Description and Use of Metering Messages transmitted by Elia for the DGO and the CMS

This document explains how to access, understand, and use messages containing metering data transmitted by Elia. It describes the content of the messages, how they are transmitted, the type of data transmitted and how this data can be implemented in client's business applications.

This manual should be read by:

- Metering operational staff who need to understand the contents of metering messages
- IT Developers, who need to use the message content in the implementation of custom applications

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Abbreviation	Description
aFRR	automatic Frequency Restoration Reserve
BRP	Balance Responsible Party Note: the former term "ARP" (Access Responsible Party) is still used in some documents or file names
$BRP_{O.I.}$	Balance Responsible Party associated with an Offshore Interconnector
BSP	Balancing Service Provider (generic role)
CDS	Closed Distribution System
CMS	Central Market System
DGO	Distribution Grid Operator
DGOBP	Distribution Grid Operator Border Point
DCP	DGO Connection Point
DSO	Distribution System Operator: In this document this term has the same meaning as DGO
DP	Delivery Point
EAN	European Article Number
EIC	Energy Identification Code
EVMSB2C	Web site allowing to download the metering publications
FTP	File Transfer Protocol
PBO	In French "Pertes de Bouclage": Loop losses, clearing differences or allocation control
mFRRCipu (mFRRDPsu)	manual Frequency Restoration Reserve delivered by CIPU units (also known as DP_{SU})
mFRRNonCipu (mFRRDPpg)	manual Frequency Restoration Reserve delivered by non CIPU units (also known as DP_{PG}).
ToE	"Transfer of Energy" as introduced by the Law of 13th of July 2017
TSO	Transmission System Operator (Elia in this document)
UMIG	Utility Market Implementation Guide
XLSX	Microsoft ® Excel format and file qualifier
XML	eXtensible Markup Language

Introduction

This document describes all aspects of metering data provided by Elia. This includes how to understand metering messages and how to access messages delivered via one of the protocols put at disposal by Elia.
This document serves four purposes:

- To provide clear understandable explanations of the data contained in metering messages. This information is for the use of operational staff, who need to understand the message's content and its application.
- To explain the use of the https://evmsb2c.elia.be web page to the operational staff.

To provide reference information for IT Developers who need to build business applications for both accessing and using metering data. Especially to explain the use of the SFTP protocol, adopted for the transfer of messages from Elia to its clients.

This document is structured as follows:

Chapter 1 describes all the concepts relating to metering messages, as well as the types of clients who can receive them. The terminology used in this chapter should be understood by both operational and development staff.

Chapter 2 contains general explanations of the contents of all message types. This information is aimed at the operational staff who need to understand message content. This Chapter contains also detailed information on all the message fields and is targeted more at developers who need to access this information for use in their own business applications.

Chapter 3 contains detailed information on the XML message fields and is targeted more at developers who need to access this information for use in their own business applications.

Chapter 4 explains how to access messages. It describes the different available protocols: it sets out the advantages of the use of the common communication protocol, which is of interest to all recipients, as well as detailed reference sections on the use of the protocol.

Chapter 1 Metering Messages

1.1. Messages

1.1.1. Market roles

This section lists each type of clients who have a contractual right to metering information. Clients have different market roles, and this role determines the type of messages they receive. A client is identified as the "receiver" of the message.

Frequency delivery and messages received by the clients are defined in section "1.1.8 Regulated messages & message delivery frequency ".

1.1.1.1. Balance Responsible Party (BRP)

A Balance Responsible Party is responsible for "nominating" the actual amounts of power injected or taken out of the Elia grid, and for maintaining the balance between injection and consumption into his balance perimeter.

Each Access Point must have a Balance Responsible Party associated with it. For details on this BRP role and on this type of contract, refer to the website Elia: https://www.elia.be/en/electricity-market-and-system/role-of-brp.

1.1.1.2. Distribution Grid Operator (DGO)

A Distribution Grid Operator is connected to the Elia grid to distribute energy to end-users and to (re)inject energy from production units connected to the distribution grid. The Distribution Grid Operators fall under the authority of regulators in Belgium's three regions.

1.1.1.3. CMS

Central Market Platform which centralizes the data exchange between different market parties (TSO/DSO/BRP).

1.1.2. Message types

The type of messages a client receives depends on the nature of the contract that is held with Elia and the "role" of the client. An overview of the message type by role is available in section 1.1.8. Elia delivers the following message types to its clients:

1.1.2.1. Summary Border Point

These messages contain a summary of the power flows values between a TSO (Elia) substations and the Distribution Grid Operator(s) (DGO) and between a TSO (Elia) substations and a Distribution Grid Operator on a specific supply bay (a trunk or a transformer for example), also known as the DGO Connection Point (DGOCP). These messages are described in more detail in section 2.1

1.1.2.2. Delta TS Report

These messages contain power flow values between the TSO (Elia) and the Distribution Grid Operator(s) (DGO) at the DGO Border point, at the DGO Interconnection Point and provides the difference between the energy measured by Elia at a Border Point (4.1) and the sum of the energy reported by DGO at the DGO Interconnection Points (4.2) linked to the Border Point. These messages are described in more detail in section 2.3.

1.1.2.3. Delta DGO Exchanges (DGO2DGO)

These messages contain power flow values measured by each of the DGO in a given DGO exchange point (DGO2DGO) and provide the difference between the energy measured by each of the DGO for a given DGO exchange point (DGO2DGO). These messages are described in more detail in section 2.4.

1.1.2.4. DGO Loop Losses (DGO PBO)

These messages contain the result of the allocation control, i.e. the checks that volumes allocated by DGO on a quarter-hourly basis correspond to offtakes/injections on the Elia grid. These messages are described in more detail in section 2.5.

1.1.2.5. DGO Reactive Area and Supply Bay (DGO RA)

These messages contain power flow values between a TSO (Elia) substation and a Distribution Grid Operator aggregated at the level of a 'Reactive Area'[1] as well as on each supply bay linked to the DGO Reactive Area. Each message refers to a single Reactive Area and the corresponding supply bays. These messages are described in more detail in section 2.6.

[1] Electrical zone of the network defined by Elia

1.1.3. Message validity

The initial metering message contains non-validated data. This should not be confused with the quality of the data – for even if all power values are labelled as normal (N) this does not yet mean that they are validated. The validity of the data applies to the complete set of values in the schedule. Data is validated by processes and checks carried out by Elia. When a message is validated, the values are guaranteed to be correct by Elia.

1.1.4. Message delivery

The power values transferred over the quarter hour periods are delivered regularly; daily and/or monthly. This pattern applies to all regulated messages.

1.1.4.1. Daily delivered messages

A message containing all the quarter hour power values for the current month is delivered by 8h each day. The day on which the message is sent is the "publication day". The values for and after the "publication day" are set as 0 (quality flag "Inexact"). So, in Figure 1 below, values for all days before Day 2 are published on Day 2.

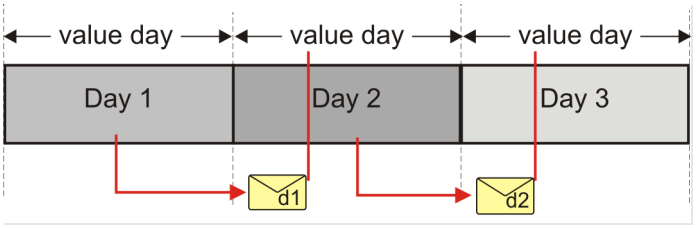


Figure 1 Daily delivery of metering messages

These messages contain non-validated data.
The deliveries are listed in section "1.1.8 Regulated messages & message delivery frequency".

1.1.4.2. Monthly validated delivered messages

The delivery of monthly validated messages is illustrated in Figure 2 below.

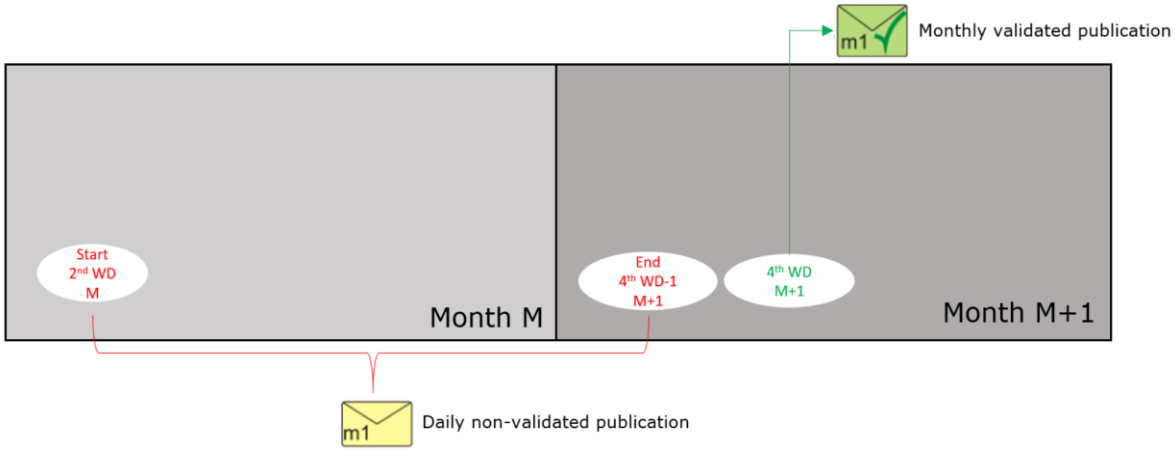


Figure 2 Regular deliveries of monthly messages

When the data is flagged as "validated by Elia", it is no longer updated. In rare cases where corrections need to take place after that, Elia will notify the DGO and Atrias and publish an updated message". See Section 1.1.8. Regulated messages & message delivery frequency.

1.1.5. Accessing messages – protocols

Messages can be delivered using the SFTP protocol or an "EVMSB2C" webpage. Section 4.1 explains these protocols and provides a reference section for the development of applications to receive metering data messages.

1.1.6. Accessing messages – formats

Messages are delivered in XML format for CMS and Excel (XLSX) format for DGO. Understanding the contents of messages and the full details on the structure of these formats are explained and given in Chapter 2 on "Understanding messages".

1.1.7. Message formats and protocols independency

The format of messages and the protocols are independent. Technically, it is therefore possible to receive any format type using any protocol. More information about the messages formats in Chapter 2 and protocols in Chapter 4.

1.1.8. Regulated messages & message delivery frequency

Table 1 lists all the stakeholders roles, the corresponding regulated messages they can receive and their delivery frequency.

Explanation of abbreviations used in the table 1 :

- CD = Calendar Day
- WD = Work Day
- 4^{th}WD-1 = The calendar day before the 4^{th} Work Day
- 10^{th}WD-1 = The calendar day before the 10^{th} Work Day
- Previous month: metering of the previous month sent the current month

Role	Message Type	Message publication frequency		Format
		Non-validated (Intermediate)	**Validated (Final)**	
DGO	Summary Border Point	Start at the 1st WD until 4th WD-1 of month M+1	Published the 4th WD of month M+1	XLSX
	DGO Loop Losses (DGO PBO)	Start at the 10th WD of month M+1 until 12th WD-1 of month M+2	Published the 12th WD of month M+2	
	Delta TS	Start at the 2nd WD of month M+1 until 5th WD-1 of month M+2	Published the 5th WD of month M+2	
	Delta DGO Exchanges (DGO2DGO)	Start at the 4th WD of month M+1 until 5th WD-1 of month M+2	Published the 5th WD of month M+2	
	DGO Reactive Area and Supply Bay (DGO RA)	N/A	Published the 4th WD of month M+1	
CMS	DGO Border Point and Supply Bay	Start at the 1st WD until 4th WD-1 of month M+1	Published the 4th WD of month M+1	XML
	DGO Loop Losses (DGO PBO)	Start at the 10th WD of month M+1 until 12th WD-1 of month M+2	Published the 12th WD of month M+2	
	Delta TS Report	Start at the 2th WD of month M+1 until 5th WD-1 of month M+2	Published the 5th WD of month M+2	
	Delta DGO Exchanges (DGO2DGO) report	Start at the 4th WD of month M+1 until 5th WD-1 of month M+2	Published the 5th WD of month M+2	

Table 1 Message delivery frequency

1.2. Related documents

More info about metering services is available from the Elia website:

- General metering page: https://www.elia.be/en/customers/metering
- Metering manual concepts: https://www.elia.be/en/customers/metering

  Technical information, documentations, links... :
  https://www.elia.be/en/customers/customer-tools-and-extranet/metering

For any other information please contact your Elia Key Account Manager or Metering services (email: Metering.Services@elia.be)

Chapter 2 Understanding messages

This chapter describes the structure of metering message types. It describes how the parameters and type of metered data introduced in Chapter 1 are incorporated into the messages and is targeted principally at operational staff.

Note: All the stakeholders roles, the corresponding messages types they can receive, and delivery frequency of the messages is summarized in section "1.1.8 Regulated messages & message delivery frequency".

2.1. Summary Border Point

These messages provide metering information about the power transferred between a TSO (Elia) substation and the Distribution Grid Operator (DGO), also called Distribution System Operator (DSO), connected to these substations.

2.1.1. Excel Summary Border Point

The Excel file contains two sheets named: Border Point and Supply Bay

The top rows contain information about the receiver, and the time of creation (last update). Subsequent areas of the sheet are divided into columns. The first lines of the columns give information about the metering data (direction of the flow, power type, metering type, compensation type) and the EAN / name of the border point or supply bay. The quarter hourly values give the power value and the quality for the mentioned metering data:

An example of a message for a BorderPoint is shown below.

	Meterable type			Active Net Compensated		Active Net Compensated		Capacitive Net Compensated		Capacitive Net Compensated		Inductive Net Compensated		Inductive Net Compensated	
				Value	Quality	Value	Quality	Value	Quality	Value	Quality	Value	Quality	Value	Quality
	Monthly energy			19.174.875 KWh	Valid	0 KWh	Valid	881.640 KVARh	Valid	0 KVARh	Valid	204.350 KVARh	Valid	0 KVARh	Valid
	Quarter hourly values														
	Date	From	To	W		W		VAR		VAR		VAR		VAR	
21	01-11-2022	00:00	00:15	21.208.000	N	0	N	2.580.000	N	0	N	0	N	0	N
22	01-11-2022	00:15	00:30	20.888.144	N	0	N	2.400.000	N	0	N	0	N	0	N
23	01-11-2022	00:30	00:45	20.776.000	N	0	N	2.400.000	N	0	N	0	N	0	N
24	01-11-2022	00:45	01:00	20.138.848	N	0	N	2.580.000	N	0	N	0	N	0	N
25	01-11-2022	01:00	01:15	19.766.224	N	0	N	2.640.000	N	0	N	0	N	0	N
26	01-11-2022	01:15	01:30	19.009.936	N	0	N	2.880.000	N	0	N	0	N	0	N
27	01-11-2022	01:30	01:45	18.742.144	N	0	N	2.860.000	N	0	N	0	N	0	N
28	01-11-2022	01:45	02:00	18.975.328	N	0	N	2.640.000	N	0	N	0	N	0	N
29	01-11-2022	02:00	02:15	18.829.440	N	0	N	2.760.000	N	0	N	0	N	0	N
30	01-11-2022	02:15	02:30	18.915.360	N	0	N	2.620.000	N	0	N	0	N	0	N
31	01-11-2022	02:30	02:45	18.937.600	N	0	N	2.660.000	N	0	N	0	N	0	N

Figure 3 Columns in a Excel Summary Border Point message

The Infeed TSO per substation and per supply bay message consists of the following sections:

- A header section.
- A set of columns headers.
- A set of columns values.

2.1.1.1.1. Header

The header contains reference of the distribution point and the receiver.

	A	B	C	D	E	F
1	**Company**	**22X20160121----V**		**Test Company**		
2	**Last update**	**02-12-2022**		**DGO Border Point and Supply Bay**		
3	**Validation Status**	**Intermediate**				
4	**Version**	**1**				

Figure 4 Excel Summary Border Point message-header

Excel Cell	Name	Data type	Comment
B1:C1	Receiver identification code	String	EIC company code of the receiver of the message.
D1:F1	Receiver name	String	Name of the company receiver of the message. **Note**: this is a "display name" that can be different from the official name of the company
B2:C2	Last update date	Date and time	Date and time of the creation of this document.
B3:C3	Validation	String	Indication as to whether the values are valid or not (see section Metering Manual Concept). Possible values are: • A01 - Intermediate • A02 - Final • A03 – Final Modified

Table 2 Excel Summary Border Point header fields

2.1.1.1.2. Column headers

Same as the Border Point described here under:

From the 4th column, 2 columns identify the source of each metering data metered at the Access Point. An Excel sheet can contain 1 or more sets of columns.

For one column (example Column 4):

12	**Meterable type**	Active
13		Net
14		Compensated

Figure 5 CSV Summary Border Point message – columns header

The content of the header is listed in the table below:

Line	Name	Data type	Comment
12	Power type	String	Identification of the type of power (see Metering Manual Concepts). Possible values are: • Active • Inductive • Capacitive
13	Metering type	String	Indication as to whether the values are net or gross or specific (see Metering Manual Concepts). Possible values are: • N: Net • G: Gross • GG: "Green Gross" • GC: "Gross CIPU"
14	Compensation type	String	Indication as to whether the values compensated or not (see Metering Manual Concepts). Possible values are: • NC: Non-Compensated. Used for metering purposes. • C: Compensated. Used for billing purposes • A: Reserved for future use • CC: Compensated Corrected Used for specific purposes
17	Sum of the monthly energy		Excel formula = the sum of all quarter hourly values and related unit
20	Power unit	String	Unit in which the power values are defined. Possible values are: • KWT, KVR, • W, KW, MW, • VAR, KVAR, MVAR

Table 3 Excel Summary Border Point column metering reference

2.1.1.1.3. Column values

Same as the Access Point described here under:

The same columns (starting from the 4th column), contain the metering values and their quality (in the next column). All the quarter hourly values of the month are present. Only positive power values are allowed in the Access Point message.

Column	Name	Data type	Comment
4, 6, 8, 10, 12, etc.	Value	Unsigned Decimal	Value of the transferred power for the given quarter. The value is always positive. The value is expressed in the defined unit and contains a maximum of 3 digits after the decimal point. If there is no decimal, then no decimal point
5, 7, 9, 11, 13, etc.	Quality	1 char	Indication as to the quality of the metered data for the given quarter (see Metering Manual Concepts) Possible values are: • N: Normal • I: Inexact • S: Substituted (Estimated replacement).

Table 4 Excel Summary Border Point columns cells

Remark: The decimal point, in Excel, being subject to the settings, it can be different from the figure shown in this document.

2.2. DGO Border Point and Supply Bay

These messages were adapted to fulfill the requirement described in the "UMIG TSO - BR - SE - 02 - Electricity" and in particular the process "Exchange Infeed Measures per Substation - 4.1 (from TSO to CMS)".

These messages contain the data for one calendar month. The structure of the message identifies the DGO, the substation (Border Point), the substation supply bays, the time period, all the parameters used to describe the power values and the actual power values.

2.2.1. DGO Border Point and Supply Bay components

The Border Point and Supply Bay message has two types of components:

- Border Point
- Supply Bay

In the XML message, the link between the supply bay components and the related border point (to which they are physically connected) can be done through the field "Domain" where the Border Point EAN code is referred.

Component	Description
Border Point	The DGO Border Point represents the total or the part of a substation dedicated to DGO (also called 4.1).
Supply Bay	The Supply Bay represents the individual meters needed to calculate the Border Point. It can be a transformer, a trunk, a capacitor bank, or an Elia customer connection.

2.2.2. DGO Border point and Supply Bay components criteria

In the following list the columns must be understood as:

- **Component**: Indicates whether the data concerns the border point or the supply bay.
- **Flow direction**: the flow of electricity (see also Metering Manual Concepts).
  - **OUT**: the quantity of energy going out the DGO grid (coming in the Elia Grid)
  - **IN:** the quantity of energy coming in the DGO grid (coming out of the Elia Grid)
- **Possible negative value?** The energy follows the flow indicated within the column 'Flow direction' in the table below. Consequently, there cannot be negative values for these components.

Component	Flow direction	Possible negative values?
Border Point Injection	Out	No
Border Point Offtake	In	No
Supply Bay Injection	Out	No
Supply Bay Offtake	In	No

2.2.3. DGO Border point and Supply Bay components added parameters

In the following list the columns must be understood as:

- **Component:** Indicates whether the data concerns the border point or the supply bay
- **Party/area:** Each component can be general and referenced to a company: this is the "party" but some components can be also detailed per "area". For example, a component on a distribution grid has also the grid area code.
- **Code:** This code can be:
- The BRP EIC code
- The area code
- A specific EIC or EAN code

Component	Party/Area	Code
Border Point Offtake	Area	Border Point EAN code
Border Point Injection	Area	Border Point EAN code
Supply Bay Offtake	Area	Supply Bay EAN code
Supply Bay Injection	Area	Supply Bay EAN code

2.2.4. XML DGO Border Point and Supply Bay (DGOBP) value

The XML DGO Border Point and Supply Bay message respects the **IEC standard 62325-451-4**. The structure therefore is briefly explained in this document but whole description is available on the IEC web store: https://webstore.iec.ch/publication/29116.

The XSD Schema reference is available on "3.1 Reference XSD ".

The XML Border Point and Supply message provide the metering values for Border Points but also for the Supply Bay below a Border Point. This section gives details on the fields and their possible values for use in client applications.

```
<EnergyAccount_MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0" xmlns:msxsl="urn:schemas-microsoft-com:xslt"
xmlns:csharp="urn:generateGuid/NewGuid">
```

Example 1 XML DGOBP message root

2.2.4.1. XML DGOBP Header fields

The message begins with information about the sender of the message (Elia) and the receiver as well as the time when the message was created plus some information about the state of this message: This header is valid for all the Time Series.

Remark: the XML comments indicated in the message here below are for the reader comprehension and are available in the message sent by Elia;

```
<EnergyAccount_MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0" xmlns:msxsl="urn:schemas-microsoft-com:xslt"
xmlns:csharp="urn:generateGuid/NewGuid">

<mRID>FC1F4CFD4C424D76AF5EBE35F85D8773</mRID>

<revisionNumber>1</revisionNumber>

<type>A45</type>

<docStatus>

<value>A01</value>

</docStatus>

<process.processType>A16</process.processType>

<process.classificationType>A01</process.classificationType>

<sender_MarketParticipant.mRID
codingScheme="A01">10X1001A1001A094</sender_MarketParticipant.mRID>

<sender_MarketParticipant.marketRole.type>A04</sender_MarketParticipant.marketRole.type>

<receiver_MarketParticipant.mRID codingScheme="A01">22XTETS--------
4</receiver_MarketParticipant.mRID>

<receiver_MarketParticipant.marketRole.type>R02</receiver_MarketParticipant.marketRole.type>

<createdDateTime>2023-01-04T06:01:42Z</createdDateTime>

<period.timeInterval>

<start>2022-11-30T23:00Z</start>

<end>2022-12-31T23:00Z</end>

</period.timeInterval>

<domain.mRID codingScheme="A10">541453137591189145</domain.mRID>
```

Example 2 XML DGOBP message header

The following header fields are mandatory and are listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	The unique identification of the document.
revisionNumber	Integer [1…999]	The version number of the document: It is not guaranteed that first document received has version number 1. A more recent document has a higher version number
type	String [3]	Fixed. Always A45 (Measurement Value document)
docStatus	String [3]	The status of the DGOBP document. Possible values: • A01 - Intermediate • A02 - Final • A03 – Final Modified
process.processType	String [3]	Fixed. Always A16 (Realized)
process.classificationType	String [3]	The classification mechanism used to group a set of objects together within a business process. Possible values: • A01 - Detail • A02 - Summary Normally only A01 is part of the DGOBP but theoretically other classificationType could also exist
sender_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	Fixed: • codingScheme: A01 (EIC code) • 10X1001A1001A094 (Elia EIC code)
sender_MarketParticipant.marketRole.type	String [3]	Fixed: Always A04 (System operator)
receiver_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: Fixed A01 (EIC code) • Value : EIC code of the receiver
receiver_MarketParticipant.marketRole.type	String [3]	Possible values: • R02 – MRCO or CMS • R06 - DGO
createdDateTime	Date and time	Time at which the message was created (in UTC time).
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month (in UTC time). Example for the month August 2015: Start time is 31/7/2015 at 22h. End time is 31/8/2015 at 22h Any period is theoretically possible.
Domain.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: A10 (EAN code) • BorderPoint EAN code

Table 5 XML headers elements for DGOBP messages

2.2.4.2. XML DGOBP TimeSeries fields

The <TimeSeries> element describes the flow of the power for one component and related criteria and the schedule of actual power values. Elia does not guarantee the order of Timeseries within the message.

```
<TimeSeries>
<mRID>A65|541453137591189145|A|C</mRID>
<businessType>A65</businessType>
<product>8716867000016</product>
<MeteringType>A01</MeteringType>
<CalculationMethod>A01</CalculationMethod>
<objectAggregation>A01</objectAggregation>
<area_Domain.mRID codingScheme="A10">5414531375911891 45</area_Domain.mRID>
<measure_Unit.name>KWT</measure_Unit.name>
```

Example 3 XML DGOBP message TimeSeries

The general meaning of these fields is given in The Metering Manual Concept. All elements are listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	Time series unique identification within the message
businessType	String [3]	Fields identifying the characteristics of the component defined in "2.2.1 DGO Border Point and Supply Bay components": See table below
product	String [1..35]	• 8716867000016 - Active Energy • 8716867000115 - Capacitive Reactive energy • 8716867000122 - Inductive Reactive energy
Calculation Method	String [3]	• A01- Compensated • A02- NonCompensated
Metering Type	String [3]	Fixed. Always A01 - Net
objectAggregation	String [3]	Fixed. Always A01
area_Domain.mRID	String [1..18]	The Border Point EAN or the Supply Bay EAN, depending on the business type
marketParticipant.mRID	String [1..18]	Not Used
measure_Unit.name	String [3]	Power unit. • KWT for Active Energy • KVR for Inductive and Capacitive Energy
Period	Similar to "2.3.4.4 XML Imbalance Period Fields "	

Table 6 XML <data> element for DGOBP messages

Component	Business Type	Flow direction

Border Point Injection	A65 – Accounting Point Relevant	Out
Border Point Offtake	A65 – Accounting Point Relevant	In
Supply Bay Injection	A64 – Meter Measurement Data	Out
Supply Bay Offtake	A64 – Meter Measurement Data	In

Table 7 XML DGOBP Time Series component and related data

For instance, the timeseries for a border point will have business type A65 and those of a supply bay will have type A64.

```
        <TimeSeries>
                <mRID>A65|541453104512600461</mRID>
                <businessType>A65</businessType> <!—Border Point -->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541453104512600461</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
        </TimeSeries>
        <TimeSeries>
                <mRID>A64_541453104512600447</mRID>
                <businessType>A64</businessType>
                <!—Supply Bay-->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541453104512600447</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
        </TimeSeries>
```

2.2.4.3. XML DGOBP Period fields

The <Period> element contains information to characterize the power value and quality for a period It contains also the Period element: see

```
<Period>
<timeInterval>
<start>2015-07-31T22:00Z</start>
<end>2015-08-30T22:00Z</end>
</timeInterval>
<resolution>PT15M</resolution>
<Point>
```

All elements are mandatory and listed in the table below.

Element name	Content type	Description
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month in ISO 8601 format (see section "3.2 XML elements)
resolution	String	Total number of minutes in the schedule. (! See also section 4.5, on the effect of daylight saving.)
Point	See below	

Table 8 XML Time Series <Period> component for DGOBP messages

2.2.4.4. XML DGOBP Point fields

The <Point> element contains information to characterize the power value and quality for a period

```
<Point>
<position>1</position>
<in_Quantity.quantity>336507.529</in_Quantity.quantity>
<in_Quantity.quality>A04</in_Quantity.quality>
<out_Quantity.quantity>0</out_Quantity.quantity>
<out_Quantity.quality>A04</out_Quantity.quality>
</Point>
```

All elements are listed in the table below.

Element name	Cardinality	Content type	Description
position	Mandatory	Integer [1…2884]	The position of the quarter within the covered period
in_Quantity.quantity	Optional	Double	Value for the direction IN (if possible for the component) or the element is not present
in_Quantity.quality	Optional	Element	Quality for the direction IN (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"
out_Quantity.quantity	Optional	Double	Value for the direction OUT (if possible for the component) or the element is not present
out_Quantity.quality	Optional	Element	Quality for the direction OUT (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"

Table 9 XML Point element for DGOBP messages

2.3. Delta TS

The purpose of these messages is to provide the difference between the energy measured by Elia at a Border Point (4.1) and the sum of the energy reported by DGOs at the DGO Interconnection Points (4.2) linked to the Border Point.

The message provides:

- The energy flow measured by Elia at the DGO Border Point (4.1)
- The energy measured by each DGO at the DGO Interconnection Point (4.2)
- The difference between the components above (4.1 – ∑4.2). This difference is called "Delta TS" and is actually a kind of "clearing differences"

These messages contain the data for one calendar month.

The structure of the message identifies the DGO(s), the substation (Border Point), the DGO Interconnection Points, the time period, all the parameters used to describe the power values and the actual power values. This message content can be delivered in one of two formats; XML format described in section 2.3.4 and XLSX format described in section 2.3.5

2.3.1. DeltaTS Components

The Delta TS message has three types of components:

- Delta TS
- Border Point
- Interconnection Point

In the XML message, the link between the Interconnection Point components and the related border point (to which they are physically connected) can be done through the field "Domain" where the Border Point EAN code is referred.

Component	Description
Border Point	The DGO Border Point represents the total or the part of a substation dedicated to DGO (also called 4.1).
Interconnection Point	The interconnection point represents the contractual connection of a DGO to the border point. This is also called 4.2 Below a Border Point there can be one or more Interconnection Point.
Delta TS	The delta TS is the difference between the energy measured by Elia at border point level and the sum of the energy measured by the DGO at the interconnection point level.

2.3.2. DeltaTS Components criteria

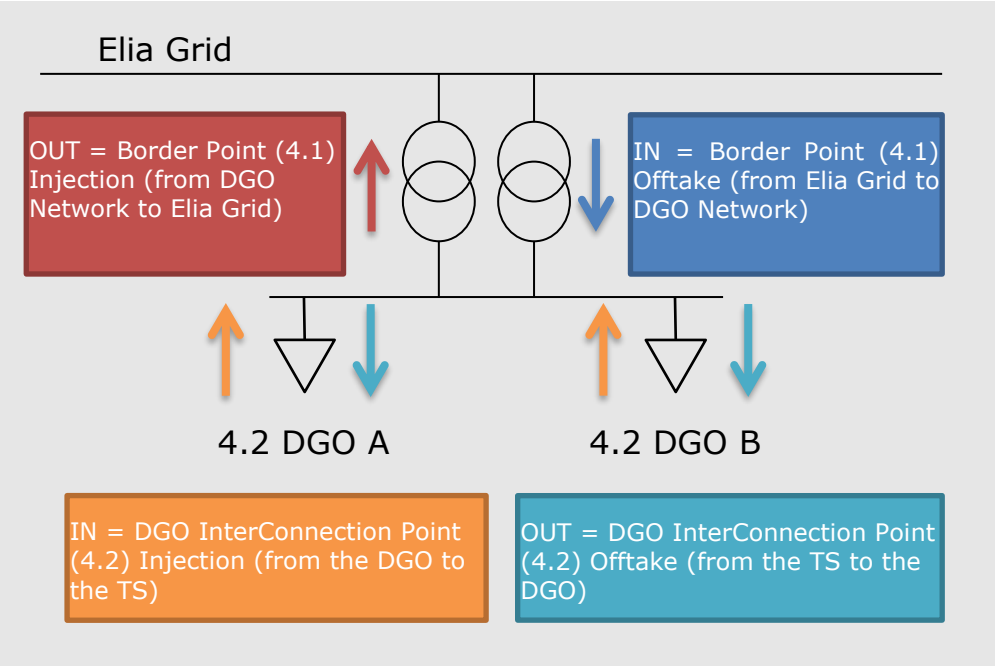
In the following list the columns must be understood as:

Component: Indicates whether the data concerns the border point, interconnection point or the delta TS.

Flow direction: the flow of electricity (see also Metering Manual Concepts)

- **OUT**: the quantity of energy going out from the transformation station (TS)
- **IN:** the quantity of energy coming in the transformation station (TS)

Possible negative value?: Normally the energy follows the flow indicated within the column 'Flow direction' in the table below, but the result of the Delta TS can flow in the other direction. In this case, the quarter value is negative.



Component	Flow direction	Possible negative values?
Border Point Offtake	In (Elia->TS)	No
Border Point Injection	Out (TS->Elia)	No
DGOInterConnectionPoint Offtake	Out (TS->DGO)	No
DGOInterConnectionPoint Injection	In (DGO->TS)	No
DeltaTS	In	Yes

2.3.3. DeltaTS Components added parameters

In the following list the columns must be understood as:

- **Component**: Indicates whether the data concerns the border point, interconnection point or the delta TS.
- **Party/area:** Each component can be general and referenced to a company: this is the "party" but some components can be also detailed per "area". For example, a component on a distribution grid has also the grid area code.
- **Code:** This code can be:
  - EAN code

Component	Party/Area	Code
Border Point Injection	Area	Border Point EAN code
Border Point Offtake	Area	Border Point EAN code
DGO Interconnection Point Injection	Area	The DGO Interconnection Point Injection EAN code
DGO Interconnection Point Offtake	Area	The DGO Interconnection Point Offtake EAN code

2.3.4. XML Delta TS value

These messages were adapted to fulfill the requirement described in the "UMIG TSO - BR - SE - 02 - Electricity"

The XML Delta TS message provides the metering values for Border Points but also for the DGO Interconnection Points linked to a Border Point.

The XML Delta TS message respects the **IEC standard 62325-451-4.** The XML structure is explained in this document but whole description is available on the IEC web store: https://webstore.iec.ch/publication/29116 (document on purchase).

The XSD Schema reference is available on "3.1 Reference XSD ".

```
<EnergyAccount_MarketDocument xsi:schemaLocation="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0 iec62325-451-4-settlement_v4.xsd"
xmlns="urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:4:0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

</EnergyAccount_MarketDocument>
```

Example 4 XML Delta TS message root

2.3.4.1. XML Delta TS <header>

The message begins with information about the sender of the message (Elia) and the receiver as well as the time when the message was created plus some information about the state of this message: This header is valid for all the Time Series.

Remark: the XML comments indicated in the message here below are for the reader comprehension and are available in the message sent by Elia;

```
<EnergyAccount_MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0" xmlns:msxsl="urn:schemas-microsoft-com:xslt"
xmlns:csharp="urn:generateGuid/NewGuid">

  <mRID>189EEC4172484643AB3C662BBDEF1963</mRID>

  <revisionNumber>1</revisionNumber>

  <type>Z02</type>

  <docStatus>

    <value>A02</value>

  </docStatus>

  <process.processType>A05</process.processType>

  <process.classificationType>A01</process.classificationType>

  <sender_MarketParticipant.mRID
codingScheme="A01">10X1001A1001A094</sender_MarketParticipant.mRID>

  <sender_MarketParticipant.marketRole.type>A04</sender_MarketParticipant.marketRole.type>

  <receiver_MarketParticipant.mRID codingScheme="A01">22XTETS--------
4</receiver_MarketParticipant.mRID>

  <receiver_MarketParticipant.marketRole.type>R02</receiver_MarketParticipant.marketRole.type>

  <createdDateTime>2020-12-21T06:08:15Z</createdDateTime>

  <period.timeInterval>

    <start>2020-10-31T23:00Z</start>

    <end>2020-11-30T23:00Z</end>

  </period.timeInterval>

  <domain.mRID codingScheme="A10">541453191216677424</domain.mRID>

<EnergyAccount_MarketDocument xsi:schemaLocation="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0 ELIA-iec62325-451-4-settlement.xsd"
```

```
xmlns="urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:4:0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

Example 5 XML Delta TS message header

The following header fields are mandatory and are listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	The unique identification of the document.
revisionNumber	Integer [1…999]	The version number of the document: It is not guaranteed that first document received has version number 1. A more recent document has a higher version number
type	String [3]	Fixed. Always Z02 – (Infeed Control)
docStatus	String [3]	The status of the Delta TS document. Possible values: • A01 - Intermediate • A02 - Final • A03 – Final Modified
process.processType	String [3]	Possible values: • A05 - Metered data aggregation
process.classificationType	String [3]	The classification mechanism used to group a set of objects together within a business process. Possible values: • A01 - Detail • A02 - Summary Normally only A01 is part of the Delta TS but theoretically other classificationType could also exist
sender_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	Fixed: • codingScheme: A01 (EIC code) • 10X1001A1001A094 (Elia EIC code)
sender_MarketParticipant.marketRole.type	String [3]	Fixed: Always A04 (System operator)
receiver_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: Fixed A01 (EIC code) • Value : EIC code of the receiver
receiver_MarketParticipant.marketRole.type	String [3]	Fixed: Always R02 (MRCO)
createdDateTime	Date and time	Time at which the message was created (in UTC time).
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month (in UTC time). Example for the month August 2015: Start time is 31/7/2015 at 22h. End time is 31/8/2015 at 22h Any period is theoretically possible.
Domain.mRID	codingScheme: String [3]	• codingScheme: A10 (EAN code) • BorderPoint EAN code

	Value: String [16]	

Table 10 XML headers elements for Delta TS messages

2.3.4.2. XML Delta TS TimeSeries fields

The <TimeSeries> element describes the flow of the power for one component and related criteria and the schedule of actual power values.

Elia does not guarantee the order of Timeseries within the message.

```
<TimeSeries>
                <mRID>A65|541416004540000143</mRID>
                <businessType>A65</businessType>
                <product>8716867000016</product>
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541416004540000143</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
</TimeSeries>
```

Example 6 XML DeltaTS message TimeSeries

The general meaning of these fields is given in The Metering Manual Concept.

The <TimeSeries> element contains information to characterize the Component and related data
It contains also the Period element: see "2.3.4.4 XML Imbalance Period fields"

```
<TimeSeries>
                <mRID>Z01|541453104512600515</mRID>
                <businessType>Z01</businessType>
                <!--=Clearing Difference-->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541453104512600515</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
</TimeSeries>
```

All elements are listed in the table below:

Element name	Content type	Description
mRID	String [1..35]	Time series unique identification within the message
businessType	String [3]	Fields identifying the characteristics of the component defined in "2.3.1 DeltaTS Components" : See table below
product	String [1..35]	Fixed. Always 8716867000016 - Active Power
Calculation Method	String [3]	Fixed. Always A01- Compensated
Metering Type	String [3]	Fixed. Always A01 - Net
objectAggregation	String [3]	Fixed. Always A01
area_Domain.mRID	String [1..18]	The Border Point EAN or the DGO Interconnection Point Offtake/Injection EAN, depending on the business type
marketParticipant.mRID	String [1..18]	Not Used
measure_Unit.name	String [3]	Power unit. Fixed. Always KWT
Period	Similar to " 2.3.4.4 XML Imbalance Period Fields "	

Table 11 XML <data> element for DeltaTS messages

Component	Business Type	Flow direction
Border Point Injection	A65 – Accounting Point Relevant	Out
Border Point Offtake	A65 – Accounting Point Relevant	In
DGO Interconnection Point Injection	A66 – Energy Flow	In
DGO Interconnection Point Offtake	A66 – Energy Flow	Out
DeltaTS	Z01 – Clearing Difference	In

Table 12 XML DeltaTS component and related data

For instance, the timeseries for a border point will have business type A65; those of a DGO Interconnection Point will have type A66 and the DeltaTS will have type Z01

```
        <TimeSeries>
<mRID>Z04_541453104512600409</mRID>
                <businessType>Z01</businessType>
                <!—Clearing Difference-->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541453104512600409</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>          <Period>..</Period>
<TimeSeries>
                <mRID>A65_541416004540000143</mRID>
                <businessType>A65</businessType>
                <!—Accounting Point-->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541416004540000143</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>..</Period>
        </TimeSeries>
                <TimeSeries>
                <mRID>166_541453104512600423</mRID>
                <businessType>A66</businessType>
                <!—Energy power-->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A10">541453104512600423</area_Domain.mRID>
                <marketParticipant.mRID codingScheme="A01">22XDGOB--------
6</marketParticipant.mRID>
                <!-- Associated DGO -->
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
```

2.3.4.3. XML Delta TS Point fields

The <Point> element contains information to characterize the power value and quality for a period.

```
<Point>
<position>1</position>
<in_Quantity.quantity>336507.529</in_Quantity.quantity>
<in_Quantity.quality>A04</in_Quantity.quality>
<out_Quantity.quantity>0</out_Quantity.quantity>
<out_Quantity.quality>A04</out_Quantity.quality>
</Point>
```

All elements are mandatory and listed in the table below.

Element name	Cardinality	Content type	Description
position	Mandatory	Integer [1…2884]	The position of the quarter within the covered period
in_Quantity.quantity	Optional	Double	Value for the direction IN (if possible for the component) or the element is not present
in_Quantity.quality	Optional	Element	Quality for the direction IN (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"
out_Quantity.quantity	Optional	Double	Value for the direction OUT (if possible for the component) or the element is not present
out_Quantity.quality	Optional	Element	Quality for the direction OUT (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"

Table 13 XML <point> element for Delta TS messages

2.3.4.4. XML Imbalance Period fields

For information only:

The <Period> element contains information to characterize the power value and quality for a period. It contains also the Period element, see:

```
<Period>
<timeInterval>
<start>2015-07-31T22:00Z</start>
<end>2015-08-30T22:00Z</end>
</timeInterval>
<resolution>PT15M</resolution>
<Point>
```

All elements are mandatory and listed in the table below.

Element name	Content type	Description
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month in ISO 8601 format (see section "3.2 XML Elements)
resolution	String	Total number of minutes in the schedule. (! See also section 4.5, on the effect of daylight saving.)
Point	See below	

Table 14 XML period components and related data

2.3.5. Excel Delta TS value

The Excel file contains two sheets named "Summary" and "Detail": These sheets contain all information about all 'DeltaTS', 'BorderPoint' and' DGOInterconnectionPoint' and related criteria's for a given month:

- The top rows contain information about the receiver, the status of the message and the time of creation (last update) of the message and the fact that this sheet follow the Imbalance message format
- Subsequent area of the sheet is divided into columns
- The first lines of the columns give information about the component name, Direction (Power Flow), Party or Area)
- The quarter hourly values give the power value and the quality for the mentioned metering data.
- Elia does not guarantee the order of components within the message.

	A	B	C	D	E	F	G
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Example 3**			
2	**Last update**	**21-12-2020**		**Delta TS**			
3	**Validation Status**	**Intermediate**					
4	**Version**	**1**					
5							
6			**Component**	**BorderPointOfftake**		**DGOInterconnectionPointOfftak**	**GC**
7			**Direction**	Outgoing		Outgoing	
8			**Domain**	ABCDE 15		ABCDE 15	
9				541453161252993346		54145316125299336	
10			**Party / Area**	ABCDE 15		ABCDE 15-DGOB	
11				541453161252993346		541453198643130066	
12			**Meterable type**	Net		Dgo	
13				Active		Active	
14				Compensated		Compensated	
15							
16				Value	Quality	Value	Quality
17			Monthly energy	20,733,939 KWh	Valid	20,733,939 KWh	Valid
18							
19		Schedules					
20	Date	From	To	W		W	

Example 7 Excel DeltaTS message 'Detail' sheet

The Excel file is made of 2 sheets:

- The first sheet, named "Summary", contains the 'Delta TS' components.
- The second sheet, named "Detail", contains all the Border Point and DGOInterconnection Point components.

The Header is the same for all sheets.

2.3.5.1. Delta TS - "Summary" header

The header contains reference of the DGO and the state, version.

	A	B	C	D
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Example 3**
2	**Last update**	**21-12-2020**		**Delta TS**
3	**Validation Status**	**Intermediate**		
4	**Version**	**1**		

Figure 6 Delta TS - Excel sheet 'Summary' –header

Excel Cell	Name	Data type	Comment
B1:C1 (merged cells)	Receiver identification code	String	EIC of the DGO receiver of the message.
D1:F1 (merged cells)	Receiver name	String	Name of the DGO receiver of the message Note this is a "display name" that can be different from the official name of the company
B2:C2 (merged cells)	Last update date	Date and time	Date and time of the creation of the highest version of this document.
D2:F2 (merged cells)	Message type	String	Fixed. Always "Delta TS"
B3:C3 (merged cells)	Message status	String	Indicate if the message is 'Intermediate', 'Final' or 'FinalModified'
B4 (merged cells)	version	Integer [1..999]	The version of the message: An integer within range [1...999]. **Note**: The first message sent is not guaranteed to have version 1.

Table 15 Excel Delta TS header fields

2.3.5.2. Delta TS - "Summary" Columns header

From the 4th column, a set of 2 columns identifies the source of each metering data for a 'Delta TS' component.

This sheet can contain many sets of columns:

	A	B	C	D	E	F	G
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Example 3**			
2	**Last update**	**21-12-2020**		**Delta TS**			
3	**Validation Status**	**Intermediate**					
4	**Version**	**1**					
5							
6			**Component**	**DeltaTS**		**DeltaTS**	
7			**Direction**	Incoming		Incoming	
8			**Domain**	ABCDE 15		AABCD 15	
9				541453161252993346		541453198270815617	
10			**Party / Area**	ABCDE 15		AABCD 15	
11				541453161252993346		541453198270815617	
12			**Meterable type**	Net		Net	
13				Active		Active	
14				Compensated		Compensated	
15							
16				Value	Quality	Value	Quality
17			Monthly energy	0 KWh	Valid	0 KWh	Valid
18							
19		Schedules					
20	Date	From	To	W		W	

Figure 7 Excel 'Delta TS' message – Sheet 'Summary' – columns header

For one set of columns:

Line	Name	Data type	Comment
6	Component	String	Fixed. Always "DeltaTS"
7	Direction	String	Incoming (IN)
8	Domain	String	Name of the Border Point
9	N/A	EAN	EAN of the Border Point.
10	Party / Area	String	Same as row 8
11	N/A	String	Same as row 9
12	Meterable type	String	Fixed. Always "Net"
13	N/A	String	Identification of the power type Fixed. Always "Active"
14	N/A	String	Fixed. Always "Compensated"
17	monthly energy	String	Excel formula = the sum of all quarter hourly values and related unit
20	Power unit	String	Unit in which the power values are defined. Fixed. Always W

Table 16 Excel 'Delta TS' message – Sheet 'Summary' – columns references

2.3.5.3. Delta TS - "Summary" Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (on the next column) All the quarter hourly values of the month are present

Column	Name	Data type	Comment
4, 6, 8, 10, 12, etc.	Value	Signed Decimal	Value of the power for the given quarter. The value is expressed in the defined unit and contains a maximum of 3 digits after the decimal point. In case of negative value the sign '-' is added
5, 7, 9, 11, 13, etc.	Quality	1 char	Indication as to the quality of the metered data for the given quarter (see Metering Manual Concept). Possible values are: • N: Normal • I: Inexact • S: Substituted (Estimated replacement).

Table 17 Excel 'Delta TS' message – Sheet 'Summary' – Columns values

2.3.5.4. Delta TS - "Detail" header

The header content is the same as the one from the 'Summary' sheet. Refer to Section 2.3.5.1.

2.3.5.5. Delta TS - "Detail" Columns header

From the 4th column, a set of 2 columns identifies the source of each metering data for a 'DGOExchange' component. This sheet can contain many sets of columns.

For one column (example Columns 4 and 5):

	A	B	C	D	E	F	G
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Example 3**			
2	**Last update**	**21-12-2020**		**Delta TS**			
3	**Validation Status**	**Intermediate**					
4	**Version**	**1**					
5							
6			**Component**	**BorderPointOfftake**		**DGOInterconnectionPointOfftak**	**GC**
7			**Direction**	Outgoing		Outgoing	
8			**Domain**	ABCDE 15		ABCDE 15	
9				541453161252993346		5414531612529933 6	
10			**Party / Area**	ABCDE 15		ABCDE 15-DGOB	
11				541453161252993346		541453198643130066	
12			**Meterable type**	Net		Dgo	
13				Active		Active	
14				Compensated		Compensated	
15							
16				Value	Quality	Value	Quality
17			Monthly energy	20,733,939 KWh	Valid	20,733,939 KWh	Valid
18							
19		Schedules					
20	Date	From	To	W		W	

Figure 8 Excel 'Delta TS' message – Sheet 'Detail' –columns header

For one set of columns:

Line	Name	Data type	Comment
6	Component	String	Possible values are : - BorderPointOfftake - BorderPointInjection - DGOInterconnectionPointInjection - DGOInterconnectionPoiintOfftake
7	Direction	String	Identification of the direction of flow Possible values are: • Outgoing (OUT): the energy is going out of this Border Point or Interconnection Point • Incoming (IN): the energy is coming in the Border Point or Interconnection Point
8	Domain	String	Name of Border Point (even if the component is an Interconnection Point)
9		EAN	EAN of Border Point (even if the component is an Interconnection Point)
10	Party / Area	String	Name of Border Point or the Interconnection Point
11	N/A	EAN	EAN of Border Point or Interconnection Point
12	Meterable type	String	Fixed. Always "Net"
13	N/A	String	Identification of the power type. Always : "Active"
14	N/A	String	Always "Compensated"
17	monthly energy	String	Excel formula = the sum of all quarter hourly values and related unit
20	Power unit	String	Unit in which the power values are defined. Fixed. Always W

2.3.5.6. Delta TS - "Detail" Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (on the next column) All the quarter hourly values of the month are present:

The format of values is the same as on the sheet "Summary". See "2.3.5.5"

2.4. Delta DGO Exchanges (DGO2DGO)

The purpose of these messages is to provide the difference between the energy measured by each of the DGO in a given DGO exchange point (DGO2DGO).

The message provides:

- The energy flow measured by each of the DGO for a given DGO exchange point (DGO2DGO)
- The difference between the energy measured by each of the DGO for a given DGO exchange point (DGO2DGO). This difference is called "Delta DGO Exchanges (DGO2DGO)" and is actually a kind of "clearing differences".

These messages contain the data for one calendar month.

The structure of the message identifies the DGO(s), the energy flow measured by each of the DGO in a given DGO exchange point, the difference between the energy measured by each of the DGO in a given DGO exchange point (DGO2DGO), the time period, all the parameters used to describe the power values and the actual power values. This message content can be delivered in one of 2 formats: XML format described in section 2.4.4 only for the CMS and XLSX (summary) format described in section 2.4.5 (only for the DSO).

2.4.1. Delta DGO Exchanges (DGO2DGO) Components

The Delta DGO Exchanges (DGO2DGO) message has two types of components:

- DGO Exchange
- Delta DGO Exchange

In the XML message, the link between the DGO Exchanges components and the related Delta DGO Exchange can be done through the field "Domain" where the pair "DGO A GLN code-DGO B GLN code" is referred.

Component	Description
DGO Exchange	The energy flow reported by one DGO for a given DGO exchange point (DGO2DGO).
Delta DGO Exchange	The difference of the exchange as reported by each of the DGO for a given DGO exchange point (DGO2DGO).

2.4.2. Delta DGO Exchanges (DGO2DGO) Components criteria

In the following list the columns must be understood as:
Component: Indicates whether the data concerns the DGO Exchange or Delta DGO Exchange.
Flow direction: the flow of electricity (see also Metering Manual Concept).

- **OUT**: the quantity of energy going out the DGO network A (coming in the DGO network B).
- **IN**: the quantity of energy coming in a DGO network A (coming out the DGO network B).

Possible negative value?: Normally the energy follows the flow indicated within the column 'Flow direction' in the table below, but the result of the Delta DGO Exchanges can flow in the other direction. In this case, the quarter value is negative.

Component	Flow direction	Possible negative values?
DGO Exchange	Out	No
DGO Exchange	In	No
Delta DGO Exchange	In	Yes

2.4.3. Delta DGO Exchanges (DGO2DGO) Components added parameters

In the following list the columns must be understood as:

- **Component**: Indicates whether the data concerns the DGO Exchange or Delta DGO Exchange.
- **Party/area:** Each component can be general and referenced to a company: this is the "party" but some components can be also detailed per "area". For example, a component on a distribution grid has also the grid area code.
- **Code:** This code can be:
  - The BRP EIC code
  - The area code
  - A specific EIC / GLN code
- **Market Participant:**
  - The other party participating in the exchange

Component	Party/Area	Code	Market Participant
DGO Exchange	Area	GLN code of the DGO communicating the data	GLN code of the related DGO with which the exchange is made
Delta DGO Exchange	Area	GLN code of the DGO communicating the data	GLN code of the related DGO with which the exchange is made

2.4.4. XML Delta DGO Exchanges (DGO2DGO) value

The XML Delta DGO Exchanges (DGO2DGO) message respects the **IEC standard 62325-451-4.** The XML structure is explained in this document but whole description is available on the IEC web store: https://webstore.iec.ch/publication/29116 (document on purchase).
The XSD Schema reference is available on "3.1 Reference XSD ".

```
<EnergyAccount_MarketDocument xsi:schemaLocation="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0 iec62325-451-4-settlement_v4.xsd"
xmlns="urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:4:0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

</EnergyAccount_MarketDocument>
```

Example 8 XML Delta DGO Exchanges (DGO2DGO) message root

The message provides:

- The energy flow measured by each of the DGO for a given DGO exchange point (DGO2DGO)
- The difference between the energy measured by each of the DGO for a given DGO exchange point (DGO2DGO). This difference is called "Delta DGO Exchanges (DGO2DGO)" and is actually a kind of "clearing difference".

2.4.4.1. XML Delta DGO Exchanges (DGO2DGO) Header fields

The message begins with information about the sender of the message (Elia) and the receiver as well as the time when the message was created plus some information about the state of this message: This header is valid for all the Time Series.

The following header fields are mandatory and are listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	The unique identification of the document. Example: <mRID>FDBACD7A1EC14398A1CE6163BCD1B8A5</mRID>
revisionNumber	Integer [1…999]	The version number of the document: It is not guaranteed that first document received has version number 1. A more recent document has a higher version number
type	String [3]	Fixed. Always Z03 – (Clearing Difference)
docStatus	String [3]	The status of the Imbalance document. Possible values: • A01 - Intermediate • A02 - Final • A03 – Final Modified
process.processType	String [3]	Fixed. Always A05 (Metered Data Aggregation)
process.classificationType	String [3]	The classification mechanism used to group a set of objects together within a business process. Possible values: • A01 - Detail • A02 - Summary Normally only A01 is part of the DGO2DGO but theoretically other classificationType could also exist
sender_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	Fixed: • codingScheme: A01 (EIC code) • 10X1001A1001A094 (Elia EIC code)

sender_MarketParticipant.marketRole.type	String [3]	Fixed: Always A04 (System operator)
receiver_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: Fixed A01 (EIC code) • Value : EIC code of the receiver
receiver_MarketParticipant.marketRole.type	String [3]	Always : R02 – MRCO (CMS)
createdDateTime	Date and time	Time at which the message was created (in UTC time).
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month (in UTC time). Example for the month August 2015: Start time is 31/7/2015 at 22h. End time is 31/8/2015 at 22h Any period is theoretically possible.
Domain.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: MIX • Value: Concatenation of DGO A GLN and DGO B GLN, with a "-" in betweenExample: <domain.mRID codingScheme="MIX">5414490000900-5499842496501</domain.mRID>

Table 18 XML headers elements for Delta DGO Exchanges (DGO2DGO) messages

Remark: the XML comments indicated in the message here below are for the reader comprehension and are available in the message sent by Elia;

2.4.4.2. XML Delta DGO Exchanges (DGO2DGO) TimeSeries fields

The <TimeSeries> element describes the flow of the power for one component and related criteria and the schedule of actual power values. . It contains also the Period element: see "2.3.4.4 XML Imbalance Period Fields"

Elia does not guarantee the order of Timeseries within the message.

```
<TimeSeries>
<mRID>Z01_5115340470003-5115340477804</mRID>
<businessType>Z01</businessType>
<!--=Clearing Difference-->
<product>8716867000030</product><!-- Active Energy -->
<MeteringType>A01</MeteringType>
<!-- Net -->
<CalculationMethod>A01</CalculationMethod>
<!-- Compensated -->
<objectAggregation>A03</objectAggregation>
<area_Domain.mRID codingScheme="A10">5115340470003</area_Domain.mRID>
<marketParticipant.mRID codingScheme="A10">5115340477804</marketParticipant.mRID>
<measure_Unit.name>KWT</measure_Unit.name>
<Period>...</Period>
</TimeSeries>
```

Example 9 XML Delta DGO Exchanges (DGO2DGO) message TimeSeries

The general meaning of these fields is given in The Metering Manual Concept.

All elements are listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	Time series unique identification within the message
businessType	String [3]	Fields identifying the characteristics of the component defined in "2.4.1 Delta DGO Exchanges (DGO2DGO) Components ": See table here below
product	String [1..35]	Fixed. Always 8716867000016 - Active Power
Calculation Method	String [3]	Fixed Always A01- Compensated
Metering Type	String [3]	Fixed. Always A01 - Net
objectAggregation	String [3]	Fixed. Always A01
area_Domain.mRID	String [1..18]	The GLN code of the DGO reporting the data
marketParticipant.mRID	String [1..18]	The GLN code of the DGO with which the exchange is made
measure_Unit.name	String [3]	Power unit. KWT for Active Energy KVR for Reactive Energy
Period	Similar to "2.3.4.4 XML Imbalance Period Fields "	

Table 19 XML <data> element for Delta DGO Exchanges (DGO2DGO) messages

Component	Business Type	Flow direction
DGOExchange	A02 – Internal Trade	Out and In
Delta DGOExchange	Z01 – Clearing Difference	In

Table 20 XML Delta DGO Exchanges (DGO2DGO) component and related data

For instance, the timeseries for a DGO Exchange will have business type A02 and the Delta DGOExchange will have type Z01

```
<TimeSeries>
                <mRID>Z01_GLN DGO A-GLN DGO B</mRID>
                <businessType>Z01</businessType>
                <!--=Clearing Difference-->
                <product>8716867000016</product><!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A01</CalculationMethod>
                <!-- Compensated -->
                <objectAggregation>A03</objectAggregation>
                <area_Domain.mRID codingScheme="A10">GLN DGO A</area_Domain.mRID>
                <marketParticipant.mRID codingScheme="A10">GLN DGO B</marketParticipant.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
</TimeSeries>
<TimeSeries>
```

```
                <mRID>A02_GLN DGO A-GLN DGO B</mRID>
                <businessType>A02</businessType>
                <!-- Internal Trade -->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A02</CalculationMethod>
                <!-- NonCompensated -->
                <objectAggregation>A03</objectAggregation>
                <area_Domain.mRID codingScheme="A10">GLN DGO A</area_Domain.mRID>
                <marketParticipant.mRID codingScheme="A10">GLN DGO B</marketParticipant.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
<!— Exchange between DGO A and DGO B reported by DGO A -->

</TimeSeries>
<TimeSeries>
                <mRID>A02_GLN DGO B-GLN DGO A</mRID>
                <businessType>A02</businessType>
                <!-- Internal Trade -->
                <product>8716867000016</product>
                <!-- Active power -->
                <MeteringType>A01</MeteringType>
                <!-- Net -->
                <CalculationMethod>A02</CalculationMethod>
                <!-- NonCompensated -->
                <objectAggregation>A03</objectAggregation>
                <area_Domain.mRID codingScheme="A10">GLN DGO B</area_Domain.mRID>
                <marketParticipant.mRID codingScheme="A10">GLN DGO A</marketParticipant.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
<!— Exchange between DGO A and DGO B reported by DGO B -->
</TimeSeries>
```

2.4.4.3. XML Delta DGO Exchanges (DGO2DGO) Point fields

The <Point> element contains information to characterize the power value and quality for a period

```
<Point>
        <position>1</position>
        <in_Quantity.quantity>336507.529</in_Quantity.quantity>
        <in_Quantity.quality>A04</in_Quantity.quality>
        <out_Quantity.quantity>0</out_Quantity.quantity>
        <out_Quantity.quality>A04</out_Quantity.quality>
</Point>
```

All elements are mandatory and listed in the table below.

Element name	Cardinality	Content type	Description
position	Mandatory	Integer [1…2884]	The position of the quarter within the covered period
in_Quantity.quantity	Optional	Double	Value for the direction IN (if possible for the component) or the element is not present
in_Quantity.quality	Optional	Element	Quality for the direction IN (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"
out_Quantity.quantity	Optional	Double	Value for the direction OUT (if possible for the component) or the element is not present
out_Quantity.quality	Optional	Element	Quality for the direction OUT (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"

Table 21 XML <point> element for Delta DGO Exchanges (DGO2DGO) messages

2.4.5. Excel Delta DGO Exchanges (DGO2DGO) value

The Excel file contains two sheets named "Summary" and "Detail": These sheets contain all information about all 'DeltaDGOExchange' and 'DGOExchange' of a DGO with its neightbour(s) and related criteria's for a given month:

- The top rows contain information about the receiver, the status of the message and the time of creation (last update) of the message and the fact that this sheet follows the Imbalance message format.
- Subsequent areas of the sheet are divided into columns.
- The first lines of the columns give information about the component name, Direction (Power Flow), Party or Area).
- The quarter hourly values give the power value and the quality for the mentioned metering data.
- Elia does not guarantee the order of components within the message.

	A	B	C	D	E	F	G
1	**Company**	**22YDGO---------1**		**DGO A**			
2	**Last update**	**21-12-2020**		**Delta DGO Exchanges (DGO2DGO)**			
3	**Validation Status**	**Intermediate**					
4	**Version**	**1**					
5							
6			**Component**	**DGOExchange**		**DGOExchange**	
7			**Direction**	Incoming		Outgoing	
8			**Domain**	DGO A - DGO B		DGO A - DGO B	
9				DGO A - DGO B		DGO A - DGO B	
10			**Party / Area**	DGO A		DGO A	
11				5115340458888		5115340458888	
12			**Meterable type**	Net		Net	
13				Active		Active	
14				Compensated			
15							
16				Value	Quality	Value	Quality
17			Monthly energy	0 KWh	Invalid	3,794 KWh	Invalid
18							
19	Quarter hourly values						
20	Date	From	To	W		W	
21	01-11-2020	00:00	00:15	0	I	9,450	I
22	01-11-2020	00:15	00:30	0	I	7,350	I

Summary | Detail

Example 10 Excel DGO2DGO message 'Detail' sheet

The Excel file is made of 2 sheets:

- The first sheet, named "Summary", contains the 'DeltaDGOExchange' components. Order ascending on the Power Type (Active, Capacitive, Inductive), next on the Direction (Incoming, Outgoing). Named "Summary".
- The second sheet, named "Detail", contains all 'DGOExchange' associated with the DGO Reactive Area. Order ascending on the Supply name, next on the Power Type (Active, Capacitive, Inductive), next on the Direction (Incoming, Outgoing). Named "Detail".

2.4.5.1. DGO2DGO - "Summary" header

The header contains reference of the DGO and the state, version.

	A	B	C	D
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Name**
2	**Last update**	**21-12-2020**		**Delta DGO Exchanges (DGO2DGO)**
3	**Validation Status**	**Intermediate**		
4	**Version**	**1**		

Figure 9 DGO2DGO - Excel sheet 'Business Summary' –header

Excel Cell	Name	Data type	Comment
B1:C1 (merged cells)	Receiver identification code	String	EIC of the DGO receiver of the message.
D1:F1 (merged cells)	Receiver name	String	Name of the DGO receiver of the message Note this is a "display name" that can be different from the official name of the company
B2:C2 (merged cells)	Last update date	Date and time	Date and time of the creation of the highest version of this document.
D2:F2 (merged cells)	Message type	String	Fixed. Always "Delta DGO Exchanges (DGO2DGO)"
B3:C3 (merged cells)	Message status	String	Indicate if the message is 'Intermediate', 'Final' or 'FinalModified
B4 (merged cells)	version	Integer [1..999]	The version of the message: An integer within range [1...999]. **Note**: The first message sent is not guaranteed to have version 1.

Table 22 Excel DGO2DGO header fields

2.4.5.2. DGO2DGO - "Summary" Columns header

From the 4th column, a set of 2 columns identifies the source of each metering data for a 'DeltaDGOExchange' component.

This sheet can contain many sets of columns.

	A	B	C	D	E	F	G
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Name**			
2	**Last update**	**21-12-2020**		**Delta DGO Exchanges (DGO2DGO)**			
3	**Validation Status**	**Intermediate**					
4	**Version**	**1**					
5							
6			**Component**	**DeltaDGOExchange**		**DeltaDGOExchange**	
7			**Direction**	Incoming		Incoming	
8			**Domain**	DGOA -DGOB		DGOA - DGOC	
9				DGOA -DGOB		DGOA - DGOC	
10			**Party / Area**	DGOA		DGOA	
11							
12			**Meterable type**	Net		Net	
13				Active		Active	
14				Compensated		Compensated	
15							
16				Value	Quality	Value	Quality
17			Monthly energy	0 KWh	Valid	0 KWh	Valid
18							
19	Quarter hourly values						
20	Date	From	To	W		W	
21	01-11-2020	00:00	00:15	0	N	0	N
22	01-11-2020	00:15	00:30	0	N	0	N

Figure 10 Excel 'DGO2DGO' message – Sheet 'Summary' –columns header

For one set of columns:

Line	Name	Data type	Comment
6	Component	String	Always "DeltaDGOExchange"
7	Direction	String	Incoming (IN)
8	Domain	String	[Name of DGO Owner of this file] – [Name of neightbour]
9	<empty>	String	Same as row 8
10	Party / Area	String	Name of the company which is the source of the data
12	N/A	String	Fixed. Always "Net"
13	Meterable type	String	Identification of the power type Always Active
14	N/A	String	Fixed. Always "Compensated"
17	monthly energy	String	Excel formula = the sum of all quarter hourly values and related unit
20	Power unit	String	Unit in which the power values are defined. Fixed. Always W

Table 23 Excel 'DGO2DGO' message – Sheet 'Summary' – columns references

2.4.5.3. DGO2DGO - "Summary" Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (on the next column) All the quarter hourly values of the month are present

Column	Name	Data type	Comment
4, 6, 8, 10, 12, etc.	Value	Signed Decimal	Value of the transferred power for the given quarter. The value is expressed in the defined unit and contains a maximum of 3 digits after the decimal point. In case of negative value the sign '-' is added
5, 7, 9, 11, 13, etc.	Quality	1 char	Indication as to the quality of the metered data for the given quarter (see Metering Manual Concept). Possible values are: • N: Normal • I: Inexact • S: Substituted (Estimated replacement).

Table 24 Excel 'DGO2DGO' message – Sheet 'Summary' – Columns values

2.4.5.4. DGO2DGO - "Detail" header

The header content is the same as the one from the 'Summary' sheet. Refer to Section 2.4.5.1".

2.5. DGO Loop Losses (DGO PBO)

As mentioned in the MIG-TSO 6.0, Elia controls the allocation data and checks that volumes allocated by DGO quarterly correspond to offtakes/injections on the Elia grid.

The result of this allocation control is called "DGO Loop Losses (DGO PBO)" and is actually a kind of "clearing differences". This result is published to the DGO through the "DGO Loop Losses (DGO PBO)" message and to the BRP through the "imbalance message".

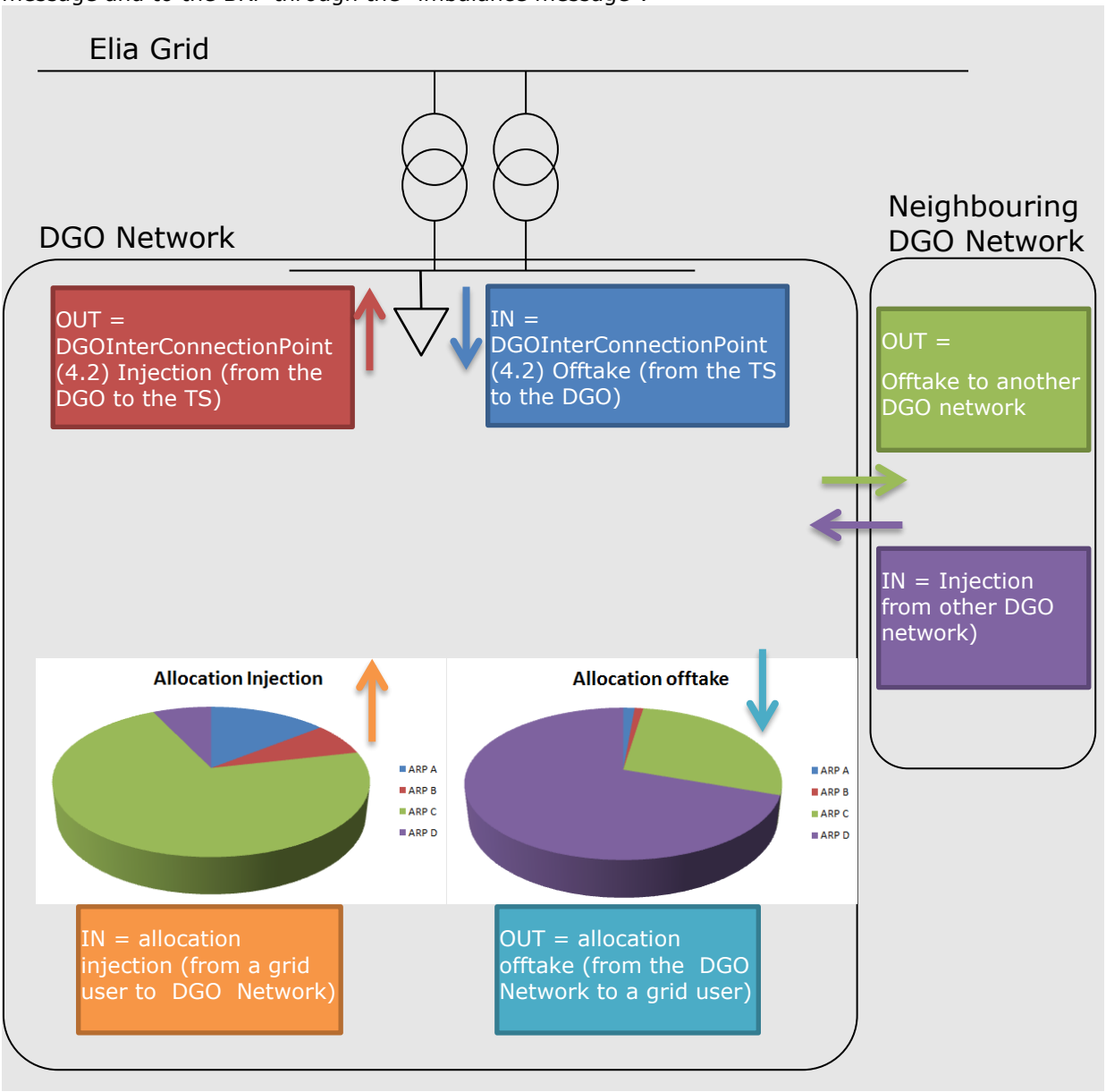


Figure 11: DGO Loop losses (DGO PBO) directions

The "DGO Loop Losses (DGO PBO)" message contains components. A component within a message represents a business flow. This is the same concept as the components within the Imbalance message.

Each component is supposedly well known by the recipient and published to facilitate the analysis in case of error: its detailed business meaning is not described in this document.

The list of components is given in 2.5.1 DGO Loop Losses (DGO PBO) components".
Each component is considered as having a direction: the "2.5.1 DGO Loop Losses (DGO PBO) components " shows the possible direction with following meaning:

- IN = The energy is coming in the DGO Network
- OUT = The energy is going out the DGO Network

DGO Loop Losses (DGO PBO) messages identify the recipient, the time period, all the parameters of each component used to describe the power values. Full details on all the descriptive fields and the possible values they can take can be found in section 2.5.4 (for the XML format messages) and section 2.5.5 (for the XLSX format messages).

2.5.1. DGO Loop Losses (DGO PBO) components

The business concepts behind each component are explained in MIG TSO 6.0. This manual gives only a brief description.

The DGO Loop Losses (DGO PBO) components that are part of the message:

Component	Description
DGOLoopLosses	Loop losses (DGO PBO) of a DGO Network give the result of the allocation control and is given by the following equation: ∑ direction IN - ∑ direction OUT (of subcomponents explained here below). This component can have as well positive as negative values.
DGOInfeedOfftakeTotal	Total energy coming from Elia network to DGO network through the Interconnection Points (∑ of the 4.2 offtake)
DGOInfeedInjectionTotal	Total energy coming from the DGO network to Elia network the Interconnection Points (∑ of the 4.2 offtake)
DGOAllocationOfftakeTotal	Total of allocations offtake for a DGO Network (OUT = means energy coming from the DGO to the BRP)
DGOAllocationInjectionTotal	Total of allocations injection for a DGO Network (IN = means energy coming from the BRP to the DGO)
DGOExchangeOfftakeTotal	Total offtake of DGO exchange point (DGO2DGO) (IN = from a Neighbouring DGO Network to the concerned DGO network)
DGOExchangeInjectionTotal	Total injection of DGO exchange point (DGO2DGO) (OUT = from the concerned DGO network to a Neighbouring DGO Network)

Remarks:

This list could vary if new components of the DGO Loop Losses (DGO PBO) are identified, or some components removed following the contract of the DGO or new market rules. It is highly recommended that the system that will read the message has not to be based on the order of the components but on the components criteria's explained here below.

In the XML message, the link between the different components and the related DGO network on which they refer can be done through the field "Domain" where the DGO Network EAN code is referred.

2.5.2. DGO Loop losses (DGO PBO) components criteria

In the following list the columns must be understood as:

- **Component** : See "2.5.1 DGO Loop Losses (DGO PBO) components"
- **Flow direction**: the flow of energy within the DGO Network: See beginning of this section.
- **Possible negative value?:** Normally the energy follows the flow indicated within the column 'Flow direction' in the table below, but the result of the allocation control can flow in the other direction. In this case, the quarter value is negative.

Component	Flow direction	Possible negative values?
DGOLoopLosses	In	Yes
DGOInfeedOfftakeTotal	In	No
DGOInfeedInjectionTotal	Out	No
DGOAllocationOfftakeTotal	Out	No
DGOAllocationInjectionTotal	In	No
DGOExchangeOfftakeTotal	In	No
DGOExchangeInjectionTotal	Out	No

2.5.3. DGO Loop losses (DGO PBO) components added parameters

Each component of the DGO Loop Losses (DGO PBO) message concerns the DGO area and refers to its DGO network EAN (these EAN codes are also used in the nomination system). See: https://www.elia.be/-/media/project/elia/elia-site/customers/customer-tools/nominations/20210201_list-of-distribution-grids_en.pdf for the complete list.

2.5.4. XML DGO Loop losses (DGO PBO)

The XML DGO Loop losses (DGO PBO) message respects the **IEC standard 62325-451-4.** The XML structure is explained in this document but whole description is available on the IEC web store: https://webstore.iec.ch/publication/29116 (document on purchase)

The XSD Schema reference is available on "3.1 Reference XSD ".

```
<EnergyAccount_MarketDocument xsi:schemaLocation="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0 iec62325-451-4-settlement_v4.xsd"
xmlns="urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:4:0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

</EnergyAccount_MarketDocument>
```

Example 11 XML DGO Loop losses (DGO PBO) message root

2.5.4.1.1. XML DGO Loop Losses (DGO PBO) Header fields

The message begins with information about the sender of the message (Elia) and the receiver as well as the time when the message was created plus some information about the state of this message: This header is valid for all the Time Series.

Remark: the XML comments indicated in the message here below are for the reader comprehension and can be not available in the message sent by Elia;

```
<EnergyAccount_MarketDocument xsi:schemaLocation="urn:iec62325.351:tc57wg16:451-
4:energyaccountdocument:4:0 ELIA-iec62325-451-4-settlement.xsd"
xmlns="urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:4:0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

        <mRID>EE2C5627CD6143B2BEF774F93AF128F7</mRID>

        <revisionNumber>1</revisionNumber>

        <type>Z01</type>

        <docStatus>

                <value>A01</value>

        </docStatus>

        <process.processType>A05</process.processType>

        <process.classificationType>A01</process.classificationType>

        <sender_MarketParticipant.mRID
codingScheme="A01">10X1001A1001A094</sender_MarketParticipant.mRID>

        <sender_MarketParticipant.marketRole.type>A04</sender_MarketParticipant.marketRole.typ
e>

        <receiver_MarketParticipant.mRID codingScheme="A01">22XDGOB--------
6</receiver_MarketParticipant.mRID>

        <receiver_MarketParticipant.marketRole.type>R06</receiver_MarketParticipant.marketRole
.type>

        <createdDateTime>2016-04-07T22:00:00Z</createdDateTime>

        <period.timeInterval>

                <start>2015-07-31T22:00Z</start>

                <end>2015-08-01T22:00Z</end>

        </period.timeInterval>

<domain.mRID codingScheme="A10">541453104512600461</domain.mRID>
```

Example 12 XML DGO Loop Losses (DGO PBO) message header

The following header fields are mandatory and are listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	The unique identification of the document.
revisionNumber	Integer [1…999]	The version number of the document: A more recent document has a higher version number. It is not guaranteed that first document received by the Recipient has version number 1.
type	String [3]	Fixed. Always Z01 (PBO document)
docStatus	String [3]	The status of the PBO document. Possible values: • A01 - Intermediate : used for non-validated messages • A02 – Final : used for validated message • A03 – Final Modified See "1.1.8 Regulated messages & message delivery frequency "
process.processType	String [3]	The type of the PBO document. Possible values: • A05 - Metered data aggregation
process.classificationType	String [3]	The classification mechanism used to group a set of objects together within a business process. Possible values: • A01 - Detail • A02 - Summary Normally only A01 is used within the DGO Loop losses (DGO PBO) message but theoretically other classificationType could also exist
sender_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	Fixed: • codingScheme: A01 (EIC code) • 10X1001A1001A094 (Elia EIC code)
sender_MarketParticipant.marketRole.type	String [3]	Fixed: Always A04 (System operator)
receiver_MarketParticipant.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: Fixed A01 (EIC code) • Value : EIC code of the DGO or MRCO
receiver_MarketParticipant.marketRole.type	String [3]	Fixed: Always R02 (MRCO)
createdDateTime	Date and time	Time at which the message was created (in UTC time).
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month (in UTC time). Example for the month August 2015: Start time is 31/7/2015 at 22h. End time is 31/8/2015 at 22h However any period is theoretically possible.
Domain.mRID	codingScheme: String [3] Value: String [16]	• codingScheme: A10 (EAN code) • DGO Network EAN

Table 25 XML headers elements for DGO Loop lossses (DGO PBO) messages

2.5.4.1.2. XML DGO Loop Losses (DGO PBO) TimeSeries fields

The <TimeSeries> element describes the flow of the power for one component and related criteria and the schedule of actual power values. It contains also the Period element, see: "2.3.4.4 XML Imbalance Period fields".

```
<TimeSeries>
                <mRID>A66_541453104512600461</mRID>
                <businessType>A66</businessType>
                <!--=Energy flow-->
                <product>8716867000016</product>
                <!-- Active power -->
                <objectAggregation>A01</objectAggregation>
                <area_Domain.mRID codingScheme="A01">541453104512600461</area_Domain.mRID>
                <measure_Unit.name>KWT</measure_Unit.name>
                <Period>...</Period>
</TimeSeries>
```

Example 13 XML DGO Loop losses (DGO PBO) message TimeSeries

The general meaning of these fields is given in The Metering Manual Concept. All elements are mandatory and listed in the table below.

Element name	Content type	Description
mRID	String [1..35]	Time series unique identification within the current message
businessType	String [3]	Fields identifying the characteristics of the component defined in "2.5.1 DGO Loop Losses (DGO PBO) components" : See table below
product	String [1..35]	Fixed. Always 8716867000016 - Active Power
objectAggregation	String [3]	Fixed. Always A01
area_Domain.mRID	String [1..18]	The EAN code of the DGO Network
marketParticipant.mRID	String [1..18]	Currently not used
measure_Unit.name	String [3]	Power unit. Always KWT
Period	*See "2.5.4.1.3 XML DGO Loop Losses (DGO PBO) Period fields* The <Period> element contains information to characterize the power value and quality for a period.	
	<Period> <timeInterval> <start>2015-07-31T22:00Z</start> <end>2015-08-30T22:00Z</end> </timeInterval> <resolution>PT15M</resolution> <Point>	
	All elements are mandatory and listed in the table below.	
	Element name	Content type

period.timeInterval	Start / End: Date	Covered one mo se
resolution	String	Tota (! See ef
Point		See be

Table 28 XML Time Series component and related data for DGO Loop Losses message

2.5.4.1.3. XML DGO Loop Losses (DGO PBO) Point fields

The <Point> element contains information to characterize the power value and quality for a position.

```
<Point>
        <position>2</position>
        <in_Quantity.quantity>113423.485</in_Quantity.quantity>
        <in_Quantity.quality>A04</in_Quantity.quality>
        <out_Quantity.quantity>542630.839</out_Quantity.quantity>
        <out_Quantity.quality>A04</out_Quantity.quality>
</Point>
```

Element name	Cardinality	Content type	
position	Mandatory	Integer [1…2884]	Th
in_Quantity.quantity	Optional	Double	po
in_Quantity.quality	Optional	Element	po
out_Quantity.quantity	Optional	Double	po
out_Quantity.quality	Optional	Element	(po

Table 29 XML <Point> element for DGO Loop lossses (DGO PBO) messages ”

Table 26 XML <data> element for DGO Loop Losses (DGO PBO) messages

Component	Business Type	Flow direction
DGOLoopLosses	Z01 - Clearing Difference	In
DGOInfeedOfftakeTotal and DGOInfeedInjectionTotal	A66 - Energy flow	Out and In
DGOAllocationOfftakeTotal and DGOAllocationInjectionTotal	A14 - Aggregated energy data	Out and In
DGOExchangeOfftakeTotal and DGOExchangeInjectionTotal	A02 – Internal Trade	In and Out

Table 27 XML DGO Loop Losses (DGO PBO) Time Series component and related data

2.5.4.1.4. XML DGO Loop Losses (DGO PBO) Period fields

The <Period> element contains information to characterize the power value and quality for a period.

```
<Period>
<timeInterval>
 <start>2015-07-31T22:00Z</start>
 <end>2015-08-30T22:00Z</end>
</timeInterval>
<resolution>PT15M</resolution>
<Point>
```

All elements are mandatory and listed in the table below.

Element name	Content type	Description
period.timeInterval	Start / End: Date	Covered Period: Normally this is exactly one month in ISO 8601 format (see section "3.2 Data Types")
resolution	String	Total number of minutes in the schedule. (! See also section 4.5, page on the effect of daylight saving.)
Point	See below	

Table 28 XML Time Series component and related data for DGO Loop Losses message

2.5.4.1.5. XML DGO Loop Losses (DGO PBO) Point fields

The <Point> element contains information to characterize the power value and quality for a position.

```
<Point>
        <position>2</position>
        <in_Quantity.quantity>113423.485</in_Quantity.quantity>
        <in_Quantity.quality>A04</in_Quantity.quality>
        <out_Quantity.quantity>542630.839</out_Quantity.quantity>
        <out_Quantity.quality>A04</out_Quantity.quality>
</Point>
```

Element name	Cardinality	Content type	Description
position	Mandatory	Integer [1…2884]	The position of the quarter within the covered period
in_Quantity.quantity	Optional	Double	Value for the direction IN (if possible for the component) or the element is not present
in_Quantity.quality	Optional	Element	Quality for the direction IN (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"
out_Quantity.quantity	Optional	Double	Value for the direction OUT (if possible for the component) or the element is not present
out_Quantity.quality	Optional	Element	Quality for the direction OUT (if possible for the component) or the element is not present Possible values: • Normal : "A04" • Inexact: "A02" • Substituted: "A01"

Table 29 XML <Point> element for DGO Loop lossses (DGO PBO) messages

2.5.5. Excel DGO Loop Losses (DGO PBO) value

The Excel file contains many sheets:

- One sheet named "Summary"
- One sheet per DGO

These sheets contain all information about all components given in section "2.6.2.2 Excel DGO Loop losses (DGO PBO metering messages)", and related criteria's for a given month:

- The top rows contain information about the receiver, the status of the message and the time of creation (last update) of the message and the fact that this sheet follows the Imbalance message format.
- Subsequent areas of the sheet are divided into columns.
- The first lines of the columns give information about the component name, Direction (Power Flow), Party or Area).
- The quarter hourly values give the power value and the quality for the mentioned metering data.
- Elia does not guarantee the order of components within the message.

	A	B	C	D	E	F	G
1	Company	22XDGO-EXAMPLE3A		DGO Example 3			
2	Last update	21-12-2020		DGO Loop Losses (DGO PBO)			
3	Validation Status	Intermediate					
4	Version	1					
5							
6			Component	DGOLoopLosses		DGOLoopLosses	
7			Direction	Incoming		Incoming	
8			Domain	IMEWO		Fluvius Antwerpen	
9				541453174796694517		541453182932680843	
10			Party / Area	IMEWO		Fluvius Antwerpen	
11				541453174796694517		541453182932680843	
12			Meterable type	Active		Active	
13				Net		Net	
14				Compensated		Compensated	
15							
16				Value	Quality	Value	Quali

Summary | SIBELGAS | INTERGEM | Fluvius Antwerpen | Fluvius Limburg | IMEWO

Example 14 Excel DGO Loop Losses message 'Summary' sheet

The Excel file is made of two sheets:

- The first sheet, named "Summary", contains the 'DGOLoopLosses' components.
- The second sheet, named with the DGO network name, contains all the DGOInfeedInjectionTotal, DGOExchangeTotal and DGOAllocationInjection of this DGO.

The header is the same for all sheets.

2.5.5.1. DGO Loop losses (DGO PBO) - "Summary" header

The header contains reference of the DGO / MRCO and the state, version.

	A	B	C	D	E
1	**Company**	**22XDGO-EXAMPLE3A**		**DGO Example 3**	
2	**Last update**	**21-12-2020**		**DGO Loop Losses (DGO PBO)**	
3	**Validation Status**	**Intermediate**			
4	**Version**	**1**			

Figure 12 DGO Loop losses (DGO PBO) - Excel sheet 'Summary' –header

Excel Cell	Name	Data type	Comment
B1:C1 (merged cells)	Receiver identification code	String	EIC of the DGO receiver of the message.
D1:F1 (merged cells)	Receiver name	String	Name of the DGO receiver of the message Note this is a "display name" that can be different from the official name of the company
B2:C2 (merged cells)	Last update date	Date and time	Date and time of the creation of the highest version of this document.
D2:F2 (merged cells)	Message type	String	Fixed. Always "DGO Loop Losses (DGO PBO)"
B3:C3 (merged cells)	Message status	String	Indicate if the message is 'Intermediate', 'Final' or 'FinalModified'
B4 (merged cells)	version	Integer [1..999]	The version of the message: An integer within range [1...999]. **Note**: The first message sent is not guaranteed to have version 1.

Table 30 Excel DGO Loop losses (DGO PBO) header fields

2.5.5.2. DGO Loop losses (DGO PBO) - "Summary" Columns header

From the 4th column, a set of 2 columns identifies the source of each metering data for a 'Delta TS' component.

This sheet can contain many sets of columns.

6	**Component**	**DGOLoopLosses**		**DGOLoopLosses**	
7	**Direction**	Incoming		Incoming	
8	**Domain**	IMEWO		Fluvius Antwerpen	
9		541453174796694517		541453182932680843	
10	**Party / Area**	IMEWO		Fluvius Antwerpen	
11		541453174796694517		541453182932680843	
12	**Meterable type**	Active		Active	
13		Net		Net	
14		Compensated		Compensated	
15					
16		Value	Quality	Value	Quality
17	Monthly energy	0 KWh	Invalid	0 KWh	Invalid
18					
19	Quarter hourly values				
20	Date From To	W		W	

Figure 13 Excel 'DGO Loop losses (DGO PBO)' message – Sheet 'Summary' – columns header

For one set of columns:

Line	Name	Data type	Comment
6	Component	String	Fixed. Always "DGOLoopLosses"
7	Direction	String	Incoming (IN)
8	Domain	String	Name of the DGO network.
9	N/A	EAN	EAN of the DGO network.
10	Party / Area	String	Same as row 8
11	N/A	String	Same as row 9
12	Meterable type	String	Fixed. Always "Net"
13	N/A	String	Identification of the power type Fixed. Always "Active"
14	N/A	String	Fixed. Always "Compensated"
17	monthly energy	String	Excel formula = the sum of all quarter hourly values and related unit
20	Power unit	String	Unit in which the power values are defined. Fixed. Always W

Table 31 Excel 'DGO Loop losses (DGO PBO)' message – Sheet 'Summary' – columns references

2.5.5.3. DGO Loop losses (DGO PBO) - "Summary" Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (on the next column) All the quarter hourly values of the month are present.

Column	Name	Data type	Comment
4, 6, 8, 10, 12, etc.	Value	Signed Decimal	Value of the power for the given quarter. The value is expressed in the defined unit and contains a maximum of 3 digits after the decimal point. In case of negative value the sign '-' is added
5, 7, 9, 11, 13, etc.	Quality	1 char	Indication as to the quality of the metered data for the given quarter (see Metering Manual Concept). Possible values are: • N: Normal • I: Inexact • S: Substituted (Estimated replacement).

Table 32 Excel 'DGO Loop losses (DGO PBO)' message – Sheet 'Summary' – Columns values

2.5.5.4. DGO Loop losses (DGO PBO) - [DGO Network name] header

The header content is the same as the one from the 'Summary' sheet. Refer to 2.5.5.1

DGO Loop losses (DGO PBO) - "Summary" header ".

2.5.5.5. DGO Loop losses (DGO PBO) - [DGO Network name] Columns header

From the 4th column, a set of 2 columns identifies the source of each metering data for a 'DGOExchange' component.

This sheet can contain many sets of columns. For one column (example Columns 4 and 5):

6		**Component**	**DGOInfeedInjectionTotal**	**DGOInfeedOfftakeTotal**	
7		**Direction**	Incoming	Outgoing	
8		**Domain**	DGO B	DGO B	
9			541453175605410335	541453175605410335	
10		**Party / Area**	DGO B	DGO B	
11			541453175605410335	541453175605410335	
12		**Meterable type**	Active	Active	
13			Net	Net	
14			Compensated	Compensated	
15					
16			Value Quality	Value Quality	
17		Monthly energy	0 KWh Valid	49,238,683 KWh Valid	
18					
19	Quarter hourly values				
20	Date	From To	W	W	

Figure 14 Excel 'DGO Loop losses (DGO PBO)' message – Sheet 'Detail' –columns header

For one set of columns:

Line	Name	Data type	Comment
6	Component	String	Possible values : - DGOInfeedInjectionTotal - DGOInfeedOfftakeTotal - DGOExchangeInjectionTotal - DGOExchangeOfftakeTotal - DGOAllocationInjectionTotal - DGOAllocationOfftakeTotal
7	Direction	String	Identification of the direction of flow Possible values are: • Outgoing (OUT): the energy is going out of this Border Point or Interconnection Point • Incoming (IN): the energy is coming in the Border Point or Interconnection Point
8	Domain	String	Name of DGO network.
9		EAN	EAN of DGO network.
10	Party / Area	String	Same as row 8
11	N/A	EAN	Same as row 9
12	Meterable type	String	Fixed. Always "Net"
13	N/A	String	Identification of the power type. Always : "Active"
14	N/A	String	Always "Compensated"
17	monthly energy	String	Excel formula = the sum of all quarter hourly values and related unit
20	Power unit	String	Unit in which the power values are defined. Fixed. Always W

2.5.5.6. DGO Loop losses (DGO PBO) - [DGO Network name] Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (on the next column) All the quarter hourly values of the month are present:

The format of values is the same as on the sheet "Summary". See "2.5.5.3 DGO Loop losses (DGO PBO) - "Summary" Columns values ".

2.6. DGO Reactive Area and Supply Bay (DGO RA)

'DGO Reactive Area and Supply Bay metering' messages identify the receiver, the time period, all the parameters of each component used to describe the power values. This message content can be delivered in one format:

- Excel (XLSX) format described in section 2.6.3

2.6.1. 'DGO Reactive Area and Supply Bay metering' components

Please note that even if some components are named a "Reactive Area", the metering can be Active, Capacitive, or Inductive. This is explained in detail in the different formats.

The 'DGO Reactive Area and Supply Bay metering' message components are:

Component	Description	XML Business Type
ReactiveAreaOfftake	The metering going from the Elia Grid to the DGO Area	A14
ReactiveAreaInjection	The metering going from a DGO Area to the Elia Grid	A14
SupplyBayOfftake	Metering at the Supply Bay going from the Elia Grid to the DGO Area	Z28
SupplyBayInjection	Metering at the Supply Bay going from a DGO Area to the Elia Grid	Z28

Remarks:

- Elia does not guarantee the order of components within the message.
- All the quarter hourly values are >= 0
- In XML, Incoming and Outgoing values are put in one Element in XML while they are put on different components in Excel.

2.6.2. Excel 'DGO Reactive Area and Supply Bay metering' message

The Excel file contains 2 sheets. These sheets contain all information about each component and related criteria's for a given month:

- The top rows contain information about the receiver, the status of the message and the time of creation (last update) of the message and the fact that this sheet follow the Imbalance message format
- Subsequent area of the sheet is divided into columns
- The first lines of the columns give information about the component name, Direction (Power Flow), Party or Area)
- The quarter hourly values give the power value and the quality for the mentioned metering data.
- Elia does not guarantee the order of components within the message.

	A	B	C	D	E
1	**Company**	**11X11111111----B**		**DGO Name**	
2	**Meterable**	**541453170095461607**		**DGO Reactive Area name**	
3	**Last update**	**18-06-2020**			
4	**Validation St**	**Final**			
5	**Version**	**1**			
6					
7			**Component**	**ReactiveAreaOfftake**	**Reac**
8			**Direction**	Outgoing	
9			**Domain**	DGO Reactive Area name	DGO F
10				541453170095461607	5414
11			**Party / Area**	DGO Reactive Area name	DGO F
12				541453170095461607	5414
13			**Meterable type**	Active	
14				Net	
15				Compensated	
16					
17				Value Quality	V
18			Monthly energy	2,504,304 KWh Valid	600,8

Example 15 Excel Imbalance message sheet

The Excel file is made of 2 sheets:

- The first sheet contains the DGO Reactive Area components. Order ascending on the Power Type (Active, Capacitive, Inductive), next on the Direction (Incoming, Outgoing). Named "Reactive Area".
- The second sheet contains all Supply Bay points associated with the DGO Reactive Area. Order ascending on the Supply name, next on the Power Type (Active, Capacitive, Inductive), next on the Direction (Incoming, Outgoing). Named "SupplyBay".

Header is the same for both sheets.

2.6.2.1. "Reactive Area" header

The header contains reference of the DGO / MRCO and the state, version.

	A	B	C	D	E
1	**Company**	**11X11111111----B**		**DGO Name**	
2	**Meterable**	**541453170095461607**		**DGO Reactive Area name**	
3	**Last update**	**18-06-2020**			
4	**Validation St**	**Final**			
5	**Version**	**1**			

Figure 15 Excel sheet 'Reactive Area' –header

Excel Cell	Name	Data type	Comment
B1:C1 (merged cells)	Receiver identification code	String	EIC of the receiver of the message.
D1:F1 (merged cells)	Reciever name	String	Name of the receiver of the message Note this is a "display name" that can be different from the official name of the company
B2:C2 (merged cells)	Meterable EAN	String	EAN of the Reactive Area
D2:F2 (merged cells)	Meterable name	String	Name of the Reactive Area
B3:C3 (merged cells)	Last update date	Date and time	Date and time of the creation of the highest version of this document.
B4 (merged cells)	Message status	String	Indicate if the message is 'Intermediate', 'Final' or 'FinalModified
B5 (merged cells)	version	Integer [1..999]	The version of the message: An integer within range [1...999]. **Note**: The first message sent is not guaranteed to have version 1.

Table 33 Excel DGO Reactive Area header fields

2.6.2.2. "Reactive Area" Columns header

From the 4th column, a set of 2 columns identifies the source of each metering data for one component.

An Excel 'Reactive Area' sheet can contain many sets of columns.

7	**Component**	**ReactiveAreaOfftake**		**ReactiveAreaInjection**		**ReactiveAreaOfftake**		**ReactiveAreaInjection**	
8	**Direction**	Outgoing		Incoming		Outgoing		Incoming	
9	**Domain**	DGO Reactive Area name		DGO Reactive Area name		DGO Reactive Area name		DGO Reactive Area name	
10		541453170095461607		541453170095461607		541453170095461607		541453170095461607	
11	**Party / Area**	DGO Reactive Area name		DGO Reactive Area name		DGO Reactive Area name		DGO Reactive Area name	
12		541453170095461607		541453170095461607		541453170095461607		541453170095461607	
13	**Meterable type**	Active		Active		Capacitive		Capacitive	
14		Net		Net		Net		Net	
15		Compensated		Compensated		Compensated		Compensated	
16									
17		Value	Quality	Value	Quality	Value	Quality	Value	Quality
18	Monthly energy	2,504,304 KWh	Valid	600,805 KWh	Valid	142,003 KVARh	Valid	7,480 KVARh	Valid
19									
20	Quarter hourly values								
21	Date From To	W		W		VAR		VAR	

Figure 16 Excel 'DGO Reactive Area' message – Sheet 'Reactive Area' –columns header

For one set of columns:

<table>
<tr><th>Line</th><th>Name</th><th>Data type</th><th>Comment</th></tr>
<tr><td>7</td><td>Component</td><td>String</td><td>One of the possible components. Possible values:
<table>
<tr><th>Component</th><th>Related direction</th></tr>
<tr><td>ReactiveAreaOfftake</td><td>Outgoing</td></tr>
<tr><td>ReactiveAreaInjection</td><td>Incoming</td></tr>
</table></td></tr>
<tr><td>8</td><td>Direction</td><td>String</td><td>Identification of the direction of flow
Possible values are:
• Outgoing (OUT): the energy is going out the DGO Reactive Area to Elia Grid
• Incoming (IN): the energy is coming in out the DGO Reactive Area to Elia Grid</td></tr>
<tr><td>9</td><td>Domain</td><td>String</td><td>The DGO Reactive Area name</td></tr>
<tr><td>10</td><td>N/A</td><td>EAN</td><td>The DGO Reactive Area EAN. Is the same as the EAN indicated the Header on cells B2:C2</td></tr>
<tr><td>11</td><td>Party / Area</td><td>String</td><td>Same as on line 89</td></tr>
<tr><td>12</td><td>N/A</td><td>EAN</td><td>The EAN DGO Reactive Area name. Is the same as the EAN indicated the Header on cells B2:C2</td></tr>
<tr><td>13</td><td>Meterable type</td><td>String</td><td>Identification of the power type
Possible values are:
- Value
- Active
- Capacitive
- Inductive</td></tr>
<tr><td>14</td><td>N/A</td><td>String</td><td>Fixed. Always “Net”</td></tr>
<tr><td>15</td><td>N/A</td><td>String</td><td>Fixed. Always “Compensated”</td></tr>
<tr><td>18</td><td>monthly energy</td><td>String</td><td>Excel formula = the sum of all quarter hourly values and related unit</td></tr>
<tr><td>21</td><td>Power unit</td><td>String</td><td>Unit in which the power values are defined.
Fixed. Always W</td></tr>
</table>

Table 34 Excel ‘DGO Reactive Area’ message – Sheet ‘Reactive Area’ –columns references

2.6.2.3. "Reactive Area" Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (on the next column) All the quarter hourly values of the month are present

Column	Name	Data type	Comment
4, 6, 8, 10, 12, etc.	Value	Signed Decimal	Value of the transferred power for the given quarter. The value is expressed in the defined unit and contains a maximum of 3 digits after the decimal point. In case of negative value the sign '-' is added
5, 7, 9, 11, 13, etc.	Quality	1 char	Indication as to the quality of the metered data for the given quarter (see Metering Manual Concept). Possible values are: • N: Normal • I: Inexact • S: Substituted (Estimated replacement).

Table 35 Excel 'DGO Reactive Area' Columns values

2.6.2.4. "Supply Bay" header

The header content is the same as the one from the 'Reactive Area' sheet. Refer to 2.6.3.1 "Reactive Area" header".

2.6.2.5. "Supply Bay" Columns header

From the 4th column, 2 columns identify the source of each metering data metered at the Supply Bay. An Excel sheet can contain the same set of columns as all MeteringRights of all BorderPoints and SupplyBays of a DGO.

For one column (example Columns 4 and 5):

Component	**SupplyBayOfftake**
Direction	Outgoing
Domain	ABEE 15 541453165197390313
Party / Area	ABEE 15 T 1 70/ 15 541453133839052912
Meterable type	Active Net Compensated
	Value Quality
Monthly energy	Valid
Quarter hourly values Date From To	W

Figure 17 Excel 'DGO Reactive Area' message – Sheet 'Supply Bay' –columns header

For one set of columns:

<table>
<tr><th>Line</th><th>Name</th><th>Data type</th><th>Comment</th></tr>
<tr><td>7</td><td>Component</td><td>String</td><td>One of the possible components. Possible values:
<table>
<tr><th>Component</th><th>Related direction</th></tr>
<tr><td>SupplyBayOfftake</td><td>Outgoing</td></tr>
<tr><td>SupplyBayInjection</td><td>Incoming</td></tr>
</table></td></tr>
<tr><td>8</td><td>Direction</td><td>String</td><td>Identification of the direction of flow
Possible values are:
• Outgoing (OUT): the energy is going out the DGO Reactive Area to Elia Grid
• Incoming (IN): the energy is coming in out the DGO Reactive Area to Elia Grid</td></tr>
<tr><td>9</td><td>Domain</td><td>String</td><td>The Border Point name.</td></tr>
<tr><td>10</td><td>N/A</td><td>EAN</td><td>The Border Point EAN.</td></tr>
<tr><td>11</td><td>Party / Area</td><td>String</td><td>The Supply Bay name.</td></tr>
<tr><td>12</td><td>N/A</td><td>EAN</td><td>The Supply Bay EAN.</td></tr>
<tr><td>13</td><td>Meterable type</td><td>String</td><td>Identification of the power type
Possible values are:
- Value
- Active
- Capacitive
- Inductive</td></tr>
<tr><td>14</td><td>N/A</td><td>String</td><td>Fixed. Always “Net”</td></tr>
<tr><td>15</td><td>N/A</td><td>String</td><td>Fixed. Always “Compensated”</td></tr>
<tr><td>18</td><td>monthly energy</td><td>String</td><td>Excel formula = the sum of all quarter hourly values and related unit</td></tr>
<tr><td>21</td><td>Power unit</td><td>String</td><td>Unit in which the power values are defined.
Fixed. Always W</td></tr>
</table>

2.6.2.6. “Supply Bay” Columns values

The same columns (starting from the 4th column), contain the metering values and their quality (in the next column) All the quarter hourly values of the month are present. The rules are the same as 2.6.2.3 Reactive Area Column Values".

Chapter 3 XML format messages

3.1. Reference XSD

Elia XML messages allow automatic validation by the client application using only the "XML Schemas" (XSD).

Schema	Description
http://nedi1.elia.be/namespaces/public/metering/Publication.xsd	• Summary Border Point
http://nedi1.elia.be/namespaces/public/metering/ELIA-iec62325-451-4-settlement.xsd http://nedi1.elia.be/namespaces/public/Metering/urn-entsoe-eu-wgedi-codelists.xsd http://nedi1.elia.be/namespaces/public/Metering/urn-entsoe-eu-local-extension-types.xsd	Local implementation of the standard where 2 fields (meteringType and calculationMethod) and local codes have been added

3.2. XML elements

This section describes the XML elements that are contained within other elements. These include:

- "party" elements
- "point" elements
- "schedule" elements

3.2.1. Party elements

Party elements refer to:

- <sender> the sender of the metering message
- <receiver> the receiver of the metering message
- <partyFrom> the party from which the power is flowing
- <partyTo> the party to which the power is flowing

An example of a <sender> is shown below:

```
<sender>
 <code>5499770302608</code>
 <codeType>C01</codeType>
 <friendlyName>ELIA</friendlyName>
 <role>R01</role>
</sender>
```

Example 16 XML Party elements

The contents of the party element are listed in the table below. Details on the different data types are given in section 3.2.

Element	Cardinality	Data type	Description
<code>	mandatory	string	Party identification code
<codeType>	mandatory	string	Code type. Possible values are: • C01: EAN code *(see note below)
<friendlyName>	optional	string	Name to easily identify the party
<role>	mandatory	string	Role of the party. Possible values are: • R02: Metering Reading Company (MRCO) • R06: Distribution Grid Operator (DGO)

Table 36 XML Party element contents

* For messages concerning MRCO and DGO, the EAN code is used. For messages concerning direct clients, the EIC code is used.

3.2.2. Point elements

Point elements are used to identify access or Metering Points. An example of an Access Point description is shown below:

```
<point>
  <code>8400001000009</code>
  <codeType>C01</codeType>
  <friendlyName>accessPoint4</friendlyName>
</point>
```

The contents of the <point> element are listed in the table below. Details on the different data types are given in section 3.2.

Element	Cardinality	Data type	Description
<code>	mandatory	string	Point identification code
<codeType>	mandatory	string	Fixed. Always C01 : EAN code
<friendlyName>	optional	string	Name to easily identify the point.

Table 37 XML Point element contents

3.2.3. Schedule elements

<schedule> elements contain all the fields that describe the metered data as well as the data values themselves. They occur in all message types.

An example of a <schedule> element is given below. Not all data values are shown.

```
<schedule>
 <beginDateTime>2001-12-31T23:00:00Z</beginDateTime>
 <duration>4320</duration>
 <period>15</period>
 <unit>W</unit>
 <powerType>A</powerType>
 <meteringType>N</meteringType>
 <compType>C</compType>
 <profile>ULP</profile>
+ <v-list>
 <v>4000.000</v>
 Etc: not all values represented in this example
 <v>2874000.000</v>
 </v-list>
+ <q-list>
 <q>N</q>
 Etc: not all quality flags represented in this example
 <q>N</q>
 </q-list>
 <validated>false</validated>
 </schedule>
```

Example 17 XML <schedule> element

The contents of the <schedule> element are listed in the table below. Details on the different data types are given in section 3.2.

Elements	Cardinality	Data type	Description
<beginDateTime>	mandatory	Date time	Date and time of the beginning of the schedule
<duration>	mandatory	integer	Total number of minutes of the schedule. This must be a multiple of a period.
<period>	mandatory	integer	The number of minutes for each value period. This always has the value 15 minutes.
<unit>	mandatory	string	Unit in which the values are defined. These are usually units of power (see Metering Manual Concepts) but can be other units for Metering Point messages.
<powerType>	optional	string	Identification of the type of power* (see Metering Manual Concepts). Possible values are: • A: Active • I: Inductive • C: Capacitive * this has no meaning for Metering Point messages containing non-power values.
<meteringType>	Optional (default=N)	string	Indication as to whether the values are net or gross* (see Metering Manual Concepts). Possible values are: • N: Net • G: Gross * this has no meaning for Metering Point messages containing non-power values.

			** FOR DGOs and MRCOs only Net is used.
<compType>	Optional (default=NC)	string	Indication as to whether the values are compensated* or not (see Metering Manual Concepts). Possible values are: • NC: Non-Compensated. Used for metering purposes. • C: Compensated. Used for billing purposes * this has no meaning for Metering Point messages containing non-power values.
<profile>	Optional (default=ULP)	string	Indication of the load profile. This is field is only for information purposes and is ignored by the Metering Application.
<v>	0 <= n	list of decimal	Value of the transferred power. The value is always positive. The value is expressed in the defined unit and contains a maximum of 3 digits after the decimal point. The number of values = duration/period.
<q>	0 <= n	list of string	Indication as to the quality of the metered data (see Metering Manual Concepts). Possible values are: • N: Normal • I: Inexact S: Substituted (Estimated replacement). Number of values must be =duration/period.
<validated>	mandatory	boolean	Indication as to whether the values are valid or not (see Metering Manual Concepts). Possible values are: • True: validated by Elia • False: not validated by Elia

Table 38 XML Schedule element contents

3.3. Data types

The following table describes all the data types allowed in XML data structure specifications.

Data type	Typical XML representation	Lexical pattern	Comments
string		.*	The following constraints can be expressed: minimum length, maximum length, pattern, choice of valid values
int	-1, 0, 126789675 +100000	[-+]?[0-9]+	The following constraints can be expressed: minimum value, maximum value. Values must be between 2147483647 and -2147483648 inclusive.
decimal	-1.23, 12678967.543233, +100000.00, 210	[-+]?[0-9]+(\.[0-9]+)?	The following constraints can be expressed: minimum value, maximum value. Values must have at most 28 digits.
boolean	1, 0, true, false	1|0|true|false	
code		.*	This is like string, but allowed values must be part of a documented "code table". The actual signification of the code table constraint is application-dependent.
datetime	1999-05-31T13:20:00+02:00	[0-9]{4}-[0-9]{2}-[0-9]{2}T[0-9]{2}(:[0-9]{2}(:[0-9]{2})?)?([+-][0-9]{2}(:[0-9]{2})?)?	Represents a time instant. If the time zone offset is not indicated, UTC is assumed. See section 4.5.2 on time formatting and daylight saving time handling.
time	13:20:00+02:00	[0-9]{2}(:[0-9]{2}(:[0-9]{2}?)?([+-][0-9]{2}(:[0-9]{2})?)?	Represents a time instant in the day. If the time zone offset is not indicated, UTC is assumed. See section 4.5.2 on time formatting and daylight saving time handling.
date	1999-05-31	[0-9]{4}-[0-9]{2}-[0-9]{2}	Represents a calendar date. See section 4.5.2 on time formatting and daylight saving time handling.
binary		Encoded binary data (the default encoding is base64)	Used to transfer data that is not unicode text.

Table 39 Data types in XML formatted messages

Chapter 4 Accessing messages

Elia provides 2 different protocols to deliver the messages to the clients:

- "EvmsB2C": The client can access on a dedicated metering website using the HTTP protocol. He can manually download the messages on this web page. This protocol is dedicated to Business operational persons wishing to easily download a few metering messages. Elia does not recommend implementing any automated way to download messages through "EvmsB2C"
- "SFTP": Clients can access their messages through the Elia SFTP servers.

4.1. Characteristics of the different protocols

The 2 protocols have their own advantages and disadvantages.
Here is a summary of the different advantages and disadvantages.

Protocol	Description	Advantages	Disadvantages
EVMSB2C	Web site	No investment from the client Zero learning time: Only a web browser is needed	The download is manual.
SFTP	Secure File Transfer Protocol	Existing protocol Allow full automatic connection to download the metering message in the client application	This protocol is not widely permitted: Some IT department block the use of this protocol The password must be updated every 120 days if no certificate is provided by the client: See "4.3.1 Use of certificates: Public key – private key "

4.2. The EVMSB2C protocol

Elia provides a proprietary application allowing clients to access their metering data using the HTTPS protocol. This is the Elia Validated Metering system for Business to Consumer ("EvmsB2C").
Clients can manually download their metering messages and save them on their disks

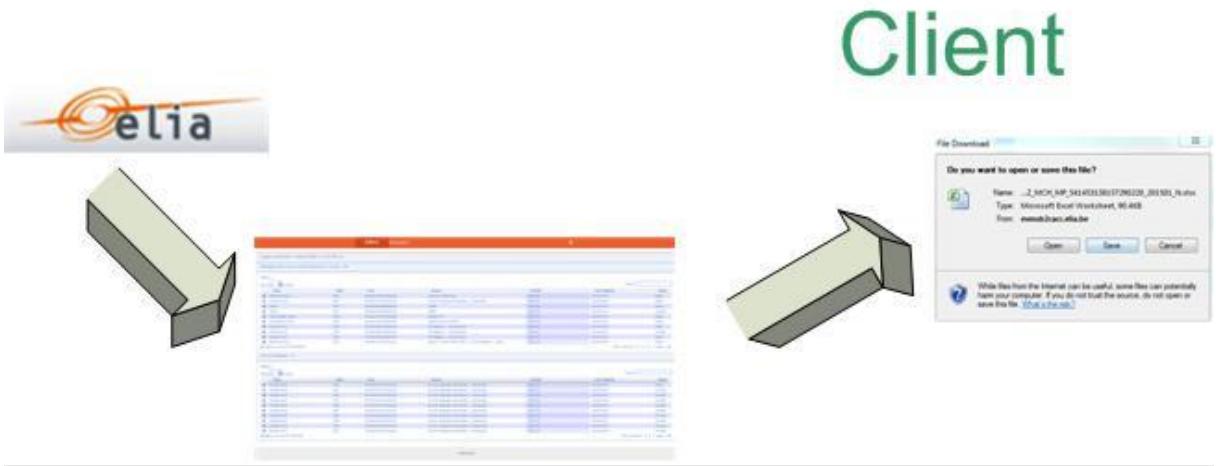


Figure 18 Delivery of metering data via the EVMSB2C web site

This delivery method is straightforward: When logged in, only one page is available with the last messages to be downloaded. A simple search can be used to easily retrieve the needed message

4.3. SFTP protocol

In addition to the EVMSB2C protocol (described in sections 4.2), Elia can also publish the metering messages on a secure FTP server.

SFTP or "Secure File Transfer Protocol" is a standard network protocol used to exchange files over a network. The protocol is easy to implement and is available on all types of computers and operating systems.

Using FTP has the following advantages:

- it is a well-known standard
- it is easy to implement
- it is Operating System independent
- it provides a secured file transfer
- SFTP works with a user id /password (exception: see Section 4.3.1)

To manage the metering messages, the diverse types are stored in separate subfolders. The client can list the contents of each folder. The messages (or files) can be read and stored locally on the file system and can be deleted after successful treatment.
The figure below shows a typical screenshot of a graphical user interface (SFTP client) showing the different subfolders.

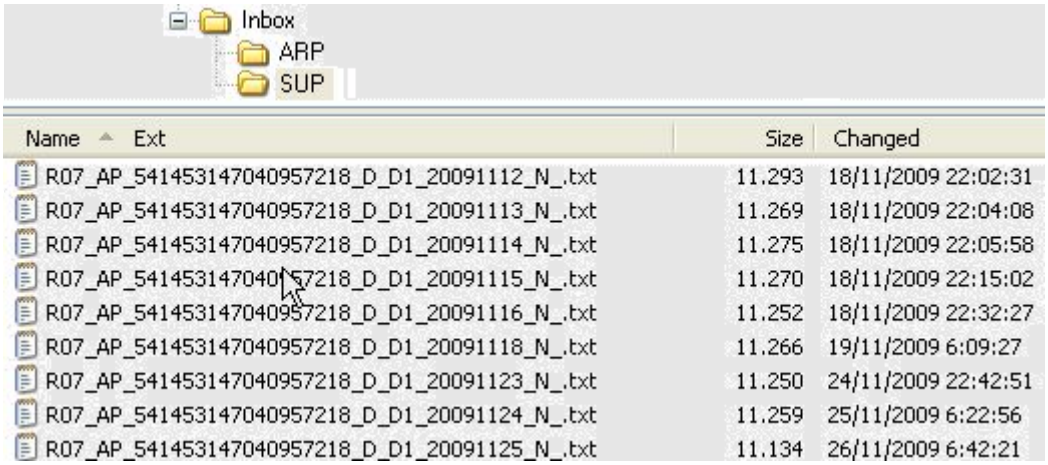


Figure 19 Folder structure on the Elia FTP client

Please contact your KAM or "metering Services" (see coordinates on the first page) to obtain a username and password to access the Elia FTP server.

4.3.1. Use of certificates: Public key – private key

One of the problems with the SFTP server is the use of a password: This password has an expiration time. Even if a reminder email can be sent to the client, it arrives that the password is expired, and the client is blocked if this one has an automated way to retrieve the messages.
To avoid the use of passwords, the client may use a certificate.

The certificate implements the concept of public and private key for authorization and authentication:

- A public key can be viewed as a lock device.
- A private key can be viewed as an actual key. This is the device used to open the 'lock' (Public key) that is stored on the other machine.

Like a regular key, the private key must be kept secret, safe, and out of the wrong hands.

Figure 20 Private and public key images

Just like a real-life key system, it is not a problem if there are hundreds of the same 'lock' on many systems if the private key stays ... private.

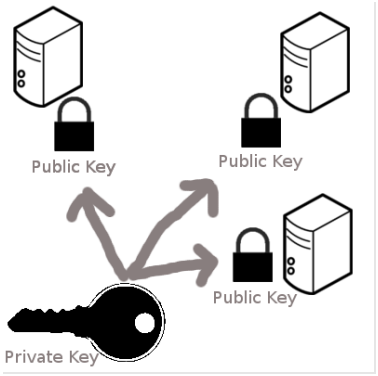


Figure 21 Private and public key on computers

This public key can therefore be distributed anywhere. Currently most companies have such a certificate composed of a private and public key: check with your IT department. When this public key is put on the Elia SFTP server, this one will be used and no longer the password.

Please contact your KAM or "metering Services" (see coordinates on the first page) to place your public key on the Elia's SFTP server.

4.4. Metering messages name

Each protocol uses a name (title) to allow distinguishing the message: It can be the file name downloaded from the EVMSB2C or the SFTP server.
This chapter lists, for each protocol how each file name or "message type" is constructed

4.4.1. EVMSB2C message file names

The type of a metering message when downloaded is a string constructed as follows:
`[Recipient EIC]_[Recipient role]_[MsgType]_[Meterable EAN]_[YearMonth]_[Validity].[Extension]`

- `[Recipient EIC]` is the EIC of the message recipient
- `[RecipientRole]` is the role of the recipient of the message and can take the values:

[RecipientRole]	Description
DGO	Distribution Grid Operator

- `[MsgType]` refers to the type of the message and can take the values:

[MsgType]	Description
DGODRA	DGO Reactive Area and Supply Ba
DGO PBO	DGO Loop Losses
DGO Border Point	DGO Border Point and Supply Bay metering
DeltaDGOExchange	Delta DGO Exchanges
Delta TS	Delta TS

- `[Meterable EAN]` is the EAN code identifying the point referenced by this message. If there is no such object, then "000000000000000000" is used
- `[YearMonth]` is the year and month covered. Format "YYYYMM"
- `[Validity]` indicate if the message is validated or not

[Validity]	Description
V	Validated
N	Not Validated

- `[Extension]` is the publication format and can take the values:

[PubFormat]	Description
XLSX	Excel file
XML	eXtensible Markup Language

4.5. Time formatting and Daylight saving

This section describes the format of times and dates used in metering messages and deals with the issues arising from daylight saving.

4.5.1. Time and date formatting

Times and dates are presented in the ISO 8601 format in XML. Date and time are expressed in UTC (Coordinated Universal Time) usually denoted by the letter Z. Time zones are expressed as an offset from UTC.

ISO 8601 format is:
`yyyy-mm-ddThh:nn:ssZ or yyyy-mm-ddThh:nn:ss+xx:yy`

Where:

- `yyyy` = year
- `mm` = month
- `dd` = day
- `T`: flag to indicate Time
- `hh` = hour
- `nn` = minute
- `ss` = second
- `Z` = Flag indicating that the time is in UTC

Or:

- `+` = a flag to indicate the positive offset of the time from UTC
- `xx:yy` = is the offset from UTC expresses in xx hours and yy minutes.

If the time zone offset is not indicated, UTC is assumed.

Examples

A local time of 1:20 pm on May 31st, 2009 in Brussels (which is 2 hours ahead of UTC) is written in UTC notation as:

`2009-05-31T11:20:00Z`

Or:

`2009-05-31T13:20:00+02:00`

The date, May the 31st 2019, is written as: 2019-05-31

4.5.2. Daylight saving

Due to daylight saving measures, twice during the year the local time is changed by one hour, meaning one day contains only 23 hours and another 25 hours. This has implications on the contents of metering messages.

Date and time are expressed in UTC (Coordinated Universal Time).

So, during winter time, the day begins at 23:00h UTC (the equivalent of 00:00h local time). During summer time, the day begins at 22:00h UTC (the equivalent 00:00h local time).

For example, in summer time:

Local time	ISO format	UTC
1:20 pm on May 31st, 2009	2009-05-31T13:20:00+02:00	2009-05-31 11:20:00

In winter time

Local time	ISO format	UTC
1:20 pm on January 31st, 2009	2009-01-31T13:20:00+01:00	2009-05-31 12:20:00

The example below shows the transition from summer time to winter time in Belgium on the 31st of October in 2010.

Local time	ISO format	UTC
0h	2010-10-31 00:00+02	2010-10-30 22:00
1h	2010-10-31 01:00+02	2010-10-30 23:00
2h	2010-10-31 02:00+02	2010-10-31 00:00
at 3h it is 2h	2010-10-31 02:00+01	2010-10-31 01:00
3h	2010-10-31 03:00+01	2010-10-31 02:00

The example below shows the transition from winter time to summer time in Belgium on the 28th of March in 2010.

Local time	ISO format	UTC
0h	2010-03-28 00:00+01	2010-03-27 23:00
1h	2010-03-28 01:00+01	2010-03-28 00:00
at 2h it is 3h	2010-03-28 03:00+02	2010-03-28 01:00
4h	2010-03-28 04:00+02	2010-03-28 02:00

4.5.3. Value periods in a message

The metering message is composed of power values for each quarter ('value periods') of each day of a month. The number of value periods in a message depends on the number of hours in the day and the number of days in the month.

For a 'normal' 24 hour day:
number of minutes = 1440
number of value periods 1440 / 15 = 96
All 96 values and qualities are consecutive.

For a 23 hour day:
number of minutes = 1380
number of value periods 1380 / 15 = 92
The value periods between 2h and 3h are omitted. There are therefore 4 less value periods in the daily message and the corresponding message.

For a 25 hour day:
number of minutes = 1500
number of value periods 1500 / 15 = 100
Four additional values periods are inserted after the 2h-3h value periods. There are 4 additional values periods in both the daily message and the corresponding message

For a 28 day month:
number of minutes = 40320
number of value periods 40320 / 15 = 2688

For a 29 day month:
number of minutes = 41760
number of value periods 41760 / 15 = 2784

For a 30 day month:
number of minutes = 43200
number of value periods 43200 / 15 = 2880

For a 31 day month:
number of minutes = 44640
number of value periods 44640 / 15 = 2976

In Excel files, on 23 hours day, the hour is not present:

96	29-03-2014	23:30	23:45	7,360,478	N	560,082	N	
97	29-03-2014	23:45	00:00	7,085,324	N	280,774	N	1
98	30-03-2014	00:00	00:15	6,991,489	N	0	N	2
99	30-03-2014	00:15	00:30	6,782,802	N	610,176	N	
00	30-03-2014	00:30	00:45	6,464,641	N	804,201	N	
01	30-03-2014	00:45	01:00	6,337,327	N	800,291	N	
02	30-03-2014	01:00	01:15	6,170,427	N	824,727	N	
03	30-03-2014	01:15	01:30	6,160,408	N	815,686	N	
04	30-03-2014	01:30	01:45	6,175,070	N	808,844	N	
05	30-03-2014	01:45	03:00	6,031,384	N	810,554	N	
06	30-03-2014	03:00	03:15	6,000,350	N	774,388	N	
07	30-03-2014	03:15	03:30	5,902,849	N	766,813	N	

In Excel files, on 25 hours day, the hour is present 2 times with an asterisk*

Appendix A. Glossary of terms

Client

A company that holds a contract with Elia, which entitles the latter to metering messages. The messages received depend on the market "roles" that the client has. One client may perform several roles. A client receives metering messages for each of its market roles.

Injection

Energy (produced by a producer) that is injected into the Elia grid

Offtake

Consumption of energy by a client connected to the Elia Grid

PBO

"Perte de Bouclage" or "Clearing difference" between 2 quantities. For example, the difference between the Elia Infeed on a distribution point and the sum of all offtakes by the DGOs at this distribution point.

Protocol

A set of rules governing the format of messages that are exchanged between computers

Receiver

The recipient of a metering message

Region

A region within Belgium that is controlled by a specific regulator

Role

A function executed by a client, as defined in a contract. See section "1.1.1 Market roles ".

Schedule

The series of values contained in a metering message. A schedule contains values for each day of a month. The time is indicated by the value of the duration field which is given in minutes.

Sender

Party who sends a metering message

Source

The provider of the metering data

Validation

This is the process whereby the quantities referred to in a message are deemed to be correct. See Metering Manual Concept.

Volt-Amperes-Reactive

Unit of reactive power (VAR)

Watt

Unit of active power (W)