Transmission Company	Transmission License (Pipeline)	Monthly
	Transmission License, Electronic Signature	Yearly
	License Fee, formal letter	Yearly
	Participation Fee, formal letter	Yearly
	Industrial Control Systems Risk Mitigation Follow Up	6-monthly

As it can be seen in the above table, the required data from the TSO as per the Regulation on Notifications is rather limited. However, the actual case is a kind of non-transparent process between EMRA and BOTAS (Transporter) and the Transporter sends regular reports to EMRA through EBIS submitting all specified data related with gas transmission activities.

The 3rd Gas Directive requires the Regulatory Authorities to 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 UK in terms of reporting is a good example for the issue and detailed information about Ofgem Requirements for TSOs for Reporting under RIIO is provided as Annex-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 BOTAS.

SCADA System provides online information from line valves, metering stations (entry and exit points) and the compressor stations. Tracking of the pressure levels at all entry and exit points, pressure profiles at various pipeline segments and overall supply/demand balance provides a tool for the monitoring of the TSO's success in physical operations. This can be done via granted special access for EMRA to the SCADA system for monitoring purposes. SCADA System is also very important data source for tracking the amount of Own Use Gas, gas vents and failures in compressor stations.

BOTAS installed a very efficient SCADA System with fibre optical telecom network means accessing all entry and exit points and the System is easily expanded to the new entry or exit points. The data logged in the SCADA System and online monitoring of the gas transmission system through it would provide EMRA very helpful tools in applying a performance basis gas transmission tariff.

The Electronic Bulletin Board (the EBT) is a commercial operating system developed in line with the commercial arrangements of the TSO and the legal framework for gas transmission. The EBT is the main platform of BOTAS in fulfilling transparency obligations of the TSO as outlined in the Network Code itself and regulations for licensing and transmission system operation. It serves as a main tool to carry out the TSO's commercial interactions with the Shippers. Certain requirements of the regulatory authority in driving the transmission tariff are related with the transactions between the Transporter and the Shippers. Among those, 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



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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 EPIAS 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 is performed via EBT. However, the EBT would need to be further developed in the case of application of a performance basis transmission tariff to allow EMRA track certain efficiency related parameters.

Continuous Trading Platform (the STP): The Organised Wholesale Gas Market Operator EPIAS developed a commercial platform through which the gas sale/purchase transactions are carried out under the governance of EPIAS. Such sale or purchase of gas by the Transporter itself is an important activity to be tracked by EMRA. The Transporter is required to carry out daily transactions through the STP to keep the system line pack within the defined minimum and maximum boundaries. The Transporter is also given a role as “Residual Balancer” to keep supply and demand balance in a safe margin and time to time it may purchase gas to maintain the balance. Monitoring of the performance of the Transporter in its transactions through the STP is an important item in applying a performance basis tariff.

The proposed incentives for gas transmission activities were presented in the Table 4.11 of the first part of the Task 1 report (Tariff Structure Assessment and Recommendations Report) and the table given below is prepared to address the potential data sources for those incentives.

Table 6.3 – Potential Data Sources for the Proposed Incentives

Incentive	Performance Criteria (Annual Records)	Data Source	Benchmarking Source
Own Use Gas	Reducing the amount used by the Transporter	Transporter Records, SCADA System logs, Transporter Reporting	Past data from BOTAS Transmission System
Unaccounted for Gas (the UAG)	Decreasing the percentage with respect to annual throughput	Transporter Reporting	Other country examples, like UK
Vented Gas	Reducing the vented amount (recorded in the compressor stations)	Transporter Records, SCADA System Logs, Transporter Reporting	Past data from BOTAS Transmission System
Critical Maintenance	Timely implementation of critical maintenance (like smart pigging, compressor overhauls)	Transporter Reporting	NA
Planned Maintenance	Reducing the number of planned maintenance works that require capacity reduction	Transporter Reporting, the EBT	Past Records of TSO
Service Interruptions (shortfalls)	Shortfalls attributed to TSO defaults	The EBT, Commercial Arrangements of the TSO	Past records of TSO
Compressor Stations Outages	Reducing the outages arising from operational defaults and line pack level reductions	SCADA System logs	Past records of TSO
The cost of the OUG	Unit average price of the Own Use Gas paid by the Transporter	The STP, Transporter Reporting	Annually averaged GRF in the STP
Demand Forecasts	Successful day ahead demand forecasts by the Transporter	The STP, EPIAS Transparency Platform	Other country examples like UK

Data requirement analysis shall specifically focus onto the incentives proposed in the previous report exploring options for resources and benchmarking. Detailed analysis of the required data related with each performance item stated in the above table is given as follows.



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6.1.1 Own Use Gas (the OUG) Amount

The OUG constitutes a major part of operational expenses for BOTAS Gas Transmission System. The vast majority of it is used for fuelling the compressor stations all of which is gas turbine driven. Minor portion of the OUG is used for heating purposes in the facilities and in certain entry points with pressure reduction process.

The SCADA System logs the OUG separately for each plant where it is used except for the ones used for the heating of buildings which constitutes very small portion of the OUG. Since day by day logging of the OUG is available in both SCADA System and the Transporter records, it is possible to make benchmark with the past realizations with exactly the same figure of OUG of the subject year performance evaluation. A descriptive table like the one given below would provide an idea to generate benchmarking data and the TSO may be required to update the table every month.

Table 6.4 – Descriptive table for the past OUG data generated from SCADA Logs and Transporter Records

The Most Recent Throughput (bcm)	OUG Amount
44.00	
44.25	
44.50	
44.75	
45.00	
.	
.	
.	
54.00	
.	

The option of benchmarking with other country and/or network data wouldn't be appropriate since the OUG is dependant not only throughput volume but also many other factors like the location of entry points, geographical conditions, the length of pipelines etc.

Currently, the OUG is the major operational expenditure item in gas transmission tariff and when applying performance-based tariff, the TSO should prepare special annual report for the OUG incentive. The OUG Report of the TSO should include the details relating to amounts, success or failures of the TSO in terms of improvements in efficiency for the use of the OUG and the rationales behind those.

6.1.2 Unaccounted for Gas (the UAG)

The UAG is an important cost element in both gas transmission and distribution systems. It mainly refers to the uncertainties in gas measurement. In high pressure gas transmission systems, the gas measurement is a very complex process which involves the management of many gas quantity and quality measurement instrumentation together. Typical accuracy design figure of a metering station is at the order of +/- 1 %. Inevitable gas leaks through flanges and other unmeasurable gas leaks are also part of the UAG. Those leaks normally constitute minor part of the UAG compared to the risk of measurement uncertainty. Considering a typical figure of 0,5 %, the UAG corresponds to 250 million m³ of gas for 50 bcm annual throughput. As a common application, the TSO is kept neutral for the risk of UAG up to certain cap and the risk is imposed on the Shippers by including the UAG among the operational cost elements in gas transmission tariff.

The UAG figure can be calculated on daily, monthly or annual basis. The typical calculation of the UAG pertaining to a certain time period can be stated as follows:

$$\text{UAG} = \text{Total Entry Quantity} - \text{Total Exit Quantity} - \text{Transporter's Own Use Gas} - \text{Variation in Line Pack Quantity}$$

The measurement errors may occur in both directions. Considering hundreds of exit points from the transmission system, the measurement error risk for the Transporter is practically reduced to a tolerable level since some of the measurement stations records more than actual figure (or true figure) and some of them records less. However, at a certain supply point subject Shippers or the end user himself bears significant risk against measurement errors.





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For the track of UAG the Transporter should submit regular reports to EMRA in a format ensuring satisfactory calculations to the extent possible.

Determination of the Variation in Line Pack Quantity may be the most critical element. The amount of gas existing in the transmission system at certain moment is calculated via special simulation software embedded in the SCADA System. Effectiveness of the simulation software and proper use of it by competent staff are critical elements. There can be considered some measures to ensure proper determination of line pack level (like external expert opinion) but the safest approach would be the use of UAG records during the days when the line pack variation between two consecutive days is comparably much less. The best approach would be to specify maximum limit for line pack variation in determining the UAG. The annual figure of the UAG may be determined at the end of the year as an average of such daily recorded figures.

Regular (timely) calibration activities for the measurement equipment and field instrumentation as per vendor specifications and/or relevant standards are also important elements to consider. The UAG report to be prepared by the TSO would be expected to include certain data related with this issue since the TSO is assumed to execute itself or witness all calibration activities for the measurement systems and field instrumentation installed in gas transmission system and its interconnections.

Benchmarking would be both possible with the performance of BOTAS during past years and the similar applications by other network operators. The case of NTS UAG reports in the UK may be a good benchmarking source.

6.1.3 Vented Gas

Among all causes of the gas vents, the focus and data requirement will be related with the case in the compressor stations' routine operation. Considerable amount of gas is vented in compressor stations much of which would occur during the shutdown of the compressor stations due to the operational failures of the Transporter in compressor management or line pack management. Such gas vent occurrences are logged in both local control system of the compressor station and the SCADA System. The amount of vented gas in such circumstances is usually determined by manual approximation method and recorded.

Except for abnormal circumstances like the entry of off spec gas into the transmission system, vented gas quantity in each compressor station during a year would ideally be expected as negligible figure (ie at the order of several thousand cubic meters). The best approach for the track of the performance of the TSO in terms of vented gas would be to require TSO prepare annual special report for vented gas in the compressor stations. The report should provide details of each vent including the name of the compressor station, date and duration of the vent, calculation of the amount and special note for the event if it is attributable to the Transporter's default.

Benchmarking can be made using the past data for each compressor station for the monitoring of the performance of the TSO. Targets may be set as decreasing amounts of vented gas in total or station by station, over the years.

Table 6.5 – Descriptive Template for Vented Gas Reporting

Name of the Compressor Station:				
Date of Vent	Amount of Vent gas	Calculation Details	Cause of Vent	Accountable to TSO (Y/N)

6.1.4 Critical Maintenance

Such a proposed incentive is arising from security of supply concerns related with the physical reliability of the network. Two essential components of gas transport activity are the pipeline itself and the compressor stations and the TSO is expected to timely carry out two special maintenance activities as stated in the following subsections.

6.1.4.1 Smart Pigging

Smart pigging is a kind of high-tech operation to detect anomalies, cracks and corrosions on the pipelines under operation by means of an inserted "smart pig" inside the pipeline which moves together with the gas. Such operations are usually carried out with 3-4 year periods but depending on the last survey results, certain sections



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of the pipe line would need to be checked sooner. Delaying of such operations may prevent timely remedial actions for potential cracks and this may cause gas stoppage at the subject pipeline segment. The transporter may be required to submit annual reports including a descriptive data table given below.

Table 6.6 – Descriptive Template for Smart Pigging Reporting

Pipe Line Segment	The Most Recent Smart Pigging Operation Completion Date	Actual Planned Date for the last Pigging Operation	Next Planned Date
36" Malkoçlar-Ankara			
...			

6.1.4.2 Heavy Maintenance Works for Compressor Stations

Some critical components of the units in the compressor stations need to be checked with specified time periods and the ones having non-tolerable damages should be replaced at the authorised maintenance basis by the vendor. Gas turbine blades are among such components. Delaying of such heavy maintenance works may cause serious damages to the compressor station units and capacity reductions for significant amount of time. The transporter may be required to submit annual reports including a descriptive data table given below.

Table 6.7 – Descriptive Template for Compressor Stations Heavy Maintenance Reporting

Name of the Compressor Station:			
Compressor Unit	The Most Recent Heavy Maintenance Completion Date	Actual Planned Date for the last Heavy Maintenance	Next Planned Date
Gas Turbine, Unit-1			
...			

Planned Maintenance

Generally, the TSO's are required to carry out planned maintenance activities under a coordinated planning with the other TSO's and producers in the gas value chain. An individual TSO is normally expected not to apply capacity reductions due to its own planned maintenance activities. When a capacity reduction needs to be applied due to the planned maintenance activities, the Transporter is required to announce through the EBT such planned maintenance activities and part of the network (relevant entry and exit points) effected. Such information can be tracked through the EBT noting the announcements by the Transporter and the reduced quantities in Shippers' nominations.

Service Interruptions (Shortfalls)

As per the provisions of Standard Transportation Contracts executed between the Transporter and The Shippers, the shortfalls in transport obligations penalize the Transporter in proportion to the amount of shortfall quantity and this is seen in the Shippers' monthly invoices prepared by the Transporter as the reductions to the Shipper's payment amount for transmission services. Noting that the SID applies standard transportation contracts with the Shippers and service interruption fee is similarly applied for all Shippers, disclose of the interactions between the TSO and the Shippers related with the service interruptions to EMRA could not be regarded as a violation to privacy rights of the Shippers in terms of their contracts with the TSO. The Transporter can be requested also to include an item in its annual report denoting the total amount of shortfall attributable to the Transporter default for the past year.

Compressor Station Outages

All compression station outages can be followed through SCADA System. The distinction is necessary for the ones attributable to the operational errors of the Transporter. Otherwise, there can be seen many planned outages in parallel to varying demand. The Transporter may be requested to report information related with this. A descriptive template is provided below.



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Table 6.8 – Descriptive Template for Compressor Outages Reporting

Name of the Compressor Station:				
Date of Outage	Type of Outage (Unit or Complete Station)	Duration for Remedy	Planned Daily Throughput	Realized Daily Throughput

The Cost of the Own Use Gas

The unit cost of the OUG and how the OUG is obtained by the TSO are critical elements in applying performance basis tariff. As of date, the vertically bundled structure of BOTAS still continues and the SID has a certain provision (the Article 24.1.3.1) requiring the TSO purchase the OUG from the trading section of BOTAS until the company is unbundled. The Transporter announces the quantity (but not the unit price) of OUG on monthly basis through the EBT. On the other side, there is limited part of the OUG used for maintaining the line pack level within certain quantities and such purchase of line pack gas by the Transporter is carried out on STP platform under competitive conditions.

The use of the daily reference prices of the STP as announced through the EPIAS Transparency Platform would provide helpful tool for EMRA in order to assess the unit cost of the OUG declared by the TSO and define success criteria for the unit cost of OUG.

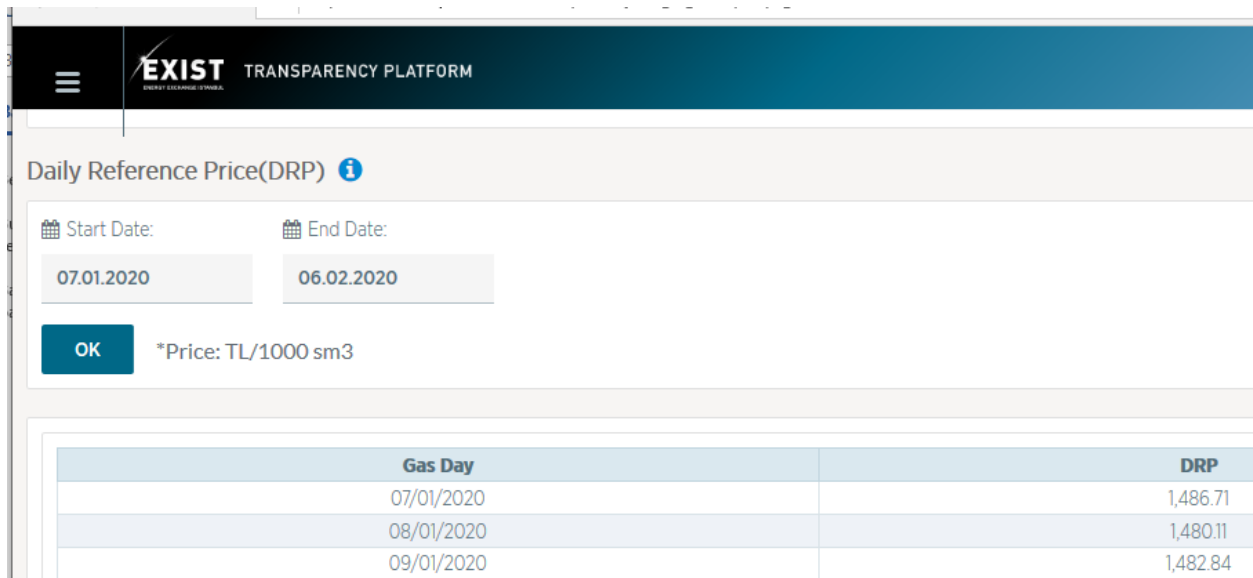


Figure 6.1 – EPIAS Transparency Platform, Daily Gas Reference Prices³⁰

Demand Forecasts

With the commencement of the activities of the Organized Wholesale Market, the Transporter is required to forecast and announce (through its Electronic Bulletin Board) daily demand for the following day and the level of line pack at the beginning of the day in accordance with the submitted nominations. This information is also transmitted to the Market Operator (EPIAS).

The Transporter may be given target of an annual weighted average absolute forecast error certain quantity. The daily forecast error is calculated as the difference (in mcm) between the D-1 forecast BOTAS Network throughput value and the actual throughput value. The necessary data is available on both the EBT and the EPIAS STP.

Customer Satisfaction

The Customer satisfaction level may be considered as a criteria among the other proposed incentives or success indicators when applying performance basis tariff. For a gas transmission TSO, its customers are practically the

³⁰ Source: EPIAS Transparency Platform <https://seffaflik.epias.com.tr/transparency/dogalgaz/stp/stp-grf.xhtml>



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Shippers having access to the transmission grid and for the case of Turkey, the number of Shippers is at the order of tens (40 – 50). The daily relations between the TSO and the Shippers are conducted by the use of the EBT and the system itself is a good source of information for following obligations of the TSO (like timely publish of specified information, no delays in scheduled transactions etc) in terms of relations with the Shippers. Actually, some of the proposed incentives are very much related with the satisfaction of the Shippers like service interruptions and the demand forecasts.

Other relevant parties who could also be considered also as the Customers are the interconnected system operators. Those system are gas distribution system operators, LNG Terminal operators, storage facility operators, gas producers and other transmission system operators. The contractual relations between the TSO and other connected operators are set out in the Interconnection Agreements concluded as bilateral negotiations. There may be complaints raised to EMRA for the actions of the TSO but for many cases EMRA wouldn't be in a position as first instance entity to handle the complaint.

In the light of the above issues stated, specific customer satisfaction surveys are not proposed to be among the incentives for a performance basis gas transmission tariff.

6.2 Guidelines for Harmonization and Standardization of Data Coming from Different Sources (to make them possible to be used in tariff calculations)

Regarding gas transmission activities in Turkey, BOTAS is the sole TSO operating the whole national gas transmission grid. In this sense, harmonisation and standardization of data would not be point of concern. However, the reliability of the data submitted from BOTAS 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 BOTAS (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. Actually, this can be achieved easily by installing a dedicated micro-wave radio link system between the EMRA Building and BOTAS Transmission Department District management facilities. BOTAS has right to install and operate its dedicated telecom systems as SCADA infrastructure there are many examples of such radio link connections. 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.

Concerning the proposed incentives for a performance-basis gas transmission tariff application, the reliability of the measurement data relating to gas flows all entry and exit points and the line pack level are the major focus items. Timely implementation of the calibration activities for the gas measurement systems and the competence of the staff and/or the laboratories involved in such calibration activities must be ensured. In its annual reports to EMRA, the Transporter should include at least a basic information related with the calibration status (info as the last scheduled calibration date, the last date of execution and the next planned date) of the all gas measurement equipment at the entry and exit points. Involvement of a competent third party, such as the National Metrology Institute, might be considered for the external audit of the Transporter's gas measurement systems' calibration status report details.



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6.3 Amendment of Secondary Legislations (regarding data submission procedures necessary to fulfil the identified data requirements)

With regard to 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. As it is the case in EU applications, more transparency could be provided for the market players in terms of transmission tariff derivation.

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 under such performance basis application. The procedure applied in the UK by the authority would provide a reference for this purpose. Ofgem publishes “Regulatory Instructions and Guidance (RIGs)” which are the primary means by which the Authority directs the licensee to collect and provide the information to the Authority that the Authority needs to enable it to administer the special conditions of transmission licensee. The matters that may be included, or for which provision may be made, in the RIGs are³¹:

- a) instructions and guidance on the establishment of systems, processes, procedures, and ways for recording and providing specified information;
- b) instructions and guidance on the standards of accuracy and reliability that are applicable to the recording of specified information (including different classes of such information);
- c) a timetable for the development of such systems, processes, and procedures as are required to achieve such standards;
- d) the methodology for calculating or deriving numbers comprising specified information;
- e) provision with respect to the meaning of words and phrases used in defining specified information;
- f) requirements as to the form and manner in which, or the frequency with which, specified information must be recorded;
- g) requirements as to the form and manner in which, or the frequency with which, specified information must be provided to the Authority;
- h) requirements as to which (if any) of the specified information is to be subject to audit, the terms on which an auditor is to be appointed by the licensee for that purpose, and the nature of the audit to be carried out by that person;
- i) requirements as to the circumstances in which the Authority may appoint an examiner to examine the recording of the specified information by the licensee;
- j) a statement on whether and to what extent each category of the specified information is required for the purposes of the RIGs; and
- k) provision about how the Authority intends to monitor, assess, and enforce compliance with the RIGs.

³¹ Source: RIIO-T1 Gas Transmission Price Control –Regulatory Instructions and Guidance: Version 6.2.

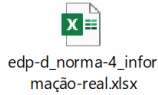


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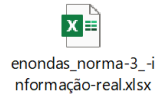


7 Annexes

7.1 Annex 1: Excel Sheets for the Data Collected in Portugal



edp-d_norma-4_informação-real.xlsx



enondas_norma-3_informação-real.xlsx

7.2 Annex 2: Information gathered related to Electricity Distribution Tariffs in the UK

Costs and Volumes³²: The purpose of the information collected is to monitor DNOs performance in RIIO-ED1 and to provide information that will inform the next Price Control review. Data collected includes:

- Admin and input worksheets (PCFM Inputs 2012-13, PCFM Inputs Nominal, Licence Values, Revenue Pack Inputs, Theft Recovery, RPI)
- Financial worksheets and commentary (Net Debt & Tax Clawback (Reported in RFPR, not required for 2018-19 reporting), Reconciliation to the Regulatory Accounts (Reported in RFPR, not required for 2018-19 reporting))
- Costs worksheets (Connections Inside the Price Control, Physical Security, IT & Telecoms (Non-Operational), Property (Non-Operational), Vehicles and Transport (Non-Operational) , Small Tools, Equipment, Plant and Machinery (Non-Operational) , Remote Location Generation (OPEX), Core CAI, Wayleaves (CAI), Vehicles and Transport (CAI), Core Business Support, IT&T (Business Support), Property Management (Business Support) , Atypicals Non Severe Weather (2011 to 2023), Smart Meters Outside Price Control , Legacy Metering Equipment , De Minimis, Other Consented Activity, Connections Outside Price Control , Out of Area Networks, Pass , Other Non Activity Based Costs (NABC), Related Party Margin
- Cost and volume worksheets (Primary Reinforcement, Secondary Reinforcement, Fault Level Reinforcement, NTCC (New Transmission Capacity Charges), Diversions (Rail Electrification), Asset Replacement, Refurbishment No Secondary Deliverable Improvement and CV9 – Refurbishment with Secondary Deliverable Improvement, Refurbishment No SDI, Refurbishment SDI Civil Works Condition Driven, Operational IT&T , Black Start , BT21CN, Legal and Safety, QoS and North of Scotland Resilience, Flood Mitigation, Rising and Lateral Mains (RLMs), Overhead Line Clearances, Worst Served Customers (WSCs), Visual Amenity, Losses, Environmental Reporting, RIIO-ED1 High Value Projects Summary, RIIO-ED1 High Value Projects HVP (a-e), HVP DPCR5, Moorside (ENWL only) , Faults, Severe Weather 1-in, - Occurrences Not Incentivised (ONIs), Tree Cutting, Inspections, Repair and Maintenance, Dismantlement, Substation Electricity , Smart Meter Intervention DNO, Operational Training (CAI), Network Innovation Allowance (NIA) Network Innovation Competition (NIC), Innovation Funding Incentive (IFI) & Low Carbon Network (LCN) Fund, Directly Remunerated Services (DRS)
- Volume worksheets (Connections, Other Asset Movements, Volume Matrix (2011 to 2023), Age Profile)
- Memo worksheets (Flood Mitigation, DPCR5 Worst Service Customer (WSC) Schemes, ED1 WSC Schemes, Enablers for ED2 (NPGY and NPGN only), Severe Weather Exceptional Events, Metal Theft, Protection Summary, Link Box Summary, Street Works worksheets summary, Traditional Street Works (Ex Ante), Permit & Lane Rental (ex ante) , Permit & Lane Rental (Reopener), Shetland (SSEH), Subsea Cables Proactive, Subsea Cable Reactive, Moorside (ENWL only), Uncertainty Mechanism Information, Drivers, MEAV (Modern Equivalent Asset Value) , Forecasts C1, Forecasts TOTEX, Full Time Equivalents.

The companies are required to demonstrate their cost estimates are efficient through benchmarking, market testing or other demonstration that they have followed economic purchasing obligations if requested by Ofgem.

³² Source: RIIO-ED1 regulatory instructions and guidance: Annex B – Costs and Volumes.



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Revenue³³: The purpose of the information gathering regarding revenue is to effectively monitor DNOs’ compliance with the licence conditions related to the calculation of Allowed Distribution Network Revenue (AR). Allowed revenue is calculated using the following worksheets:

- Base Demand Revenue (BR)
- Incentive revenue (IP)
- Allowed Pass-Through Items (PT)
- Network Innovation Allowance (NIA)
- Low Carbon Networks Fund (LCN)
- Connections activities adjustments (AUM and CGSRA)
- DPCR4 residual distribution losses incentive value (PPL) (WPD and SSE owned DNOs only)
- DPCR4 residual distribution losses incentive value and Growth Term (DLGT) (ENWL, NPg UKPN and SP owned DNOs only)
- Correction factor for over or under recoveries of revenue (K).

Secondary Deliverables³⁴: Secondary Deliverables Reporting Pack provides a framework for the collection and provision of accurate and consistent information from DNOs on the movements in health and criticality of the assets for the asset categories included in the DNOs’ RIIO-ED1 Network Asset Secondary Deliverables targets. Information gathered is used to calculate DNOs’ progress towards meeting their Network Asset Secondary Deliverables targets for RIIO-ED1, as set out in their electricity distribution licences. In addition, the information will also be used to inform benchmarking and analysis used for determining future price controls. Information collected includes:

- Summary by Voltage
- Summary by Asset
- Health (age and condition) and Criticality Tracker for LV Assets (HCT_LV), HV Assets (HCT_HV), EHV Assets (HCT_EHV), 132kV Assets (HCT_132kV) and for Other Assets (HCT_Other assets)
- Probability of Failure Values
- Consequence of Failure Values
- Asset Risk Values
- Asset Count Check

Reinforcement³⁵: Within the scope of this information and related substation and substation groups worksheets, the annual volume of substations in each load index band and the resultant load index risk points are provided. It allows comparison against the values stated in the DNOs’ Business Plan Data Templates that align with the settlement for RIIO-ED1.

Interruptions³⁶: DNOs and IDNOs are required to meet the guaranteed standards of performance under the Electricity (Standards of Performance) Regulations. Ofgem reviews the data, alert the DNOs where corrections are needed and provide finalised returns to the relevant body annually.

Customers Interrupted (CIs), Customer Minutes Lost (CMLs) (duration of interruptions to supply), Short Interruptions (SIs), Customers Re-interrupted (RIs) and Occurrences Not Incentivised (ONIs) are reported within this scope. Main worksheets used to provide information are:

- Quality of Service Interruptions
- Exceptional Events impact
- Disaggregation by duration band (pre-arranged and unplanned CI only)
- Disaggregation by frequency band (higher voltage unplanned CI only)
- Disaggregation by HV circuit
- Disaggregation by Occurrences Not Incentivised
- Short Interruptions

³³ Source: RIIO-ED1 regulatory instructions and guidance: Annex C – Revenue.

³⁴ Source: RIIO-ED1 regulatory instructions and guidance: Annex D – Secondary Deliverables.

³⁵ Source: OFGEM, RIIO-ED1 regulatory instructions and guidance: Annex E – Reinforcement.

³⁶ Source: RIIO-ED1 regulatory instructions and guidance: Annex F – Interruptions.



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Network related reports published by Ofgem are explained in more detail in the main report.

Connections³⁷: Connection refers to the provision or upgrading of individual Meter Point Administration Numbers, points of connection or unmetered connections to end customers. Connection reports includes the following:

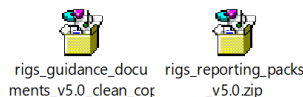
- Metered in-year (detailed overview of all metered connection projects that took place in the regulatory year)
- Unmetered in-year (detailed overview of all unmetered connection projects that took place in the regulatory year)
- Completed summary (snapshot of all connection projects that were financially closed within the regulatory year)
- Annual quotations issued (summary of all quotes that are provided by a DNO within the reporting year)
- Annual out of area connections
- Direct Related Party Margin (RPM) (level of related party margin relevant to connection activity disaggregated by connection category, level of margin and the element of the connection that is sole use funded and subject to the apportionment rules.
- Time to Connect and Time to Quote

Customer Service³⁸: Ofgem shall collect accurate and consistent customer service performance data from the DNOs and DNOs are also required to provide Ofgem with information on complaints handling in accordance with the Consumers, Estate Agents and Redress (CEAR) Act 2007.

Information is provided through complaints handling worksheet, customer satisfaction survey worksheet, Instructions for the telephony worksheet. More information on customer service-related reporting is provided in the main report.

Environment and Innovation³⁹: In order to monitor DNOs' actions and performance in RIIO-ED1 and provide information for the next price control review, information is collected via Environment and Innovation Reporting Pack. Worksheets used to collect information are:

- Instructions for completing Visual Amenity, Environmental Reporting and BCF worksheets
- Instructions for completing the Losses Snapshot worksheet
- Instructions for completing Smart Metering, Innovative Solutions, LCTs and IRM worksheets



³⁷ Source: RIIO-ED1 regulatory instructions and guidance: Annex G – Connections.

³⁸ Source: RIIO-ED1 regulatory instructions and guidance: Annex H – Customer Service.

³⁹ Source: RIIO-ED1 regulatory instructions and guidance: Annex J– Environment and Innovation.



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7.3 Annex 3: Electricity Distribution EBIS Data

Currently collected EBIS data by EMRA is given in below tables.

- Distribution Income Information

For subscribers and generators, the following fees are required in ₺:

Table 7.1 – Distribution Income Information (in ₺)

Single Term Distribution Fee
Double Term Distribution Fee
Connection Power Fee
Connection Power Exceeding Fee

- Distributed Energy

Quarterly consumption in kWh with respect to single and multiple time (day, peak, night) of the below categories:

Table 7.2 – Distributed Energy (in kWh)

Double Term Industrial Medium Voltage
Double Term Commercial Medium Voltage
Double Term Household Medium Voltage
Double Term Agricultural Medium Voltage
Double Term Lighting Medium Voltage
Single Term Industrial Medium Voltage
Single Term Commercial Medium Voltage
Single Term Household Medium Voltage
Single Term Agricultural Medium Voltage
Single Term Lighting Medium Voltage
Single Term Industrial Low Voltage
Single Term Commercial Low Voltage
Single Term Household Low Voltage
Single Term Martyr Families and Veterans Low Voltage
Single Term Agricultural Low Voltage
Single Term Lighting Low Voltage
General Lighting

- Removal Installation Expenditures

This will be recorded by service company, amount and service received method.

- Data Regarding the Realization of Theft and Loss

For Free Market Customers (other retailer), Free Market Customers (incumbent retailer), Regulated Tariff Sales (incumbent retailer-excluding general lighting), Regulated Tariff Sales (general lighting) the below data regarding Energy entering the Distribution System is required in kWh:



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Table 7.3 – Data regarding the Realization of Theft and Loss (in kWh)

Retail Sales Accrual of Consumed Energy in the Related Year (including idle losses)
Retail Sales Additional Accrual of Consumed Energy in the Related Year (excluding T&L accrual)
Cancellation of Retail Sales Accrual of Consumed Energy in the Related Year (excluding T&L accrual)
Total Net Retail Sales Accrual of Consumed Energy in the Related Year (including idle losses)
Retail Sales Additional Accrual of Consumed Energy in the Previous Years (excluding T&L accrual)
Before 1/1/2013 Additional Accruals
After 1/1/2013 Additional Accruals
Cancellation of Retail Sales Accrual of Consumed Energy in the Previous Years (excluding T&L accrual)
Before 1/1/2013 Additional Accruals
After 1/1/2013 Additional Accruals
Total Net Retail Sales Accrual in the Related Year
Theft Accrual of Consumed Energy in the Related Year
Cancelation of Theft Accrual of Consumed Energy in the Related Year
Theft Accrual of Consumed Energy in the Previous Years
Before 1/1/2013 Additional Accruals
After 1/1/2013 Additional Accruals
Cancellation of Theft Accrual of Consumed Energy in the Previous Years
Before 1/1/2013 Additional Accruals
After 1/1/2013 Additional Accruals
Total Net Accrual in the Related Year

Also, again for Energy Entering the Distribution System in kWh, the below data is required:

Table 7.4 – Energy Entering the Distribution System (in kWh)

Traction amount from transmission system
Supply amount to transmission system
Traction amount from other distribution regions
Supply amount to other distribution regions
Generation amount in region (licenced and unlicensed)

Regarding Realization of Theft and Loss Ratio in percent, the following data is required:

Table 7.5 – Realization of Theft and Loss Ratio (in %)

Energy entering the distribution system
Energy leaving the distribution system
Lost Energy

- Income Within the Scope of Article 25 of the Distribution Communiqué - Monthly Based

Revenue realizations in ₺, within the scope of Article 25 of the Distribution Communiqué should be recorded considering the amounts recorded in the financial statements without taking into account the cancellations related to accruals before 1/1/2016, in the following categories:



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Table 7.6 – Realization of Revenue (in ₺)

Maintenance and repair service income
Donations
Penalties and compensation revenues obtained under connection and system usage agreements
Criminal, excellence, collateral and compensation income
Revenue from advertising and rent (cell tower, vehicle, building, land, data transfer communication infrastructure usage income) obtained by the distribution company over the distribution network operated in the region
Consulting income
Displacement revenue
Revenues from power quality measurement service cost
Damage income
Theft electricity usage income
Revenues form disconnection/connection fee
Revenues form provision for uncollectible theft accruals (after 1/1/2016)
Other revenues from unlicensed electricity generation plants
Automatic meter reading revenue
Revenue from payment notification and release of second notice
Measure test income
Income from reactive energy fee
Meter Control Revenue
improper electricity usage income

- Uncontrollable Operating Expenses - Monthly Based

These data consist of the following fields in ₺:

Table 7.7 – Uncontrollable Operating Expenses (in ₺)

System Usage and System Operation Fee paid to TEIAS (excluding reactive fee, connection power exceeding fee, etc.)
Severance and notice pay expenses
Expenses related to forest land use
Taxes, duties, fees, license fees and similar expenses (excluding VAT and Corporate Tax)
Permission, license and fees paid to public institutions
Provision for doubtful trade receivables related to theft accrual (after 1/1/2016)

- Outages

Outages should be recorded by level, location as province, district, network asset, explanation of the outage, classification as source, time, reason, notification, start and end date-time of the outage, duration of outage, number of subscribers affected in/out of zoning area by MV, LV, also total time of impact in/out of zoning area by MV, LV.

- Quality Indicators - By Province



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Also, outages are recorded as quality indicators, as MV/LV subscribers in/out of zoning area for SAIDI (Unreported), SAIDI (Reported), SAIFI (Unreported), SAIFI (Reported), SAIFI short based on the following sources and reasons, in addition to total subscriber number:

Table 7.8 – Quality Indicators

Source	Reason
Transmission	Network Operator
Transmission	Force Majeure
Distribution - MV	Network Operator
Distribution - MV	External
Distribution - MV	Force Majeure
Distribution - MV	Security
Distribution - LV	Network Operator
Distribution - LV	External
Distribution - LV	Force Majeure
Distribution - LV	Security

- Realizations of Commercial Quality

These realizations are recorded using commercial quality code no and includes the name and surname, address and telephone number, province of real/legal person that being processed, also start and end date and/or time of process.

- Summary of commercial quality indicators

This summary includes the following data;

Table 7.9 – Commercial Quality Indicators

Commercial Quality Code No
Total Number of Applications/Transactions
Applications/Transactions Resolved during the predetermined standard time
Unsolved Applications/Transactions during the predetermined standard time
Ratio of Unsolved Applications/Transactions during the predetermined standard time to Total Application/Transactions

- Commercial Quality Additional Indicators

These additional indicators are indicated as the following categories:

Table 7.10 – Additional Commercial Quality Indicators

Total Subscriber Number
Total Complaint Number
Total Call
Calls answered in 30 seconds



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- Quality Indicators

Also, as quality indicator the following data are recorded:

For medium voltage level, in/out of zoning area:

Table 7.11 – Quality Indicators - Medium Voltage

Total MV Subscriber Number
Center Number
Ratio of Total MV Subscriber Number to Center Number
MV Feeder Number
Ratio of Total MV Subscriber Number to MV Feeder Number

Table 7.12 – Quality Indicators - Low Voltage

Total LV Subscriber Number
Center Number
Ratio of Total LV Subscriber Number to Center Number
MV Feeder Number
Ratio of Total LV Subscriber Number to MV Feeder Number
Distribution Transformer Number
Ratio of Total LV Subscriber Number to Distribution Transformer Number

For low voltage level, in/out of zoning area:

Table 7.13 – Quality Indicators - Low Voltage, in/out of Zoning Area

Total LV Subscriber Number
LV Feeder Number
Ratio of Total LV Subscriber Number to LV Feeder Number

- Consumption Information - Period Based

Consumer is a real or legal person whose connection to the system was established. Regardless of any consumption in the related month, he/she shall be included in the consumer number. If there exists more than one consumption point related to one person, then consumption points shall be considered as consumers. These data are recorded by province of consumption point, sector of consumer, type of consumer (regulated-free market), consumer number, consumption amount (billed amount) (MWh).

- Distribution Region Data

It is stated for the end of the period, LV/MV and institutional/private current transformer capacity (Installed Power MVA), current transformer number, and distribution company permanent employee number, contractor/subcontractor employee number. Also, the following data are expressed as cumulative; realized investment amount (₺) for transformer, line and other investments, theft and loss amount and rate, LV/MV and institutional/private overhead and underground lines.

- List of Places where Technical Quality Devices can be Installed



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These places are indicated as the following categories:

Table 7.14 – List of Places where Technical Quality Devices can be Installed – Medium Voltage

Distribution Center (Transformer/ Downloader/ Distribution/ Kiosk)	Code Name		
	Name		
	Type		
	Province		
	District		
	Latitude		
	Longitude		
	Feeder	Code	
Name			
Contexture			
Short Circuit Current			
Feeding		Weighted Subscriber Group	
		Distribution Transformer Number	
		In Zoning Area	MV Subscriber Number
			LV Subscriber Number
		Out of Zoning Area	MV Subscriber Number
			LV Subscriber Number

Table 7.15 – List of Places where Technical Quality Devices can be Installed – Low Voltage

Distribution Transformer	Code Name		
	Name		
	Type		
	Province		
	District		
	Town/Village		
	Latitude		
	Longitude		
Feeder	Code		
	Name		
	Contexture		
	Short Circuit Current		
	Feeding	Weighted Subscriber Group	
		Subscriber Number in Zoning Area	
		Subscriber Number Out of Zoning Area	

- Technical Quality Devices Measurement Results

These data consist of definition of measurement point, measurement period number, number of weeks in which limit values are exceeded, characteristics of the measuring point where number of weeks in which limit values are exceeded are recorded as:



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Table 7.16 – Technical Quality Devices Measurement Results

Effective Voltage Value
Voltage Unbalance
Voltage Crash
Total Harmonic Distortion
Harmonic Voltage
Long-term flicker

and characteristics of the measuring point are recorded as:

Table 7.17 – Characteristics of the Measuring Point

Technical quality measured voltage level
Network characteristics
Weighted customer group
Weighted zoning area status
Calculated three-phase short-circuit current value of the installation location
Explanation

- Charged Power Measurement Fee

These data are recorded as MV/LV subscriber based on:

Table 7.18 – Charged Power Measurement Fee

Measurement Number Due to Complaint
Measurement Number that the User is Justified in Complaint
Measurement Number that the User is Unjustified in Complaint
Charged Power Measurement Fee

- Realization of call center quality indicators

These indicators are measured as accessibility level, service level, response rate. Accessibility level is measured as follows:

Table 7.19 – Realization of Call Center Quality Indicators

Number of calls to call center
Number of calls reaching call center
Number of 15-minute time interval in the relevant period
Number of successful 15-minute time interval in the relevant period

Service level is measured as follows:

Table 7.20 – Realization of Call Center Quality Indicators - Service Level

Number of calls in the operator queue
Number of calls initiated by the operator within 20 seconds

Response rate is measured using the following:



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Table 7.21 – Realization of Call Center Quality Indicators – Response Rate

Number of voice calls with operator

- Complaints

Complaints are recorded by using to mediums; through a call center and out-of-call center channel. Through these mediums total complaint numbers and positively resolved number of complaints are recorded by the subject of complaints which can be categorized as follows:

Table 7.22 – Realization of Call Center Quality Indicators - Complaints

1.1 Investment / Initial Connection (Physical Connection to Network)
1.2 Activation (Actually Energizing)
1.3 Facility (Line, Transformer, Pole ...) Relocation / Removal
1.4 Connection Fee
2.1 Outage
2.2 Voltage Fluctuation / Pressure Change
3.1 Meter Location
3.2 Meter Reading and Reading Notice
3.3 Meter Change
3.4 Meter Price
3.5 Disconnecting - Connecting
4.1 Theft Energy Use Accrual
4.2 Accrual of Disconnecting - Connecting Fee
4.3 Accrual Due to Meter Failure
4.4 improper Energy Use Accrual
5.1 Fault Notification
5.2 Lighting Notice
5.3 Theft Electricity Usage Notice
6.1 Inaccessibility to Company Phones / Call Center
6.2 Non-response of Applications in Time
6.3 Complaints about the Company and Customer Service
7.1 Transmission-Distribution and Other System Fees
7.2 Taxes, Funds and Shares

- Connection-Disconnection and Accrual Information

Accrual transactions are recorded number, energy amount and monetary amount based for household, commercial, industry, irrigation and lighting in the following categories:

Table 7.23 – Accrual Information

Missing accrual due to meter failure (difference taken from consumer)
Excessive accrual due to meter failure (difference returned to consumer)
Missing accrual due to multiplier error (difference taken from consumer)
Excessive accrual due to multiplier error (difference returned to consumer)
Missing accrual due to reading error (difference taken from consumer)



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Excessive accrual due to reading error (difference returned to consumer)
Missing accrual for other reasons (difference from consumer)
Excessive accrual for other reasons (difference returned to the consumer)
Theft accrual due to intervention in the meter (Except for the intervention of the seal)
Theft accrual due to opening of the meter seal
Theft accrual due to external line usage
Theft accrual due to the absence of a contract

Disconnection-connection transactions are recorded number and monetary amount based for household, commercial, industry, irrigation and lighting in the following categories:

Table 7.24 – Connection-Disconnection

Disconnection of new and evacuated subscriptions
Disconnection due to unpaid debt in time
Disconnection due to theft electricity detection
Disconnection due to improper electricity detection
Connection of new and evacuated subscriptions
Connection due to unpaid debt in time
Connection due to theft electricity detection
Connection due to improper electricity detection

- Unlicensed Production Network Information Form – Monthly

Firstly, total connection capacity (MW) allocated by TEIAS for distribution area within the scope of unlicensed production and total monthly production amount in the scope of unlicensed generation (MWh) are indicated. In addition, the plants are described using the below information:

Table 7.25 – Unlicensed Production Network Information Form – Monthly

Province
Type of Applicant (Real-Legal-Public)
Applicant Tax ID / Identification Number
Applicant Name / Title
Facility Type
Source Type
Installed Power (MWe)
Installed Power (MWm)
Connection Level
Condition
Is Production Source Certificate Given?
Production Source Certificate Starting date
Production Source Certificate End date

- Distribution Previous Year Data

For the previous years, energy entering the distribution system (MWh), peak demand (MW) and consumer numbers are indicated by household, commercial, industry, irrigation and lighting categories. The amount of energy and the number of consumers related to the “Martyr Families and Combat Disability Veterans” group will be included in the Residential consumer group. Prior to 2013, the amount of energy and number of consumers related to the “Other1”



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and “Other2” groups in Commercial consumer group will be included in Commercial consumer group. General lighting energy amount shall be included in lighting category.

- Forecast Results

In addition to previous years realizations, the forecasts are indicated as again energy entering the distribution system (MWh), peak demand (MW) and consumer numbers using base, low and high scenarios.

7.3.1 Investments

- Previous Year Meter Change Form

This form indicates the reason of meter change in pieces by meter type as monophas, triphase and active/reactive (kombi), and the reasons can be the followings:

Table 7.26 – Previous Year Meter Change Form

First meter installation under new connection agreement
Fault
Expiration of stamp time
Within the scope of Temporary Article 2 of the Communiqué on the Meters to be Used
Within the scope of external intervention
Power Increase / Reduction
Within the scope of the second paragraph of Article 13 of the Procedures and Principles Regarding Tariff Applications of Distribution Licensee Legal Entities and Supply Companies
For AMR
Other Reasons

- Information on Physical Investments of the Next Year (Annex-3)

These are the information on physical investments of distribution facility of the next year in the following details:

Table 7.27 – Information on Physical Investments of the Next Year

Transformer Power (kVA)
Transformer Assembly (Pcs)
Transformer Disassembly (Pcs)
Transformer Assembly from Disassembly (Pcs.)
Conductor and Cable Type
Conductor and Cable Type Assembly (Km)
Conductor and Cable Type Disassembly (Km)
Conductor and Cable Type Assembly From Disassembly (Km)
Pole Type
Pole Type Assembly (Pcs)
Pole Type Disassembly (Pcs)
Pole Type Assembly from Disassembly (Pcs)
Material
Type
Pieces



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where transformer power can be 25, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600 kVA or other, and conductor and cable type can be the followings:

Table 7.28 – Information on Physical Investments of the Next Year – various transformer levels

477 MCM
266.8 MCM
3/0 AWG
1/0 AWG
SWALLOW
Aluminum
Copper
Underground cable (MV x50)
Underground cable (MVx70)
Underground cable (MVx95)
Underground cable (MVx120)
Underground cable (MVx150)
Underground cable (MVx185)
Underground cable (MVx240)
Underground cable (LVx50)
Underground cable (LVx70)
Underground cable (LVx95)
Underground cable (LVx120)
Underground cable (LVx150)
Underground cable (LVx185)
Underground cable (LV x240)

and pole type can be the followings:

Table 7.29 – Information on Physical Investments of the Next Year – pole type

Iron (MV)
Iron (LV)
Concrete (MV)
Concrete (LV)
Wood (MV)
Wood (LV)
Fixtures and Lamps
Others

and materials can be the followings:

Table 7.30 – Information on Physical Investments of the Next Year - materials

Current Transformer
Voltage Transformer
Separator
Cutter
Compact RMU



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Modular Cell
Concrete Kiosk
Surge protection device
Insulator
Automatic Switch
Panel
Field Distribution Box
Recloser
Sectionalizer
Grounding
Compensation (MVar)
Battery Rectifier Group
Fault Indicator Assembly
Relay

In additions, the projects are indicated as follows:

Table 7.31 – Information on Physical Investments of the Next Year – projects

Order Number
Investment Project Number
Project Approval Date and Number
Project Name and Location
Province
Investment Characteristics
Transformer Power (kVA): MV/LV and MV/MV
Discovery Price (₺)
Energy Transmission Line (km) MV
City Network-Underground (km) MV&LV
City Network-Overhead (km) MV&LV
Village Network (km) MV&LV
DC/Kiosk (Pieces)
Discovery Price (₺)
Expenditures in the context of Investments with Environmental, Security and Other Legal Obligations (₺)
Meter (pcs): Monophase, Triphase, Active/Reactive (Kombi)
Discovery Price (₺)
Start Date
End Date
Total Amount by Characteristic (₺)
Total Discovery of The Project (₺)
Discovery by Approved Unit Prices (₺)

where investment characteristics are the followings:



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Table 7.32 – Information on Physical Investments of the Next Year – investment characteristics

Network Capacity Increase Investments
Network Renewal Investments
Network Improvement Investments
New Standard Connection Investments
New Non-Standard Connection Investments
Investments dependent to Load Distribution
Investments with Environmental, Security and Other Legal Obligations
Lighting Investments
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Information on Physical Investments of the Next Year

These are the information on physical investments of the next year in the following details:

Table 7.33 – Information on Physical Investments of the Next Year

Order Number
Investment Project Number
Project Approval Date and Number
Project Name
Province-District
Town
Neighbourhood
Village
Investment Characteristics
Start Date
End Date
Total Amount by Characteristic (₺)
Project Total Amount (t)
Amount Calculated with Unit Prices (₺)
Justification of The Project

where investment characteristics are;

Table 7.34 – Information on Physical Investments of the Next Year – investment characteristics

Network Investments (Investments subject to unit price)
Network Investments (Other Investments)
Investments with Environmental, Security and Other Legal Obligations
Network Operating System Investments
Meter Investment
Network Investments (Other investments)



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- Information on Investment Realizations of the Previous Year (Annex-4)

These are the information on amount of investment realizations calculated both using current prices and approved unit prices, in the implementation period years by investment characteristics which are;

Table 7.35 – Information on Investment Realisations of the Previous Year

Network Capacity Increase Investments
Network Renewal Investments
Network Improvement Investments
New Standard Connection Investments
New Non-Standard Connection Investments
Investments dependent to Load Distribution
Investments with Environmental, Security and Other Legal Obligations
Lighting Investments
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Notification Form for Investment Realizations of the Previous Year

These forms include the information on amount of investment realizations calculated both using current prices and approved unit prices, in the implementation period years by investment characteristics which are;

Table 7.36 – Notification Form for Investment Realizations of the Previous Year

Network Investments (Investments subject to unit price)
Network Investments (Other Investments)
Investments with Environmental, Security and Other Legal Obligations
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Information on Investment Forecast for the Next Year (Annex-4)

These are the information on amount of investment expenditure calculated both using current prices and approved unit prices, in the implementation period years by investment characteristics which are;

Table 7.37 – Notification Form for Investment Forecast for the Next Year

Network Capacity Increase Investments
Network Renewal Investments
Network Improvement Investments
New Standard Connection Investments
New Non-Standard Connection Investments
Investments dependent to Load Distribution
Investments with Environmental, Security and Other Legal Obligations
Lighting Investments



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Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Notification Form for the Investment Forecast of the Next Year

These forms include the information on amount of investment expenditure calculated both using current prices and approved unit prices, in the implementation period years by investment characteristics which are;

Table 7.38 – Notification Form for Investment Forecast for the Next Year – investment characteristics

Network Investments (Investments subject to unit price)
Network Investments (Other Investments)
Investments with Environmental, Security and Other Legal Obligations
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- In the Capacity Increase Investments of the Previous Year; Costs for the Unconstructed Lighting Network in the City Network-Overhead (LV) and Village Network-Overhead (LV) Distribution Facility Elements (Annex-5)

These are the information on unconstructed lighting network material by type, unit (piece/meter/kilogram), quantity, unit price and amount. Also, project order no, investment project no, project approval date and number, project name and location information are indicated.

- Information on Previous Year's Investments (Annex-6)

These are the information of previous year's investment distribution facility in the following details:

Table 7.39 – Information on Previous Year's Investments

Transformer Power (kVA)
Transformer Assembly (Pcs)
Transformer Disassembly (Pcs)
Transformer Assembly from Disassembly (Pcs.)
Conductor and Cable Type
Conductor and Cable Type Assembly (Km)
Conductor and Cable Type Disassembly (Km)
Conductor and Cable Type Assembly from Disassembly (Km)
Pole Type
Pole Type Assembly (Pcs)
Pole Type Disassembly (Pcs)
Pole Type Assembly from Disassembly (Pcs)
Material
Type
Pieces

where transformer power can be 25, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600 kVA or other, and conductor and cable type can be the followings:



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Table 7.40 – Information on Previous Year's Investments – voltage levels

477 MCM
266.8 MCM
3/0 AWG
1/0 AWG
SWALLOW
Aluminum
Copper
Underground cable (MV x50)
Underground cable (MVx70)
Underground cable (MVx95)
Underground cable (MVx120)
Underground cable (MVx150)
Underground cable (MVx185)
Underground cable (MVx240)
Underground cable (LVx50)
Underground cable (LVx70)
Underground cable (LVx95)
Underground cable (LVx120)
Underground cable (LVx150)
Underground cable (LVx185)
Underground cable (LV x240)

and pole type can be the followings:

Table 7.41 – Information on Previous Year's Investments – pole type

Iron (MV)
Iron (LV)
Concrete (MV)
Concrete (LV)
Wood (MV)
Wood (LV)
Fixtures and Lamps
Others

and materials can be the followings:

Table 7.42 – Information on Previous Year's Investments - materials

Current Transformer
Voltage Transformer
Separator
Cutter
Compact RMU
Modular Cell
Concrete Kiosk
Surge protection device



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Insulator
Automatic Switch
Panel
Field Distribution Box
Recloser
Sectionalizer
Grounding
Compensation (MVar)
Battery Rectifier Group
Fault Indicator Assembly
Relay

In additions, the projects are indicated as follows:

Table 7.43 – Information on Previous Year's Investments – project details

Order Number
Investment Project Number
Project Approval Date and Number
Project Name and Location
Province
Investment Characteristics
Transformer Power (kVA): MV/LV and MV/MV
Amount (₺)
Energy Transmission Line (km) MV
City Network-Underground (km) MV&LV
City Network-Overhead (km) MV&LV
Village Network (km) MV&LV
DC/Kiosk (Pieces)
Amount (₺)
Amount from ANNEX-8 or ANNEX-9 (₺)
Meter (pcs): Monophase, Triphase, Active/Reactive (Kombi)
Amount (₺)
Start Date
End Date
Total Amount by Characteristic (₺)
Project Total Amount (₺)
Amount Accounted by Approved Unit Prices (₺)

where investment characteristics are the followings:

Table 7.44 – Information on Previous Year's Investments – characteristics

Network Capacity Increase Investments
Network Renewal Investments
Network Improvement Investments
New Standard Connection Investments
New Non-Standard Connection Investments



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Investments dependent to Load Distribution
Investments with Environmental, Security and Other Legal Obligations
Lighting Investments
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Notification Form for Investments of the Previous Year

These forms include the information on investments of the previous year in the following details:

Table 7.45 – Notification Form for Investments of the Previous Year

Order Number
Investment Project Number
Project Approval Date and Number
Project Name
Province-District
Town
Neighbourhood
Village
Investment Characteristics
Start Date
End Date
Total Amount by Characteristic (₺)
Project Total Amount (₺)
Amount Calculated with Unit Prices (₺)

where investment characteristics are the following:

Table 7.46 – Notification Form for Investments of the Previous Year – investment characteristics

Network Investments (Investments subject to unit price)
Network Investments (Other Investments)
Investments with Environmental, Security and Other Legal Obligations
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Final Account Difference Information on Investments with Final Account after the Application Year of the Project (Annex-7)

These are the information on final account difference after the application year of the project in the following details:

Table 7.47 – Final Account Difference Information

Order Number
Investment Project Number



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Project Approval Date and Number
Project Name and Location
Investment Characteristics
Transformer Power (KVA) MV/LV and MV/MV
Amount (₺)
Energy Transmission Line (Km) LV&MV
City Network-Underground (Km) LV&MV
City Network-Overhead (Km) LV&MV
Village Network (Km) LV&MV
Dc/Kiosk (Pieces)
Amount (₺)
Amount from Annex-8 ((₺)
Start Date
End Date
Total Amount by Characteristic (₺)
Project Total Amount According to Final Interim Payment (₺)
Project Total Amount According to Previous Year Interim Payment (₺)
Difference (₺)

where investment characteristics are the following:

Table 7.48 – Final Account Difference Information – investment characteristics

Network Capacity Increase Investments (Final Account) (A)
Network Capacity Increase Investments (Previous Year Last Interim Payment) (B)
Network Capacity Increase Investments (Difference=A-B)
Network Renewal Investments (Final Account) (A)
Network Renewal Investments (Previous Year Last Interim Payment) (B)
Network Renewal Investments (Difference=A-B)
Network Improvement Investments (Final Account) (A)
Network Improvement Investments (Previous Year Last Interim Payment) (B)
Network Improvement Investments (Difference=A-B)
New Standard Connection Investments (Final Account) (A)
New Standard Connection Investments (Previous Year Last Interim Payment) (B)
New Standard Connection Investments (Difference=A-B)
New Non-Standard Connection Investments (Final Account) (A)
New Non-Standard Connection Investments (Previous Year Last Interim Payment) (B)
New Non-Standard Connection Investments (Difference=A-B)
Investments dependent to Load Distribution (Final Account) (A)
Investments dependent to Load Distribution (Previous Year Last Interim Payment) (B)
Investments dependent to Load Distribution (Difference=A-B)
Investments with Environmental, Security and Other Legal Obligations (Final Account) (A)
Investments with Environmental, Security and Other Legal Obligations (Previous Year Last Interim Payment) (B)
Investments with Environmental, Security and Other Legal Obligations (Difference=A-B)
Lighting Investments (Final Account) (A)
Lighting Investments (Previous Year Last Interim Payment) (B)



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Lighting Investments (Difference=A-B)
Network Operating System Investments (Final Account) (A)
Network Operating System Investments (Previous Year Last Interim Payment) (B)
Network Operating System Investments (Difference=A-B)
Meter Investment (Final Account) (A)
Meter Investment (Previous Year Last Interim Payment) (B)
Meter Investment (Difference=A-B)
Network Investments (Other investments) (Final Account) (A)
Network Investments (Other investments) (Previous Year Last Interim Payment) (B)
Network Investments (Other investments) (Difference=A-B)

- Final Account Difference Notification Form for Investments with Final Account after the Application Year of the Project

These forms include the information on final account difference after the application year of the project in the following details:

Table 7.49 – Final Account Difference Information – after the application year

Order Number
Investment Project Number
Project Approval Date and Number
Project Name
Province-District
Town
Neighbourhood
Village
Investment Characteristics
Start Date
End Date
Total Amount by Characteristic (₺)
Project Total Amount According to Final Interim Payment (₺)
Project Total Amount According to Previous Year Interim Payment (₺)
Difference (₺)

where investment characteristics are the following:

Table 7.50 – Final Account Difference Information – investment characteristics

Network Investments (Investments subject to unit price) (Final Account) (A)
Network Investments (Investments subject to unit price) (Previous Year Last Interim Payment) (B)
Network Investments (Investments subject to unit price) (Difference=A-B)
Network Investments (Other Investments) (Final Account) (A)
Network Investments (Other Investments) (Previous Year Last Interim Payment) (B)
Network Investments (Other Investments) (Difference=A-B)
Investments with Environmental, Security and Other Legal Obligations (Final Account) (A)
Investments with Environmental, Security and Other Legal Obligations (Previous Year Last Interim Payment) (B)



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Investments with Environmental, Security and Other Legal Obligations (Difference=A-B)
Network Operating System Investments (Final Account) (A)
Network Operating System Investments (Previous Year Last Interim Payment) (B)
Network Operating System Investments (Difference=A-B)
Meter Investment (Final Account) (A)
Meter Investment (Previous Year Last Interim Payment) (B)
Meter Investment (Difference=A-B)
Network Investments (Other investments) (Final Account) (A)
Network Investments (Other investments) (Previous Year Last Interim Payment) (B)
Network Investments (Other investments) (Difference=A-B)

- Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations - Excluding the costs paid for the taken over distribution facilities (Annex-8)

These are the information on previous year's investments with environmental, security and other legal obligations excluding the taken over distribution facilities in the following details:

Table 7.51 – Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations

Order Number
Investment Project Number
Project Approval Date and Number
Project Name and Location
Expropriation Expenses (₺)
Excavation Permit or License Fees (₺)
Displacement Works (₺)
Forest Permit Fees (₺)
Provisional Acceptance Fees Paid (₺)
Other (₺)
Ground Destruction-Construction Costs (₺): Other Investment Characteristic Costs and Costs Under Network Capacity Increase Investments
Total Amount to Annex-6 (₺)
Total Amount (₺)

- Notification Form on Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations - Excluding the costs paid for the taken over distribution facilities (Annex-8)

These forms include the information on previous year's investments with environmental, security and other legal obligations excluding the taken over distribution facilities in the following details:

Table 7.52 – Notification Form on information on Previous Year's Investments with Environmental, Security and Other Legal Obligations

Order Number
Investment Project Number
Approved Project Date and Number



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Project Name
Province-District
Town
Neighbourhood
Village
Expropriation Expenses
Forest Permit Fees (₺)
Provisional Acceptance Fees (₺)
Project Approval Fees (₺)
Protocol Prices (Tpc, Tsr Etc.) (₺)
Ground Destruction-Construction Fees Paid to Municipalities (₺)
Supervision Fees Paid to Municipalities (Excluding Excavation License-Permission Fees) (₺)
Other (₺)
Total Amount (₺)

- Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations - The costs paid for the taken over distribution facilities (Annex-9)

These are the information on previous year's investments with environmental, security and other legal obligations about the taken over distribution facilities in the following details:

Table 7.53 – Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations – taken over distribution facilities

Order Number	
Investment Project Number	
Project Approval Date and Number	
Project Name	
Charges Paid Under the Connection and System Use Regulation	Article 21
	Article 37
	Article 38
	Provisional Article 2
Total Amount	

- Notification Form on Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations - The taken over distribution facilities (Annex-8)

These forms include the information on previous year's investments with environmental, security and other legal obligations about the taken over distribution facilities in the following details:

Table 7.54 – Information on Previous Year's Investments with Environmental, Security and Other Legal Obligations – Taken over Distribution Facilities

Order Number
Investment Project Number
Approved Project Date and Number
Project Name



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Province-District	
Town	
Neighbourhood	
Village	
Project Realization Amount	
Temporary Acceptance Date	
History of Take Over	
Take Over Price	
Total Amount Expended / Paid Up to The Year of Implementation	
Amount Expended / Paid in The Year of Implementation	
Total Amount Expended / Paid Up to The Year of Implementation	Article 21
	Article 37
	Article 38
	Provisional Article 2
Amount Expended / Paid in The Year of Implementation (₺)	Article 21
	Article 37
	Article 38
	Provisional Article 2
Total Amount	

- Projects that cannot be completed within the implementation period (Annex-10)

Total expenditure of the projects is divided into expenditure during the implementation period that the investment project has started and planned expenditure in the next implementation period using total amount by characteristic, total project amount (₺), amount accounted by approved unit prices (₺), project realization rate in the current implementation period. Also, the following properties of the project are specified:

Table 7.55 – Projects that cannot be Completed within the Implementation Period

Order Number
Investment Project Number
Approved Project Date and Number
Project Name
Province-District
Town
Neighbourhood
Village
Investment Characteristics
Start Date
End Date

where investment characteristics are;

Table 7.56 – Projects that cannot be completed within the Implementation Period – Investment Characteristics

Network Investments
Investments with Environmental, Security and Other Legal Obligations
Network Operating System Investments



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Meter Investment
Network Investments (Other investments)

- Investment Plan Notification Form (Annex-1)

Planned amounts are shown in ₺ with the fixed prices on a specified date. Accepted investment expenditure calculation for distribution activity is indicated for the following years as the below categories:

Table 7.57 – Investment Plan Notification Form

Network Investments
Investments with Environmental, Security and Other Legal Obligations
Network Operating System Investments
Meter Investment
Network Investments (Other investments)

- Notification form for the works displaced in the previous year within the scope of subparagraph (f) of the first paragraph of Article 10 of the Procedures and Principles

This form consists of the following details:

Table 7.58 – Investment Plan Notification Form - Details

Order Number
Investment Project Number
Project Name
Provisional Acceptance / Activation Date of Existing Facility
Expropriation / permit / protocol status of the existing facility (YES / NO)
Real / Legal person requesting displacement
Justification for displacement
Current Cost

- Provisional Acceptance Information Notification Form for Investments of the Previous Year

This information consists of the following details:

Table 7.59 – Provisional Acceptance Information Notification Form

Order Number
Tender Group Number
Investment Project Number
Project Name
Contract Date
Approved Project Date Number
Who made the provisional acceptance (Distribution Company/TEDAS)
Provisional Acceptance Commission President Name
Ready for provisional acceptance letter date
Date of provisional acceptance request letter addressed to TEDAS



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Establishment Date of Provisional Acceptance Commission
Provisional Acceptance Date
Provisional Acceptance Approval Date

- Transformer Notification Form for Previous Year's Investments

Information of the transformers in the provisional acceptance report includes; order number, tender group number, investment project number, project name, transformer in the acceptance report by brand, voltage (KV), power (KVA), series number, year of manufacture and warehouse exit/interim material price.

- Previous Year Network Operating System Investments Notification Form

In these category Scada, AMR, GIS, DMS, OMS, ERP, ICT, etc. are included and indicated as follows:

Table 7.60 – Previous Year Network Operating System Investments Notification Form

Order Number
Investment Project Number
Project Name
Expenditure Type
Acquisition Date
Activation Date
Current Cost ₺

- Investment Expenditures (Other expenditures) of Previous Year Notification Form

In these category land, building, vehicle, project construction, software and licenses, other fixtures are included and indicated as follows:

Table 7.61 – Investment Expenditures (Other expenditures)

Order Number
Investment Project Number
Project Name
Expenditure Type
Acquisition Date
Activation Date
Current Cost ₺

- Asset Sales Revenues Form of Previous Years

Revenues from asset, scrap and inventory sales and connections are indicated as current costs and the amount calculated by June 2015 CPI.



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7.4 Annex 4: Ofgem Requirements for TSOs for Reporting under RIIO⁴⁰

It is a requirement for TSOs to publish an annual report, on its company website. The report should be published by 30th September each year. 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;
- 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 requires 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):
 - o flagging any substantial variations in cost or incentive performance against the incentive targets;
 - o details of any substantial variation and a commentary on why this has occurred e.g. changes to market conditions, a one-off event, etc.

⁴⁰ RIIO-T1 Gas Transmission Price Control –Regulatory Instructions and Guidance: Version 6.2.



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- 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:
 - o an overview of its performance against each incentive;
 - o a discussion of any changes to market conditions which may be affecting the System Operator's costs/role;
 - o 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 headings⁴¹:

- 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);
- Residual gas balancing daily price incentive payments and daily line pack 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.

⁴¹ Source: National Grid UK Web site.



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7.5 Annex 5: Gas Distribution Company Annual Tariff Tables

Annex 1: Company Profile and License Information

This table provides necessary information about the distribution company, license information, expansion information, and contact information. Besides, staff information who are responsible for preparing tariff tables should be included in this Annex 1.

ANNEX-1: Company Profile and License Information	
1. Company Identification	
1.1.	Company Title
1.2.	Date of Establishment
2. Licence Information	
2.1.	License Date and Number
2.2.	License Type
2.3.	License Period
2.4.	Tariff Based Activity
2.5.	Current License Zone
2.6.	License Zone Expansion Information
3. Expansion Zones (Expansion Board Decision Date and Number, Provinces)	

Annex 2: Basic Data

This table provides population data, buildings information, infrastructure data, subscribers data, and consumption data.

The data received by this table is used for the efficiency analysis of the OPEX by conducting clustering studies, calculating the physical change index, modeling the gas purchase stamp tax, and distributing the income requirement to grades by considering peak consumption to perform efficiency analyzes.

ANNEX-2: Basic Data	
1. Basic Information	
1.1.	Population
1.2.	Distribution Zone Number
1.3.	Total Number of Buildings
1.4.	Total Apartments
1.5.	Total Number of Subscriber Centers
1.6.	Number of Emergency Response Locations
1.7.	Total Number of Emergency Response Vehicles
2. Network Information	
2.1.	Activity Area
2.2.	Total Pipeline Length (Cumulative)
2.2.1.	Total Steel Length (Cumulative)
2.2.2.	PE Steel Length (Cumulative)
2.2.3.	Service Line Length (Cumulative)
2.3.	Total Metering Number
2.4.	Penetration Rate
2.5.	Peak Day Data
2.5.1.	Daily Gas Carrying Capacity of the Network
2.5.2.	Peak Day
2.5.3.	Total Amount of Gas Passing through the Grid on the Peak Day of the Network
2.5.4.	Amount of Gas Consumed by Free Consumers on Peak Day
2.5.5.	Amount of Gas Consumed by Subscribers on Peak Day
3. Subscriber Information	
3.1.	Number of Consumers Contracted
3.2.	Number of Gas Supplied Buildings



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4. Natural Gas Sales and Transportation Information
4.1. Amount of Natural Gas Purchased
4.2. Amount of Natural Gas Sold
4.3. Amount of Natural Gas Transported

Annex 3: Annual Financial Status

Within the scope of Natural Gas Market Law No. 4646, natural gas distribution companies shall have a financially sustainable structure, and EMRA is authorized to implement necessary regulations for achieving this purpose.

In order to evaluate the financial structure of the distribution company, financial statements are requested, and the financial situations are analyzed, and the overall financials of the DSOs are evaluated by the Authority.

In addition, financial statements are also important in examining whether the data presented with detailed tables are compatible with financial records.

Annex-3: Annual Financial Status
3.1. Current Assets-Active
A) Values
B) Stocks and Bonds
C) Trade Receivables
D) Other Receivables
E) Stocks
F) Years of Common Construction and Repair Costs
G) Future Expenses and Incomes for Future Months
H) Other Current Assets
3.2. Fixed Assets-Active
A) Trade Receivables
B) Other Receivables
C) Financial Fixed Assets
D) Tangible Fixed Assets
E) Intangible Fixed Assets
F) Depletable Assets
G) Future Expenses and Incomes for Future Months
H) Other Fixed Assets
3.3. Short Term Liabilities-Passive
A) Financial Debts
B) Commercial Debts
C) Other Debts
D) Advances Received
E) Acceleration for Construction, Repair and Maintenance
F) Taxes to be Paid and Other Liabilities
G) Allowances
H) Revenue Collected in Advance and Accrued Expenses Payable in Next Months
I) Other Short-Term Liabilities
3.4. Long-Term Liabilities-Passive
A) Financial Debts
B) Commercial Debts
C) Other Debts
D) Advances Received
E) Allowances
F) Revenue Collected in Advance and Accrued Expenses Payable in Next Years
G) Other Long-Term Liabilities



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3.5. Shareholder Equity
A) Issued Capital
B) Capital Reserves
C) Profit Reserves
D) Profits of Previous Periods
F) Period Net Income and Losses

Annex 4: Annual Income Statements

Distribution company’s annual income statements are used to examine whether the data presented with detailed tables are compatible with financial records. This sort of information also enables EMRA to successfully modeling the revenues of the DSOs other than the system usage fee.

Annex-4: Annual Income Statements
A) Gross Sales
B) Sales Deductions
C) Net Sales
D) Cost of Sales
E) Operational Expenses
F) Income and Profit from Other Ordinary Operations
G) Expenses and Losses from Other Ordinary Operations
H) Financing Expenses
I) Extraordinary Revenues and Profits
J) Extraordinary Expenses and Losses
K) Period Income Tax Provision

Annex 5: Annual Cash Flow Sheet

This table provides yearly cash flow information. Distribution companies report the items that provide cash flow such as natural gas purchase and sale, investment, assurance fee, tax payments, loans to EMRA in this annex sheet.

Annex 6: Balance

In this table, distribution company’s balance information can be found. The balance sheet is reported to EMRA both electronically and in writing.

Annex 7: Distribution Company Natural Gas Purchase Amounts and Costs

In this annex, the amount and price information of natural gas purchased by a distribution company for subscribers and eligible consumers in a year are reported to EMRA.

EMRA considers the reasonable profitability that will allow investments, and the current natural gas purchase prices in the market, in addition to other parameters, to determine the System Usage Fee for each DSO.

Although natural gas supply costs are not directly included in the System Usage Fee calculations, they are necessary to analyze the cost increases on subscribers precisely, and to interpret financial records correctly.

Annex 8/A Distribution Company Natural Gas Sales Amounts and Costs

Distribution companies report their natural gas sales, quantities, and prices to EMRA on a monthly basis. The relevant information is reported at the subscriber, electricity generation, OIZ, CNG licensees, and other bases.



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This data set also allows EMRA to precisely assess the differentiation of each consuming segment having different prices by clustering.

Annex 8/C: List of Eligible Consumer Consuming Over 100.000 sm³

In this annex, the title, current suppliers, and yearly consumption information of eligible consumers are claimed to EMRA. 100.000 sm³ limit is based on the amount measured from a single meter, and the total consumption of the meters is not applicable.

In EMRA's Board Resolution No. 5362 dated December 18, 2014, grants "eligible consumer" status to commercial, industrial, and public consumers by the Article 1 stating that "All consumers are eligible consumers, with the exception of residential consumers." and Article 4 stating "Regardless of the amount of consumption, cogeneration plants producing electricity and heat energy, and individuals and user unions are eligible consumers."

With the provision, all our commercial, industrial, and public customers have gained the right to freedom. In addition, the second article of the same law, "Residential consumers; the limit of being a free consumer for domestic consumers is 75.000 m³. For the free consumer limit, the consumption amount measured from a single meter will be taken into consideration."

Annex 9: List of Eligible Consumers Purchasing Natural Gas from Suppliers

Eligible consumers' monthly data, including the ones in Organized Industrial Zones, are reported to EMRA by submitting Annex 9.

EMRA's above mentioned Board Resolution No. 5362, dated December 18, 2014, allows EMRA to collect data for the annual consumption variations of consumers, that supply gas from suppliers other than the DSOs.

Therefore, Annex 9 is used for modeling the consumption patterns of eligible consumers, located in the distribution zones.

Annex 10/B Operational Expenditures

This table provides all relevant data for analyzing and monitoring the OPEX of the DSOs. OPEX is elaborated on the basis of expense items and the classification of the expenses on the basis of sub-activity except outsourcing services.

All tables of the Annex 10 group are the tables required for the calculation of the OPEX component, one of the two main components in determining the tariffs of DSOs.

EMRA conducts activity-based efficiency analyzes by using the financial records created uniformly for the entire sector and the operational expenses tables prepared based on Authority's "Sectoral Account Plan and Procedures" regulation.

Therefore, the operational expenses of DSOs are normalized by de-scaling and de-seasonalizing for further analysis by taking into account the financial variables such as the network length of the companies, the number of subscribers, the number of districts, the number of city entry stations, and the financial variables such as inflation.

Annex 10/B: Operational Expenses	
A)Personnel Fees and Expenses	E)Energy Expenses
1.Fees	1.Heating Gas Expenses
2.Benefits	2.Fuel Expenses
3.Compensation	3.Building Warmin Expenses
4.Employer Shares	4.Electricity
5.Daily Allowance	5.Water Expenses
6.Personnel Health Expenses	6.Odorizing Expenses
7.Personnel Education Expenses	
8.Personnel Service Expenses	F) Legal Mandatory Expenses



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9. Personnel Meal Expenses	1. Court and Law
10. Travel Expenses	2. Stamp Tax
11. Other Personnel Expenses	3. Other Taxes
	4. Insurance
B) Material Expenses	5. EMRA Annual License Fee
1. Distribution Lines	6. EMRA Participation Share
2. Stations	7. Audit Expenses
3. Meters	8. Notary Expenses
	9. Dues Expenses
C) Externally Provided Service Expenses	10. EPDK Final Collateral Commission Expense
1. Conuter Reading and Billing	11. Announcement Expenses
2. Notice Distribution Service	
3. Metering Operation	G) Communication Expenses
4. Internal Installation Operations	1. Radio
5. Periodic Inspection and Meter Calibration	2. Phone
6. Individual Measurement Equipment Inspection Expenses	3. Internet
7. Expenses of Collection	4. Mail and Cargo
8. Commission Expenses	5. SCADA
9. Security Services	
10. Call Center	H) Bureau and Administrative Expenses
11. Maintenance and Repair Expenses	1. Bureau Expenses
12. Technology Service	2. Cleaning Materials
13. Consultancy Expenses	
14. Cleaning Service Expenses	I) Other Expenses
15. CNG Purchase Price Differences	1. Advertising and Promotion
16. LNG Purchase Price Differences	2. Donation, Sponsorship and Association Dues Expenses
	3. Representation Expenses
D) Rental Expenses	4. R&D Expenses
1. Real Estate Rental Expenses	5. Expense Counted Fixtures
2. Use Expenses	6. Nonallowable Charges
3. Machinery Equipment Lease Expenses	
4. Vehicle Rental Expenses	

Annex 10/D: Real Estate Rent Expenses

In this table, the information for the real estates rented by the DSO is provided to EMRA. Distribution companies report detailed renting information, such as the location, rental fee with Annex 10/D.

Annex 10/E: Vehicle Rent Expenses

The car license plate number, model, rental period, other detailed information of vehicles rented by the distribution companies are submitted to EMRA in this Annex.

Annex 10/F: Software Rent Expenses

Detailed information of software, acquisition date, cost of software by distribution companies are shared with Annex 10/F.

Annex 10/G: Billing Information

In this annex, the number of meters read within the scope of natural gas consumption, the number of invoices issued, the number of invoices sent, and other detailed information for invoicing are submitted to EMRA. Invoice information for remote reading meters is not covered by this annex.



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EMRA also assesses the distribution of collections, which is used to make the necessary analyses to determine the Operating Expenses of the Customer Service Offices. Also, the accrued collections are monitored by EMRA with the information received by this annex.

Monthly unit consumption realizations are calculated by dividing monthly consumption amounts by monthly invoice numbers, and these data are used in the formation of tariff period consumption models.

Annex 10/G: Billing Information
Number of Reading Meters
Number of Invoices Issued
Number of Notices Distributed
Invoice Collection Information

Annex 13: Staff Number and Staff Expenses

Annex 13 includes tables for claiming the number of personnel and their costs based on their activities. With this table, the costs of the distribution companies that provide the service from outside and the distribution companies that provide the service with their own personnel are used to make efficiency analyzes by comparing them.

Annex 13: Staff Numbers and Personnel Expenses
Number of Personnel
Total Personnel Expenses
Distribution of Personnel
1. Customer Service Personnel
2. Security Personnel
3. Technical Services Personnel
4. General Services Personnel
5. Marketing Staff
6. General Management Personnel
Distribution of Personnel Expenses in TL
1. Customer Services Personnel Expenses
2. Security Personnel Expenses
3. Technical Services Personnel Expenses
4. General Services Personnel Expenses
5. Marketing Staff Expenses
6. General Management Personnel Expenses

Annex 14/B: Distribution Company Loans

Information such as the project where the loan is used, the funded project/institution, loan execution and end date, loan currency and interest rate are requested in this annex.

This table does not include loans of which the payments have expired in the relevant year. In addition, interest rates applied in the periods realized in floating interest rate loans indicated separately on a yearly basis.

The information processed over this data also used for assessing the financial sustainability of the distribution companies.

Annex 19: Quality of Service

This table provides distribution companies recorded performance and service quality data to EMRA for the purpose of calculating the Quality Indicator included in the tariff methodology. It is based on rewarding or penalization of companies for tariff revenues depending on the quality of the services they offer.



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However, this tool has not yet been implemented in the current tariff methodology. Based on the assessments included in the natural distribution section of Task 1.1. Report, the content of the table would be amended to receive more data.

Annex 19: Service Quality Performance Indicators
1. Connection Information
2. Reasons for Temporary Gas Interruption
3. Measurement
4. a) Reasons for Complaint
4. b) Complaint Methods
4. c) Bill Complaint
5) Collection Information
6) Emergency Case Information
7) Interruption
8) Health and Safety
9) Supplier Change
10) Call Center

Annex 20: Detailed Customer Number Table

The data provided by Annex 20 is used by EMRA for clustering distribution companies, creating subscriber projections, and modeling DSO’s revenues other than System Usage Fee.

Within the scope of Law Natural Gas Market Law No. 4646 and Natural Gas Market Tariffs Regulation, EMRA sets connection tariffs, security deposit fees, and other service charges.

This table is mainly used in the cost analysis required for determining the connection tariffs.

Annex 20: Number of Consumers Detail Table
Activity Area
Number of Potential Consumers in Distribution Zone (Residential and Non-Residential)
Number of Potential Consumers Reached by Distribution Network (Residential and Non-Residential)
Service Line Construction Number (Cumulative)
Total Length of Service Lines Installed (Cumulative)
Total Cost of Service Line (Excluding VAT)
Number of Potential Consumers Reached by Service Line (Residential and Non-Residential)
Number of Consumer Agreements (Cumulative) (Connected by Service Line - Consumers who pay the connection fee via BBS)
Number of Consumers Approved internal installations (Cumulative)
Number of Consumers Who Signed the Gas Use Agreement (Cumulative)
Number of Consumers Gas Opened (Consumer with Gas on for the first time in years)
Number of Consumers Billed At Least Once in The Year
Number of Gas Supplied Buildings (with at least one subscriber in it)
Water Subscriber in Distribution Zone

Annex 21/A1: Investments

All of the tables of Annex 21 are the tables required to calculate the crucial Investment Component of the distribution tariffs.

With the previously mentioned “Sectoral Account Plan and Procedures” regulation of EMRA, investment type-based efficiency analyzes can be made using financial records created in one type and Investment tables prepared with these records.

Sectoral analyzes are carried out on the distribution costs of the distribution companies, and efficiency increases on costs are targeted through reward and penalty practices.



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ANNEX-21/A1: INVESTMENTS

Investment Expenses (TL)

Network Elements

Total Investment Amount

1. DISTRIBUTION NETWORK

1.1 Distribution Lines

1.1.1. Steel Lines (from 1 to over 28")

1.1.2. Polyethylene Lines (ND 0-40mm, ND 63 mm, ND 90 mm, ND 110 mm, ND 125 mm, over ND 125 mm)

1.2. Special Transition Distribution Lines

1.2.1. Special Transition Steel Lines (from 1 to over 28")

1.2.2. Special Transition Polyethylene Lines (ND 0-40mm, ND 63 mm, ND 90 mm, ND 110 mm, ND 125 mm, over ND 125 mm)

1.3. Line Valves and Valve Rooms

1.3.1. Steel Valves (from 1 to over 28")

1.3.2. Polyethylene Valves (ND 0-40mm, ND 63 mm, ND 90 mm, ND 110 mm, ND 125 mm, over ND 125 mm)

1.4. Live (Hot-tap) Operation Expense

1.5. City Entrance Station

1.5.1. First Investment (By Station Capacity-m³/h)

1.5.2. Additional Investment

1.6. Inner City Regional Stations

1.6.1. First Investment (By Station Capacity-m³/h)

1.6.2. Additional Investment

2. CITY FEEDING LINE

2.1. Steel Lines (from 1 to over 28")

2.2. Steel Valves (from 1 to over 28")

2.3. Pig Stations

2.4. Live (Hot-tap) Operation Expense

3. METERS

3.1. Mechanical (G4, G6, G10, G16, G25, G40, G65, G100, G160, G250, G400, above G400)

3.2. Electronics (Including Prepaid Module System) (G4, G6, G10, G16, G25, G40, G65, G100, G160, G250, G400, above G400)

3.3. Volume Corrector

4. OTHER INVESTMENTS

4.1. Excavation, License, Fee Expenses

4.2. Expropriation

4.3. Cover Coat Expenses

4.3.1. Municipality Cover Coat Expenses

4.3.2. Subcontractor Cover Coat Expenses

4.3.3. Asphalt Plant

4.4. Control Company Costs

4.5. Cathodic Protection System

4.6. SCADA Investments

4.7. Mapping and Geographic Information Systems

4.8. Inherited Lines and Facilities

4.9. CNG Investments

4.10. LNG Investments

Annex 21/A2: Service Lines

Service lines of the distribution grid are analyzed in 3 items as unit material expenses, unit construction and labor costs and total investment expenses.



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Annex 21/A3: Individual Lines

ANNEX-21/A2: Service Lines	
Investment Expenses (TL)	
TOTAL INVESTMENT AMOUNT	
1. Service Line	
2. Service Box	
3. Meters	
3.1. Mechanical (G4, G6, G10, G16, G25, G40, above G40)	
3.2. Electronics (Including Prepaid Module System) (G4, G6, G10, G16, G25, G40, above G40)	
4. Other Investments	
4.1. Cover Coat Expenses	
4.1.1. Municipality Cover Coat Expenses	
4.1.2. Subcontractor Cover Coat Expenses	
4.2. Mapping and Geographic Information Systems	
4.2.1. Application (As-Built) Investments	

Individual Lines are analyzed under three categories as unit material expenses, unit construction and labor costs and total investment expenses.

ANNEX-21/A3: INDIVIDUAL LINES	
Investment Expenses (TL)	
TOTAL INVESTMENT AMOUNT	
1. LINES	
1.1 Steel Lines (from 1 to over 28")	
1.2. Polyethylene Lines (ND 0-40mm, ND 63 mm, ND 90 mm, ND 110 mm, ND 125 mm, over ND 125 mm)	
2. STATIONS	
2.1. Customer Station	
2.2 Customer Service Box	
3. METERS	
3.1 Meters	
3.2. Volume Corrector	
4. OTHER INVESTMENTS	
4.1. Excavation, License, Fee Expenses	
4.2. Expropriation	
4.3. Cover Coat Expenses	
4.4. Cathodic Protection System	
4.5. SCADA Investments	
4.6. Mapping and Geographic Information Systems	

Annex 21/C: Planned Investments

Planned investments are determined for three years. Amount and cost are taken as basis in planned investments.

ANNEX-21/C: PLANNED INVESTMENTS	
INVESTMENTS ITEMS	
1. Distribution Lines	
1.1. Steel Lines (meter)	
1.2. Polyethylene Lines(meter)	
2. Line Valves and Valve Rooms	
2.1. Steel Valves(number)	
2.2. Polyethylene Valves(number)	
3. City Entrance Stations(number)	
4. Inner City Regional Station (number)	
5. City Feed Lines	





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6. Service Line Cost(Including meters)
7. Excavation, License, Fee Expenses
8. Expropriation Costs
9. Cover Coat Expenses
10. Control Company Costs
11. Cathodic Protection System
12. SCADA Investments
13. Mapping and Geographic Information Systems
14. Inherited Lines and Facilities
15. CNG Investments
16. LNG Investments

Annex 21/D: Stations Information

The station information includes city entry stations and customer stations. These stations have technical features such as capacity, inlet pressure, outlet pressure. Apart from these features, the first and additional investment amounts in the relevant year are available in the table, and necessary for EMRA’s data processing purposes for DSOs.

Annex 21/E: Displacements Lines

The table with displaced lines contains line number, displaced line length (steel and polyethylene), displaced line costs (materials and labor), and the amount collected.

Annex 21/F: Metering Information

The meters are divided into two categories as mechanically and electronically based on their types. The metering hardware data is reported to EMRA by identifying meters installed to the grid, stock movements, and scrap meters.

Annex 22/A: Allowance

Allowance Annex includes progress payment date, progress payment amount, contractor, region, and procedures, mainly used for checking and comparing the data received by the tables of Annex 21.

Annex 22/C: Coating-Covering Details

The coating details table contains the coating type, contractor, year, unit, quantity and amount information.

Annex 23: Non-Network Assets

The non-network assets table includes the property of the real estate, vehicles, and software information to separate the network-based and non-network-based assets.

Tables contain information about the non-network assets acquired by the Distribution Company within the scope of its primary operating activity. It is used for efficiency analysis by bringing the costs of the distribution company to the base.

Annex 24/A: Operating Revenue

Annex 24/A is the table where all the revenues of the Distribution Companies are presented to EMRA for further processes. It is used as basic data in Regulated Asset Base account and the creation of other income projections.

ANNEX-24/A: OPERATING REVENUES
PERIODIC INCOME TABLE (TL) (Excluding VAT)
TOTAL REVENUES
1. System Usage Revenues





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1.1. 0 - 10.000 Sm3
1.2. 10.001 - 100.000 Sm3
1.3. 100.001 - 1.000.000 Sm3
1.4. 1.000.001 - 10.000.000 Sm3
1.5. 10.000.001 - 100.000.000 Sm3
1.6. 100.000.001 Sm3 and above
2. Connection Revenues
2.1 Connection Revenue Based on the Number of Independent Regions
2.2. Other Connection Revenues
3. Interior Installation Transaction Revenues
4. Certificate Service Revenues
5. Meter On/Off Revenues
6. Displaced Line Revenues
7. Damage Revenues
8. Irregular Gas Usage cost
9. Illegal Gas Usage Cost
10. Delay Fee
11. Other Revenues
11.1 Rental Income
11.2. Hot-Tap Operating Income
11.3. Specification Sales Revenues
11.4. Other Services Revenues
11.5. Fixed Asset Sales Revenues
11.6. Scrap Sales Revenues
11.7. Insurance Compensation Revenues
11.8. Meter Repair Revenues
11.9. Advertising Revenues
11.10. First Item and Material Sales Revenues
11.11. Peripheral Service Revenues
11.12. Prepaid Meter Exchange Revenues
11.13. Measurement Equipment Inspection Revenues
11.14. Calibration Revenues

Annex 24/B: Operating Income-Balance

Annex 24/B aims to summarize the operating income of the distribution company in accordance with the company's balance sheet.

The data in this table is used in the Regulated Asset Base calculations of each DSOs.

ANNEX-24/B: OPERATING REVENUES-BALANCE	
Operating Income - Main Item	
1. System Usage Revenue	
2. Connection Revenues	
3. Interior Installation Transaction Revenues	
4. Certificate Service Revenues	
5. Meter On/Off Revenues	
6. Displaced Line Revenues	
7. Damage Revenues	
8. Irregular Gas Usage cost	
9. Illegal Gas Usage Cost	
10. Delay Fee	
11. Other Revenues	

Annex 25: Security Deposit Flow Table



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This table contains data on the insurance fees collected by subscribers and eligible consumers in order to secure their receivables.

Security Deposit Fee is returned to the customer if the subscription is terminated. The amount of Security Deposit to be returned is calculated by taking into account the difference in inflation between the value at the date of payment, and the date at which it will be returned.

With this table, it is aimed to follow up the amount and updated amount of the Security Deposit amount, recorded as debt in the accounting accounts of the distribution companies.

In addition, the total amount of Security Deposit returned during the period is reported in the table.

ANNEX-25: SECURETIY DEPOSIT FLOW TABLE	
COLLECTED SECURITY DEPOSIT	
1.	Sum of Security Deposit Collected for The Relevant Year Beginning (Excluding Inflation)
2.	Total Inflation Difference of Security Deposit Collected at the Beginning of the Related Year.
3.	Amount of Security Deposit Collected in the Relevant Year
4.	Principal Total of Security Deposit Paid for Subscription Termination in the Related Year
5.	Total Inflation Difference of Security Deposit Paid for Subscription Termination in the Related Year

Annex 26: Asset Sale

The asset sales table of Annex 26 is the table containing information about network asset sales and non-network asset sales. Asset name, acquisition date, acquisition value, sales date, sales value, accumulated depreciation amount on sales date are submitted to EMRA.

The table aims to keep track of the changes that occurred due to the sales of the distribution company during the period. In the calculation of the Asset Base of the natural gas distribution company, corrections are made according to the data in this table.

Annex 27/A: Number of Consumers and Consumption Amounts by Consumption Group-V1

Table with monthly consumption levels realized and planned by years.

The aim of Annex 27/a is to report the number of customers in the activity region of the distribution company and the consumption amount at the levels determined by EMRA as realization and estimation.

Reporting is based on the amount of consumption corresponding to the number of invoices issued monthly. The data in this table is used in the projections and the forecasts of consumption.

Annex 27/B: Number of Consumers and Consumption Amounts by Consumption Group-V1

In this table, the number of customers in the distribution company (meter-based), the amount of consumption based on consumption level in the relevant month, and the number of invoices issued in the relevant month are reported to EMRA by the DSOs. -

The difference between this table from the 27/B table is that the consumption grade changes during the period are not taken into consideration in this table.

The data in the table is used to calculate the grade-based distribution of the calculated company's Revenue Requirement.

Moreover, the calculation of the Revenue Deviation of a distribution company in +/- 7% deviation is made by using the data in this table, within the framework of the EMRA's Board Resolution No. 5120.

Annex 27/C: Customer Profile Based on Consumption Grades



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According to the consumption grades, the table shows the monthly consumption amounts in the relevant year of the residentials, public institutions, commercials, and others, industrial facilities, organized industrial zones, and electricity-generating power plants.

The difference of the data in this table from Annex 27 B is the reporting of monthly consumption amounts in 6 grades according to the consumer profiles.

It is aimed to determine the consumer profile in the distribution region with the data in this table.

Annex 28: DBP-09: Distribution License Declaration Table

DBP-09 includes seven sub-declaration forms for the distribution companies license operations and allows distribution companies to submit detailed operational activities on monthly basis.

Annex 28/A: Amount of Gas Purchased Form includes:

- Title of Company Supplied of Gas
- Company License No
- Gas Type and Amount (Pipe Gas/LNG)
- Price (\$/1000 m3)
- Total Price

In this table, the price at which the distribution company procures natural gas from each source is checked. In accordance with the existing legislation, each distribution company is obliged to supply natural gas from the cheapest source available. With this table, it is checked whether this procurement obligation is achieved monthly, and therefore the interests of the consumers in the distribution region are protected. It is also possible to supply gas in LNG or CNG phase for areas where natural gas is not available by pipelines for technical and economic reasons. This table also enables to report LNG and CNG purchases of DSOs.

In addition, the DSO's natural gas supplier also enters its sales figures into the EBIS system, and the data of both license holders are cross-checked by EMRA.

Annex 28/B: Amount of Gas Sold to Natural Gas License Holders includes:

- Title of Company Where Gas Is Sold
- Company License No
- Gas Type and Amount
- Sales Price excluding VAT but including SCT (Special Consumption Tax)
- Total Amount

The data, including the consumption and sales price related to the sales of the natural gas distribution company to the CNG companies, is requested in this table. Therefore, EMRA collects DSO's sales figures to CNG companies while checking the claims of CNG companies by comparing the figures.

Annex 28/C: Amount of Gas Transported by Distribution Companies

- Suppliers Title
- Suppliers License Number
- Suppliers Customer Name
- Customers Tax No
- Customer Status for transmission
- Provinces and District
- Eligible Customer Sector
- Amount of Gas Transported

Consumers who are in the eligible consumer category in a distribution region have the right to make natural gas supply either from the distribution company or from a different supplier, such as a wholesaler or an importer.



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This table contains the information of the consumers and the relevant suppliers that the distribution company provides transmission services by supplying natural gas from different suppliers in the corresponding distribution region.

EMRA also collects statistical information with this data set to clearly identify the natural consumption volumes of each sectoral segment. As a result of notifying the sales data of the supplier, which is also a licensed company having an obligation to report its own figures to EMRA, the figures are cross-checked, and the most appropriate data is processed by the Authority.

Annex 28/D: Information About Eligible Customer Applications

- License No
- Tax No
- Licensee Title
- Year and Periods
- Number of Customers Gaining Eligible Customer Status During the Period as a result of Changing the Limit on Being an Eligible Customer
- Sector of Consumers Who Change Suppliers During the Period
- Number of Eligible Consumers Changing Suppliers During the Period
- Amount of Consumption of Consumers Who Change Suppliers During the Period
- Number of Consumers Whose Supplier Change Request Was Rejected During the Period

The primary purpose of this table is to monitor the progress towards a more liberalized market by assessing the supplier changes of the eligible consumers in the distribution zones. DSO's reaction in case of receiving an application from an eligible consumer to switch to another supplier is monitored by EMRA whether the DSO is easing or resisting the procedures. However, the liberalization of the Turkish natural gas market is behind the level of liberalization in the electricity market, and therefore only mid, and large-scale consumers have the opportunity to select their suppliers.

The importance of the collected data via DPF-44 is expected to play a crucial role in the near future due to progressing towards liberalization.

Annex 28/E: Information About Customer Quality of Service

- Connection Information
- Reasons for Gas Cutting
- Measurement
- Reasons for Complaint
- Ways of Complaint
- Invoice Objections
- Payment Information
- Emergency Response Status
- Health and Safety

This table provides a vital indication regarding the customer service standards offered by the distribution companies.

The data collected by EMRA by DPF 45 is also essential for assessing **Quality Performance Indicators**, which is discussed and kindly proposed in the natural gas distribution section of the Task 1.1 Report.

Among these, essential business processes such as meeting connection requests, opening/closing meters, termination of contracts, distribution of notices, illegal/irregular consumption control, number of defective meters, justification rates of customer complaints, and fees received in return for the services provided to the customer are monitored by EMRA.

Annex 28/F: Amount of Gas Sold to Electricity Generation Companies



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- Title of Company Where Gas Is Sold
- Electricity Market License
- Provinces-District
- Amount
- Sales Price excluding VAT but including SCT (Special Consumption Tax)
- Total Price

Data regarding the amount and the prices of natural gas sold to natural gas-fired power plants are collected by DPF-66 table, as electricity generation from these power plants plays an important role to meet Turkey's electricity demand and achieving security of supply.

The data collected by this table also enables EMRA to cross-check the inputs of power plants, and therefore increase the reliability of this crucial information.

Annex 28/G: Gas Transport Operation for Organized Industrial Zones (OIZ)

- Name of OIZ Legal Entity
- District-Province Name
- Distribution Zone Information
- Total Amount of Transportation

Organized industrial zones can carry out natural gas distribution activities within their own regions within the scope of the authority coming from their own legislation. On the other hand, some organized industrial zones may request the distribution activity to be carried out by the natural gas distribution company authorized in the relevant region with the decision of its board of directors.

DPF-77 enables EMRA to collect natural gas volumes and transmission service information regarding Organized industrial zones to identify the service provider of the distribution activity within these zones.

Annex 29: Forecasting Table

DBP-23 table of the declaration system is used to collect all necessary data for forecasting and estimating the consumption volumes in the distribution zones, which plays a crucial role in determining tariffs. In this table, the reflection of the retail sales price, which consists of the system usage fee and supply cost calculated within the scope of the tariff of the distribution company, is checked by EMRA. The system usage fee determined within the scope of the tariff is updated every month with the CPI index.

Compliance of these updates with the existing legislation and the methodology is monitored and controlled with the data in these tables.

The table is prepared on the basis of gradual consumption limit and it is examined whether or not an application has been made for each stage apart from the determined System Usage Fee of the distribution company.

According to the legislation, it is possible for the distribution companies to reflect a price below the determined cost to all consumers, without discriminating between equal parties. Through these tables, it is checked whether the distribution company applies a discount to any consumption level. Even if the distribution company applies a System Usage Fee discount to a consumption level, it is assumed that it earns its income from the System Usage Fee unit price determined for the relevant period.

Annex 29/A: Forecasting

- System Usage Fee (TL/sm³) (Distribution company should report upper price and excise price)
- Natural Gas Price (Including SCT, Excluding VAT)
- Resale Price (Including SCT, Excluding VAT) (Distribution company has to identify upper price limit and the implemented price)



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The DSOs are obliged to report EMRA the retail sales prices and the System Usage Fees by identifying upper price limits and the prices even if applied below these upper limits for each consumption grade listed in below table.

Table 7.62 – Grades based on gas consumptions

Grades based on gas consumptions (Sm ³)
Grade 1: 0 - 100,000
Grade 2: 100,001 - 1,000,000
Grade 3: 1,000,001 - 10,000,000
Grade 4: 10,000,001 - 100,000,000
Grade 5: 100,000,001 Sm ³ and above

Annex 30:: Distribution Activity Report Table

EMRA aims to collect detailed data for clearly outlining and monitoring the overall operational activities of each DSO with eight tables on monthly periods.

Annex 30/A: Subscriber Information of Distribution Companies

- Distribution Area Name
- Province and Districts
- Subscriber Sector
- Subscriber Usage Type
- Number of Subscriber
- Subscriber Consumption Quantity

With DPF-59, the data of the natural gas sales to consumers having the “subscriber” status are reported by the distribution company. Since all consumers, except residentials, have gained eligible consumer status to EMRA.

Annex 30/B Distribution Companies Gas Sales to Eligible Consumers

- Distribution Area Name
- Province and Districts
- Eligible Consumer’s Sector (Field of Activity) Sold by Distribution Company
- Number of Eligible Consumers
- Volume of Gas Sold to Eligible Consumers

The amount of natural gas sold to eligible consumers by the distribution company is reported on a sectoral basis, to create statistical data while monitoring the activities of the DSOs.

This information is also used to support sustaining the security of natural gas supply in case of a shortage by prioritizing sectoral consumptions.

Annex 30/C: Other Data of Distribution Companies

- Distribution Area Name
- Province and Districts
- Gross Calorific Value Applied to Subscribers (kcal/m³)
- Average Monthly SO₂ Value (µg/m³)



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The transmission system operator measures the caloric value of natural gas delivered from each city entrance station. The amount of natural gas received by the distribution company for each day and the calorific value of this gas is recorded in the system, and it is reflected to the relevant consumers by taking the weighted average in each billing period.

DPF-61 enables EMRA to monitor the monthly average Gross Calorific Value of each distribution zone as the Gross Calorific Value is an important component of the monthly bills.

Annex 30/D: Investment Information of Distribution Companies

- Distribution Area Name
- Province and Districts
- Total Length of Steel Pipeline Constructed
- Total Length of Polyethylene Pipeline Constructed
- Total Length of Service Line Constructed
- Total Number of Service Units Constructed
- Number of City Entry Stations in Operation
- Number of Regional Regulators in Operation
- Number of Customer Stations in Operation
- Number of Installed Service Boxes
- Number of Installed Counters

In this table, information is collected to analyze the investments of the distribution companies by assessing the city entry station, customer station, CNG or LNG discharge station if it exists, and steel and polyethylene grid information provided by the distribution company.

Besides, since the investment costs related to these investments are included in this table, it is possible to analyze the investment made according to the efficiency criteria.

Annex 30/E: Regulator and Measurement Station Information of Distribution Companies

- Province and Districts
- Name of City Entry Station
- The Reason of Gas Passing Through City Entry Station that Enters the Grid
- Amount of Gas Passing Through City Entry Station
- Customer Station Type
- Number of Customer Station
- Number of Customers that receive gas from Customer Stations
- Amount of Gas Passing Through Customer Stations

In this table, the data regarding the amount of natural gas received from each city entry station and the amount of natural gas passing through the customer stations' downstream flows are collected to assess the capacity utilization rates in the stations and the flow profile of the steel network.

Annex 30/F: Employment Information of Distribution Companies

- Distribution Area Name
- Province and Districts
- Number of Staff Edifies Distribution Company
- Number of Contractor Companies
- Number of Contractor Company Personnel
- Number of Subcontracted Company
- Number of Subcontracted Company Personnel



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The labor data of the distribution companies, including contractors and subcontractors, are monitored by the information collected by DPF-64. Service recruitment and personnel expenses are analyzed as well as the quality and efficiency of the related services are measured by the Authority.

Annex 31/A: Regional LNG/CNG Network Activities of Distribution Companies

- Provinces and District
- Station Type in Operation
- Number of Station Units in Operation
- Natural Gas Supply (LNG/CNG)
- Volume of Natural Gas

In areas where natural gas cannot be supplied by pipelines for technical and economic reasons, distribution companies are allowed to supply natural gas in CNG or LNG by tender method or by temporary direct supply method. The necessary information regarding CNG and LNG deliveries of the DSOs are collected by DPF-73.

Annex 31/B: Investment Information of the cities where natural gas has not been supplied for distribution.

- Distribution Area Name
- Province and Districts
- Investment Process Phase
- Remaining Expropriation Information
- Type of Stations to be used
- Number of Stations manufactured but not yet commissioned
- Number of Stations not produced yet
- Manufactured High Pressure Steel Pipelines
- High Pressure Steel Pipeline to be manufactured
- Manufactured Medium Pressure Steel Pipelines
- Medium Pressure Steel Pipeline to be manufactured
- Manufactured Low Pressure Polyethylene Pipelines
- Low Pressure Polyethylene Pipeline to be manufactured
- Starting Date of Investment

DPF-76 contains information that will allow the monitoring of the investment made in the cities where the gas supply is not yet provided. It also enables EMRA to monitor the progress of the investments and the realization of the site works.

Annex 32: Correction coefficient table

Annex 32/A

- Average Ground Temperature at -50 cm Depth
- Average Ground Temperature at -100 cm Depth
- Pressure Values (mbar)
- Mechanical Meter Correction Coefficient Calculation
- Prepaid Meter Adjustment Coefficient Calculation

Pressure, temperature, and compressibility (PTZ) correction is carried out by using automatic volume corrector at the measurement points that use natural gas at pressure over 300 mbar in the measurement of natural gas as required by the legislation.

A constant coefficient is applied in the consumption points measuring 300 mbar or less, in accordance with the legislation. For this application, the average of the last 10 years of underground temperature data and atmospheric pressure data received from the relevant meteorology station, and the effect of compressibility is accepted as 1 and ignored. With this table, the “k” coefficient, which is a very important factor of the measurement of natural gas delivered to consumers, is controlled by EMRA.



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Annex 33: Distribution Activity Progress Report

Annex 33/A: Contracts with Suppliers

- Supplier's Title
- Supplier's License No
- Total Contract Volume with the Suppliers (m³/year)

DPF-42 contains the necessary data to assess the supply status of the distribution region. State-owned BOTAS supplies natural gas to all distribution companies under current market conditions. However, diversification in gas supplies of the DSOs is expected due to the increasing level of market liberalization and the number of suppliers. This table will play an important role and expected to be the base of the supply information when gas supplies are diversified.

Annex 33/B: Construction and Service Certification Information

Distribution companies report EMRA the relevant information regarding the Construction and Service Certification holders, which are authorized for carrying out projects, construction works, maintenance of facilities, service lines.

The installations to be made from the station or service box in residences, commercials, or industrial facilities in a distribution region are referred to as "internal installations," and the responsibility of construction belongs to the relevant customer.

The companies that will make this installation are authorized by obtaining a certificate from the distribution company. In addition, service line construction in distribution regions is also subject to certification of EMRA. In addition, the authorized companies whose certificates are revoked by the distribution company are also checked by the DPF-43 table.

Annex 33/C: Information About ISO Documents

The date, regulating, validity period, and audit information of ISO 9001, ISO 14001, OHSAS 18001, ISO 27001 documents owned by Distribution Companies are reported in this form.

Distribution companies are obliged to have the certificates defined in the Natural Gas Marketing Licensing Regulation of EMRA, and EMRA aims to monitor the status of DSOs conformity to this obligation.

Annex 33/D: More Information About Distribution Network

- Distribution Area Name
- Province and Districts
- Number of Neighbourhoods Reached
- Number of Potential Subscribers Reached
- Expropriation Quantity
- Total Excavation Permit and Overcoating Fee Paid in TL
- Valve Room/ Valve Group

Annex 33/E: Distribution of Steel and PE Lines by Pipe Diameters

- Distribution Area Name
- Province and Districts
- Steel Pipe Diameter and Length
- PE Pipe Diameter and Length

Annex 33/F: Neighbourhood Names and Housing Numbers Reached on Distribution Network

- Distribution Area Name



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- Province and Districts
- Neighbourhood Names Reached
- Number of Houses

DPF-68-69-70 are tables that are prepared to monitor the progress of distribution companies' investment activities. Various information including the network lengths, paid excavation license fees, coating and permit expenses, and the number of houses reached by investment is reported for the regions, where gas supply is provided by the distribution network constructed by the DSO.

Annex 33/G: Control Company Information Signed Contract with Distribution Company

The DPF-72 table contains information about the control companies that are authorized to assess the distribution company's practices on behalf of the EMRA. The distribution companies are obliged to contract with the authorized control companies of EMRA. This report contains the information of the companies and related staff that they have contracted.

Annex 34/A : Distribution License Declaration Due to the Conditions

In this form, commercial and sales activities of distribution companies are reported to EMRA. Companies periodically report 10 forms to EMRA's EBIS system.

These forms are as follows:

- Yearly cash flow table
- List of eligible consumers
- Grade-based consumption table
- Depreciation
- Assets
- Tariff proposal
- Security deposit
- Sales table
- Customer profile

Annex 34/B: Natural Gas Price

DPB-47 includes a form for the Natural Gas Price Declaration of the distribution companies. This form includes price information of the residential and industrial consumers. Distribution companies report sales volume of natural gas, base sales price, system usage fee, and taxes.

This report is being prepared for use by TurkStat and is prepared based on a non-tariff consumption breakdown for State's statistical database. The consumption amounts and financial items related to the invoicing for consumers in the housing and eligible consumer category are also included in this category.

Annex 34/C: Natural Gas Financial Statement

DPB 50 includes four DTF forms, such as Annual Balance Sheet, Annual Income Statement, Cash Flow -V2. All of these are requested to assess the financial status of distribution companies. Companies are obliged to report these four tables to EMRA in six-months periods.

Annex 35: Loans of Distribution Companies

Annex 35/A: Credits

The loans and the credits granted to distribution companies are reported to EMRA based on the below items in 6-months periods.

- Credit No
- Credit Type
- Project in Use



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- Credit-Proving Financial Institution
- Credit Start and End Date
- Currency
- Credit Amount
- Installment Period
- End of Period Balance
- Annual Interest Rate

Annex 35/ B Distribution Company Annual Tariff Tables

Natural gas distribution companies annually submit 27 main tables to EMRA’s Tariffs Department. Some of these headings are sent to EMRA annually, while others are sent in different periods. The information included in these tables are assessed by EMRA and used to produce the necessary data sets for tariff determination (see Annex 5 for details).

Table 7.63 – Distribution Company Annual Tariff Tables

Distribution Company Annual Tariff Tables
Annex 1: Company Profile and License Information
Annex 2: Basic Data
Annex 3: Annual Balance Sheet
Annex 4: Annual Income Sheet
Annex 5: Annual Cash Flow Sheet
Annex 6: Balance
Annex 7: Distribution Company Natural Gas Purchase Amounts and Costs
Annex 8/A: Distribution Company Natural Gas Sales Amounts and Costs
Annex 8/B: Distribution Company Natural Gas Amount Estimation
Annex 8/C: List of Eligible Consumer Consuming Over 100.000 sm3
Annex 9: List of Eligible Consumers Purchasing Natural Gas from Suppliers
Annex 10/B: Operational Expenditures
Annex 10/D: Real Estate Renting Expenses
Annex 10/E: Vehicle Renting Expenses
Annex 10/F: Software Renting Expenses
Annex 10/G: Billing Information
Annex 13: Staff Number and Staff Expenses
Annex 14/B: Distribution Company Loans
Annex 14/C: Distribution Company Loan Repayment Table
Annex 19: Quality of Service
Annex 20: Customer Number Detailed Table
Annex 21/A1: Investments



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Distribution Company Annual Tariff Tables
Annex 21/A2: Service Lines
Annex 21/A3: Individual Lines
Annex 21/B: Investments Dispersion
Annex 21/C: Planned Investments
Annex 21/D: Stations Information
Annex 21/E: Displacement Lines
Annex 21/F: Metering Information
Annex 22/A: Allowance
Annex 22/B: Allowance Details
Annex 22/C: Coating-Covering Details
Annex 23: Non-Network Assets
Annex 24/A: Operating Income
Annex 24/B: Operating Income-Balance
Annex 25: Security Deposit Flow Table
Annex 26: Asset Sale
Annex 27/A: Number of Consumers and Consumption Amounts by Consumption Group-V1
Annex 27/B: Number of Consumers and Consumption Amounts by Consumption Group-V2
Annex 27/C: Customer Profile Based on Consumption Levels



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7.6 Annex 6: Ofgem’s Data Assurance Guidance for Electricity and Gas Network Companies

7.6.1 Risk Assessment of the Data

Risk of a data submission is the level of its consequences and negative impacts if the data is inaccurate or incomplete. The negative impacts can be classified according to its outcomes to the i) customers, ii) competition, iii) financial and iv) comparative efficiency. Risk is calculated by the probability of occurrence and its impact. For the data submissions, risk of an inaccurate data is the probability of a submission that contains inaccurate data multiplied by its negative impact. Therefore, risk assessment is shown via risk matrix, one axis for the probability and one axis for the impact.

Table 7.64 – Risk Assessment Matrix

Impact Level \ Probability of Occurrence	Low	Medium	High
	Low		
Medium			
High			

In the table above, probability of occurrence is scored through the evaluation of the data collection, reporting and related control systems and processes. Impact level is the expected impact of the inaccurate data for the customers, competition, revenue requirement and comparative efficiency. Stages of risk assessment process is defined as below.

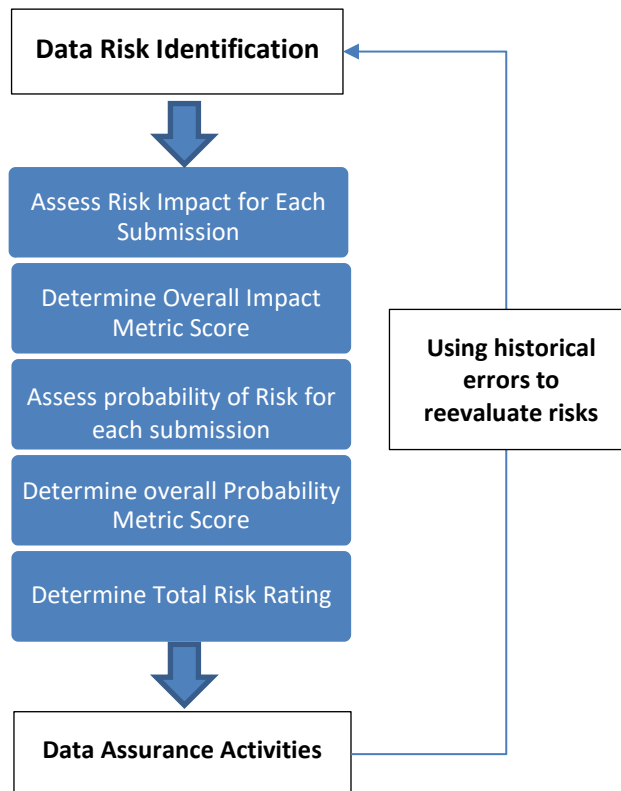


Figure 7.1 – Risk Assessment Process



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7.6.1.1 Impact Metric

Impact metric is the comparative significance valuation for the inaccurate data. This metric has four ratings 1 to 4, with 4 denoting the highest level of adverse impact and 1 denoting the lowest level of adverse impact that could arise due to the usage of inaccurate or incomplete data.



Figure 7.2 – Risk Impact Valuation

The impact valuation should be done for the four categories:

- Customers,
- Competition,
- Financial (revenue requirement),
- Comparative efficiency,

The impact assessment table is shown below.

Table 7.65 – Impact Assessment Table

	Customers	Competition	Financial	Comparative efficiency
1	Has no or negligible service impact on all customers, other network operators, service providers, or shippers.	Negligible or no impact on the ability of third parties to compete in the market place.	No or negligible potential for financial impact on the level of incentives receivable from the Regulator as a result of an Error.	No or negligible comparative efficiency analysis impact from an Error.
2	Creates a breach that has a moderate service impact on any customers, other network operators, service providers, or shippers (and does not score 3 or 4) Or Creates a moderate but low profile level of customer complaints, either directly or indirectly.	Low impact on the ability of third parties to compete in the market place.	An Error or omission that could potentially give rise to a low financial impact (assessed against a financial value equivalent to $< \pm 1\%$ Licensee's annual opex)	Comparative efficiency analysis impact from an Error of less than 1% of Licensee's annual opex.
3	Creates a breach in licence conditions that has a moderate impact on a large number of customers, other network operators, service providers, or shippers or Creates a breach that has a major impact on a small number customers, other network operators, service providers, or shippers or	Moderate impact on the ability of third parties to compete in the market place.	An Error or omission that could potentially give rise to a significant financial impact (assessed against a financial value equivalent to $\geq \pm 1\%$ Licensee's annual opex but $\leq \pm 5\%$)	Comparative efficiency analysis impact from an Error of $\geq 1\%$ and $\leq 5\%$ of Licensee's annual opex.



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	Creates a moderate but high profile number of legitimate customer complaints or dissatisfaction, either directly or indirectly			
4	Creates a breach in licence conditions that has a major impact on a large number of customers, other network operators, service providers, or shippers ¹¹ or Creates a significant number of legitimate customer complaints either directly or indirectly.	High impact on the ability of third parties to compete in the market place.	An Error or omission that could potentially give rise to a major financial impact (assessed against a financial value equivalent to >±5% of Licensee’s annual opex)	Comparative efficiency analysis impact from an Error > 5% of Licensee’s annual opex.

Each of these categories should be scored from 1 to 4. To calculate the overall impact metric score for a submission, highest score of all categories (biggest risk impact) is taken.

To consider historical errors in submitting data, the impact score should not be reduced for at least 2 years following the error detection.

7.6.1.2 Probability Metric

Probability metric is the likelihood of confronting with an error in submitted data. Probability metric has also four ratings, 1 to 4, 1 denoting the lowest probability of inaccurate, incomplete or late data submission. To calculate the probability metric score, two categories should be scored first:

- Error probability of the data submission process (Inherent probability),
- Control process,

The sum of these two categories form the overall probability metric.

Inherent Probability

Inherent probability reflect the error probability of the system where no control other than the general system or process controls are used. Inherent probability depends on the following items:

1. Complexity of data sources,
2. Completeness of data set,
3. Extent of manual intervention,
4. Complexity and maturity of reporting rules,

Inherent probability has three ratings from 2 to 4, with 2 is the lowest probability for inaccurate data. These ratings are given based on no other control activities.

Table 7.66 – Inherent Probability Assessment Table

	11. Complexity of Data sources	12. Completeness of Data set	13. Extent of manual intervention	14. Complexity & maturity of reporting rules
2	Single Data system used to populate submission.	Complete Data set routinely captured to populate this report for 2 years or more	Data collation and reporting are fully automated	The rule set is complete; the rules require no interpretation, judgement or assumptions; the rules have been in place for more than 12 months.
3	One numerical and one financial Data system	Data routinely captured by DNO to populate this report but for less than 2 years	More than 0% but less than 60% of the Data is	The rule set is complete and has not changed for at least months but the rules require



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	used to populate submission.	or some elements of reporting based on extrapolation of sample Data rather than full Data set.	manually collated and reported.	some interpretation, judgement or assumptions.
4	Two numerical systems or two financial systems or more than two Data systems used to populate submission.	Data not routinely captured by Licensee to populate this report. Reporting for a significant number of elements of the submission is based on extrapolation of sample Data rather than full Data set.	More than 60% of the Data is manually collated and reported.	The rule set is incomplete or the rules require significant interpretation, judgement or assumptions or the first issue of rules have been completed within the last 12 months.

Control Activities

Control process is the actions taken above the general system controls to reduce inaccurate data. Control process scores depends on the following items:

1. Control activities,
2. Experience of personnel,
3. Evidence of historical Errors with this data,

Control scores has three ratings from 0 to 2, with 0 is the weakest control and 2 denotes the strongest control. These are indicators of the level of confidence in the control environment.

Table 7.67 – Control Framework Assessment Table

	C1. Control Activities	C2. Experience of personnel	C3. Evidence of historical Errors with this Data
0	There are inadequate validation / preventative controls or controls have been in place for less than 12 months or systems and processes not documented and control points not assessed (ie any such material lacks substantial coverage) or Regulatory submissions not subject to effective review or supervision processes.	This submission being collated by employees with no prior experience of doing so and no method statement available to explain prior year approach to completing this report.	Material Errors identified for this report, or table level as appropriate, within the last two years; and the issues identified have not been eliminated or no audit undertaken on this submission in the last five years.
1	There are adequate validation / preventative controls and controls have been in place for more than 12 months but less than 2 years and systems and processes substantially documented and control points assessed and regulatory submissions subject to effective review or supervision processes.	This submission being collated by employees with no prior experience of completing this submission but using method statements for prior submissions to support them or this submission being collated by employees with prior experience of completing this submission – with no method statements for prior years available.	Material Errors for this submission have been identified within the last two years for which all issues have been remediated but not yet validated or no audits undertaken on this Data within the last two years, but audit has been undertaken within the last five years.



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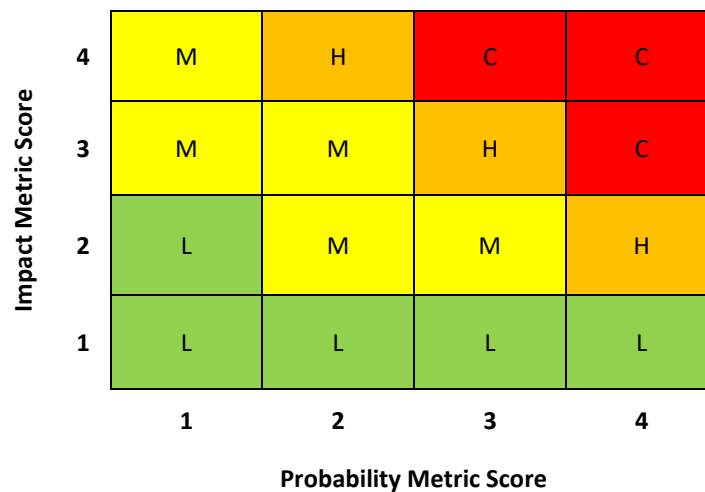
2	<p>There are extensive validation / preventative controls. and controls have been in place for more than two years and systems and processes fully documented and control points fully evaluated and assessed and regulatory submissions subject to comprehensive and effective review and supervision processes.</p>	<p>This submission being collated by employees with prior experience of completing this submission – with method statements for prior years in place</p>	<p>Audit has been undertaken on this submission within the last two years and no Material Errors were identified and either there were no previously identified Errors in submissions. or Audit confirmed that any previously identified issues have been properly addressed.</p>
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Overall Probability Metric Score

To achieve the probability metric score;

- Maximum score of the inherent probability categories are taken,
- Take the average score of the control activities,
- Subtract the average control score from the maximum inherent probability score,
- Minimum score is 1, so if the result is 0 take it as 1.

7.6.1.3 Total Risk Score



7.6.2 Data Assurance Activities

Before submitting the data to the regulator, data assurance activities should be conducted. These activities are defined in terms of **who** should undertake the activity, **when** (i.e. under what circumstances) and **what** this involves. Data assurance activities should be informed by the Risk Assessment study, which is explained in the above heading. All data submissions require a degree of:

- Planning,
- Review,
- Sign-off,



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7.6.2.1 Planning

Methodology Statement and Submission Plan should be prepared for the submitted forms. This plan explains the process of producing the submission and include the details of systems, responsibilities, timings, sign-off and additional methodologies to complete any calculations required.

7.6.2.2 Review

Submission/Data review options are stated as follows:

Second Person Review

All submissions are checked by a person other than the person who prepared the submission/tables. Second person is not necessarily be the chief or manager of the first person. Any person with reasonable understanding of the requirements is sufficient.

The role of the second person is to check whether the methodology is obeyed, confirming the accuracy of the data through checking inputs.

Internal Expert Review

A regulatory specialist or someone who understands the return in detail (and may have been directly involved in its preparation) does the check. The role of this expert is to check whether the submission is compatible with any guidance of the regulator and ensure that the control activities have been performed and unusual data is resolved.

Internal Data Audit

This check is performed by an Independent Internal Assurance Provider, e.g. a Group Internal Audit Function or Assurance Function (or equivalent) or a subject matter expert not directly involved in the return. This control ensures for providing the evidence of verification of data. Data verification is done by sampling approach and confidence level is determined through sample testing.

Internal Submission Process Audit

This check is performed by an Independent Internal Assurance Provider, e.g. a Group Internal Audit Function or Assurance Function (or equivalent). These auditors are not responsible from the accuracy of the data but the control of the process to produce the submission. They review the adequacy and effectiveness of the internal control systems to ensure returns are timely, complete and accurate.

External Data Audit

This audit is useful where specialist knowledge required and essential for financial accounts. Audit carried out by a third party outside the company or group. Independent registered audit organisations or independent experts with or without formal audit qualifications, may be assigned. This control ensures for providing the evidence of verification of data. Data verification is done by sampling approach and confidence level is determined through sample testing.

External Submission Process Audit

Audit carried out by a third party outside the company or group. Independent registered audit organisations or independent experts with or without formal audit qualifications, where appropriate. These auditors are not responsible from the accuracy of the data but the control of the process to produce the submission. They review the adequacy and effectiveness of the internal control systems to ensure returns are timely, complete and accurate.

7.6.2.3 Sign-Off

Sign-off data assurance classifications is given in the below table.



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Table 7.68 – Data Assurance Sign-Off Definition Table

	When applies	Who is responsible	What: content/coverage
Senior Manager Sign-off	All submissions	Accountable senior manager.	<p>This review must be done in line with the minimum review criteria as established by each Licensee.</p> <p>Detailed review of table and the narrative.</p> <p>Complete and sign a record of evidence attesting to confidence in the accuracy of the submission.</p>
Director Sign-off	As identified through Risk Assessment.	A Director of a business function for example Director of Operations or Financial Director.	<p>Must complete a final review prior to submission to Ofgem.</p> <p>This review must be done in line with the minimum review criteria as established by each Licensee and include a challenge of the Senior Manager Sign-off.</p> <p>Must complete and sign a record of evidence attesting to accuracy of the submission.</p> <p>Drives an overall confidence assessment for the submission.</p>
CEO Sign-off	As identified through Risk Assessment.	Chief Executive Officer	<p>High-level oversight.</p> <p>Final layer of challenge to adequacy of submission in terms of completeness and accuracy.</p> <p>Must complete and sign a record of evidence attesting to accuracy of the submission.</p>
Board Sign-off	As identified through Risk Assessment.	Licensee Board	<p>High-level oversight.</p> <p>Board reviews summary of submission and assurance activities followed, as presented by a relevant Director.</p> <p>Detailed review of tables and assurance processes formally delegated to Director who approves with delegated authority on behalf of the Board.</p> <p>Approval of submission must be minuted to enable completion of a record of evidence attesting to accuracy, to be delegated to the CEO or other director identified by the board.</p>



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