

**COMMISSION IMPLEMENTING REGULATION (EU) 2023/1162****of 6 June 2023****on interoperability requirements and non-discriminatory and transparent procedures for access to metering and consumption data****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU <sup>(1)</sup>, and in particular Article 24(2) thereof,

After consulting the Electricity Cross-Border Committee,

Whereas:

- (1) Directive (EU) 2019/944 introduced a number of rules empowering consumers and providing them with the tools to access data on consumption and costs. Notably, smart metering systems that enable consumers to access objective and transparent consumption data should be interoperable and able to provide data required for consumer energy management systems. To that end, Directive (EU) 2019/944 requires Member States to have due regard to the use of relevant available standards, including standards that enable interoperability on the level of the data model and the application layer, to best practices and the importance of the development of data exchange, to future and innovative energy services, to the deployment of smart grids and to the internal market for electricity.
- (2) This Regulation is the first from a series of implementing acts that should be developed setting out interoperability requirements and non-discriminatory and transparent procedures for access to data in order to fully implement Article 24 of Directive (EU) 2019/944. The rules laid down in this Regulation are to facilitate the interoperability and increase the effectiveness of transactions that involve data access and exchange by market participants, and ultimately of energy services, promote competition in the retail market and help avoid excessive administrative costs for the eligible parties.
- (3) This Regulation applies to metering and consumption data in the form of validated historical metering and consumption data and non-validated near-real time metering and consumption data. It lays down rules enabling final customers in the retail electricity market and eligible parties to access this data, in a timely, simple and secure manner. Moreover, it ensures that suppliers and service providers have transparent and seamless access to final customers' data, in a manner that the data is easy for them to understand and use, provided that customers have given the required permission. Upon receiving this permission, the metered data administrator provides the relevant data covered by this authorisation to the eligible party chosen by the final customer. Moreover, this specific authorisation procedure could be linked to a contractual agreement, or to an explicit clause within the contractual agreement with the eligible party. This way, interoperability is ensured in a manner that respects consumer rights over their data, and market participants have a shared understanding of the type of data and workflows that are required for specific services and processes. Customers can be required to give permission to suppliers or other market participants such as aggregators as part of their contractual agreements. Where a customer terminates their contract with a supplier or other market participant, the supplier or market participant should continue to have access to the metering data necessary for billing or balancing purposes. Member States may require certain metering data to be shared for legitimate public purposes, for instance with environmental or statistical authorities as well as with system operators or other market participants.

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<sup>(1)</sup> OJ L 158, 14.6.2019, p. 125.

- (4) For the purposes of this Regulation, near-real time data should involve meter readings coming from smart metering systems for which the start of works began after 4 July 2019, or which are put into use systematically after this date, in accordance with Article 19(6) and Article 20 of the Directive (EU) 2019/944. Such data can be acquired for further use and processing by an energy management system, an in-home display, or another system which for the purposes of this Regulation is referred to as 'near real-time data consumption system'.
- (5) Industry practice is to separate interoperability into five layers. The business layer relates to the business objectives and roles for certain services or processes. The function layer relates to the use cases, data sharing and permission management. The information layer relates to data models and information models, such as CIM <sup>(2)</sup>. The communication layer relates to the communication protocols and data formats such as CSV <sup>(3)</sup> or XML <sup>(4)</sup>. The component layer relates to data exchange platforms, applications and hardware such as meters and sensors.
- (6) The present Regulation lays down a set of rules for interoperability for access to metering and consumption data taking into account existing national practices. The 'reference model' set out in this Regulation defines common rules and procedures at Union level for the business, function and information layers, in line with national practices.
- (7) Fulfilment of these interoperability requirements and compliance with the procedures for access to data depends on Member States using the same reference model for metering and consumption data. By establishing a reference model, this Regulation aims at ensuring that market participants have a mutual and clear understanding of the roles, responsibilities and procedures for access to data. At the same time, implementation of the reference model allows Member States to determine the communication and component layers in accordance with national specificities and practices.
- (8) The reference model describes workflows that are required for specific services and processes based on a minimum set of requirements to ensure that a given procedure can run correctly, while allowing for national customisation. It is composed of (i) a 'role model' with a set of roles/responsibilities and their interactions; (ii) an 'information model' that contains information objects, their attributes, and the relationships between these objects; and (iii) a 'process model' detailing the procedural steps.
- (9) The reference model is technology-neutral and not directly tied to any specific implementation details. However, the reference model reflects, as far as possible, definitions and terminology that are used in available standards and the relevant European initiatives, such as the Harmonised Electricity Market Role Model <sup>(5)</sup> and the International Electrotechnical Commission's Common Information Model<sup>2</sup>. Where possible, the reference model should use available European standards.
- (10) This Regulation describes the roles and responsibilities of market participants in the exchange of information under the reference model, including the roles and responsibilities of the metered data administrator, the metering point administrator, the data access provider and the permission administrator. Market participants that exchange information following the specific procedures described in this Regulation should be able to assume roles and responsibilities assigned by the reference model individually or jointly and may also carry out more than one role.
- (11) It is important that eligible parties have the possibility to test their products and procedures before deploying them. Metered data administrators and permission administrators, including a central entity if so designated by the Member State, should provide eligible parties access to facilities to test their products and services in advance before deployment as far as possible, to avoid technical implementation problems, and to fine-tune their operations to ensure that their products and services run smoothly in line with the procedures of this Regulation.

<sup>(2)</sup> CIM - Common Information Model, <https://www.iec.ch/homepage>.

<sup>(3)</sup> CSV data format – Comma-Separated Values data format.

<sup>(4)</sup> XML data format - Extensible Markup Language format.

<sup>(5)</sup> HEMRM - Harmonised Role Model (for the Electricity Market) by eBIX®, ENTSO-E, and EFET.

- (12) Under this implementing Regulation, and to assist with the identification and the authentication of parties that are requesting access to data, Member States are recommended to encourage data access providers and permission administrators to support, as far as possible, digital solutions compliant with Regulation (EU) No ° 910/ 2014 of the European Parliament and of the Council <sup>(6)</sup> ('eIDAS Regulation') to electronically identify and authenticate final customers and/or eligible parties. When doing so, data-access providers and permission administrators should make good use of already rolled-out national infrastructure. Using digital solutions should help increase the effectiveness of energy-related online services and transactions, and electronic business and commerce in the Union.
- (13) It is important that not only eligible parties, but also customers have access to their own data, including data from smart metering. Therefore, this Regulation ensures that final customers have access also to non-validated near real-time metering and consumption data from smart metering systems if they request it in line with point (e) of Article 20 of Directive (EU) 2019/944.
- (14) Member States may choose how to implement the interoperability requirements in their national system reflecting national practices, in particular regarding aspects linked to the communication and component layer. While this ensures that the implementation model is based on existing national practices, it also makes it more difficult for eligible parties to understand how the reference model is implemented across the Union in the Member States, in particular with regard to the communication and component layer. This could lead to a barrier to entry for eligible parties who want to be active in other Member States. Therefore, a common repository of national practices should be established on how the reference model is implemented in the national practices of Member States and should be made publicly available. The publication of these reports is part of the transparent and non-discriminatory procedures introduced in this Regulation, because it will contribute to improving access to metering and consumption data across the EU by increasing awareness, providing clarity on applicable rules, and help lowering barriers for new market entrants. Moreover, it will also enable market participants identify and better understand similarities, differences and relationships between Member States' national arrangements. Furthermore, it will also help share best practices between Member States and improve interoperability.
- (15) To effectively ensure transparency of access to data procedures it would be necessary to collect the reports of national practices provided by Member States and make those reports available, at EU level, while at the same time assisting Member States in the reporting of national practices. In this regard, the European Network of Transmission System Operators for Electricity (the 'ENTSO for Electricity') and the European Entity for Distribution System Operators (the 'EU DSO entity'), would help ensure the transparency of access to data procedures within the EU, through their ongoing cooperative work and in the context of their tasks related to data management and data interoperability, pursuant to Article 30(1) points (g), and (k) and Article 55(1) points (d) and (e) of Regulation (EU) 2019/943 of the European Parliament and of the Council <sup>(7)</sup>. This cooperation would be based on the existing responsibilities of the two bodies, namely the responsibility of the EU DSO entity to contribute to the digitalisation of distribution systems and to participate, in cooperation with relevant authorities and regulated entities, in the development of data management, as well as the responsibility of the ENTSO for Electricity to contribute to the establishment of interoperability requirements and non-discriminatory and transparent procedures for accessing data as provided for in Article 24 of Directive (EU) 2019/944 and Article 30 and 55 of Electricity Regulation (EU) 2019/943.
- (16) Within the context of the procedures described in the reference model for metering and consumption data introduced in this Regulation and its Annex, eligible parties are receiving and processing data. Any processing of personal data under this implementing act, such as meter or connection point identification numbers, exchanged using the procedures set out in this implementing act will need to comply with Regulation (EU) 2016/679 of the European Parliament and of the Council <sup>(8)</sup>, including but not limited to the processing and retention requirements

<sup>(6)</sup> Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC (OJ L 257, 28.8.2014, p. 73).

<sup>(7)</sup> Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (OJ L 158, 14.6.2019, p. 54).

<sup>(8)</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation; OJ L 119, 4.5.2016, p. 1).

in Article 5 (1) and 6 (1) of the aforementioned Regulation. Moreover, and given that smart meters qualify as terminal equipment, Directive 2002/58/EC of the European Parliament and of the Council concerning the processing of personal data and the protection of privacy in the electronic communications sector, applies as well <sup>(9)</sup>. Relevant eligible parties should accordingly comply with their obligations stemming from this Directive, including Article 5 (3).

- (17) The European Data Protection Supervisor was consulted in accordance with Article 42(1) of Regulation (EU) 2018/1725 of the European Parliament and of the Council <sup>(10)</sup> and delivered an opinion on 24 August 2022.

HAS ADOPTED THIS REGULATION:

#### CHAPTER 1

### ***Subject Matter and Definitions***

#### *Article 1*

#### **Subject matter**

1. This implementing Regulation lays down interoperability requirements and rules for non-discriminatory and transparent procedures for access to electricity metering and consumption data by final customers and eligible parties in accordance with Directive (EU) 2019/944. It also sets out non-discriminatory and transparent procedures for access to data that require reporting and publication of national practices applying the reference model.
2. In order to ensure the application of interoperability requirements, this Regulation establishes a reference model for metering and consumption data that sets out the rules and procedures that Member States shall apply to enable interoperability. It lists the electricity market participants that are concerned by this act and the roles and responsibilities they perform individually or jointly, as described in Articles 5, 6, 7 and 8 and in the Annex to this Regulation, with one electricity market participant being able to carry out more than one role.

#### *Article 2*

#### **Definitions**

For the purposes of this implementing Regulation, the following definitions shall apply:

- (1) 'reference model' means the procedures that are necessary for access to data describing the minimum required information exchange between market participants;
- (2) 'metering and consumption data' means meter readings of electricity consumption from the grid, or electricity fed into the grid, or consumption from on-site generation facilities which are connected to the grid, and includes validated historical data and non-validated near-real time data;
- (3) 'validated historical metering and consumption data' means historical metering and consumption data collected from a meter, a conventional meter or a smart meter, or a smart metering system, or completed with substitute values that are determined otherwise in case of meter unavailability;

<sup>(9)</sup> Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications) (OJ L 201, 31.7.2002, p.37).

<sup>(10)</sup> Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data, and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC (OJ L 295, 21.11.2018, p. 39).

- (4) 'smart meter' means an electronic metering device deployed within a smart metering system as defined in the Article 2(23) of the Directive (EU) 2019/944;
- (5) 'near real-time metering and consumption data' means metering and consumption data provided continuously by a smart meter or a smart metering system in a short time period, usually down to seconds or up to the imbalance settlement period in the national market, which is non-validated and made available through a standardised interface or through remote access in line with Article 20(a) of the Electricity Directive (EU) 2019/944;
- (6) 'eligible party' means an entity offering energy-related services to final customers, such as suppliers, transmission and distribution system operators, delegated operators and other third parties, aggregators, energy service companies, renewable energy communities, citizen energy communities and balancing service providers, as far as they offer energy related services to final customers;
- (7) 'metered data administrator' means a party responsible for storing validated historical metering and consumption data and distributing these data to final customers and/or eligible parties;
- (8) 'permission' means the authorisation given by a final customer for an eligible party on the basis of a contractual agreement they have with this party, to access their metering and consumption data managed by the metered data administrator for the provision of a specific service;
- (9) 'active permission' means a permission that has not been revoked or expired;
- (10) 'permission administrator' means a party responsible for administering a register of data access permissions for a set of metering points, making this information available to final customers and eligible parties in the sector, on request;
- (11) 'data access log' means a timestamped record of data items accessed that includes at least the identification of the final customer or the eligible party accessing the data and, if applicable, the identification of the permission used to access the data;
- (12) 'metering point administrator' means a party responsible for administering and making available the characteristics of a metering point, including the registrations of eligible parties and final customers linked to the metering point;
- (13) 'data access provider' means a party responsible for facilitating access, including in cooperation with other parties, to validated historical metering and consumption data by the final customer or by eligible parties;
- (14) 'permission provision log' means a timestamped record of when the permission for a an eligible party or final customer was granted, revoked, or terminated, including a permission identifier, and a party identifier;
- (15) 'identity service provider' means a party that manages identity information; issues, stores, protects, keeps up to date, and manages identity information for a natural or legal person and provides authentication services to eligible parties and final customers;
- (16) 'authentication' means an electronic procedure that enables the electronic identification of a natural or legal person;
- (17) 'meter operator' means a party responsible for installing, maintaining, testing, and decommissioning physical meters;
- (18) 'near real-time data consumption system' means a system or device that obtains the flow of non-validated near real-time data from a smart metering system as referred to in Article 20, first subparagraph, point (a) of Directive (EU) 2019/944.

## CHAPTER 2

**Interoperability Requirements and Transparent and Non-Discriminatory Procedures for Access to Data**

## Section 1

**Interoperability requirements - Reference model***Article 3***Implementation of the reference model**

In order to meet the interoperability requirements, electricity undertakings in the retail electricity market apply the reference model set out in this Chapter and in the Annex of this Regulation.

*Article 4***Reference model and information on market organisation**

1. Member States shall report the national practices regarding the implementation of the interoperability requirements and procedures for access to data, according to Article 10, and ensure that these comply with the obligations set out in this Regulation.
2. Member States shall make the information on the organisation of the national market regarding specific roles and responsibilities set out in Table I of the Annex easily available to all eligible parties and final customers.
3. The information referred to in paragraph 2 of this Article shall include the identification of those parties acting in the national market as the metered data administrator(s), the metering point administrator(s), the data access provider(s) and the permission administrator(s), whose responsibilities are set out in Articles 5, 6, 7 and 8 of this Regulation.

*Article 5***Responsibilities of metered data administrator**

1. In order to ensure seamless access to data for final customers and eligible parties, the metered data administrator shall:
  - (a) make validated metering and consumption data available to final customers and eligible parties in accordance with this Regulation through an online or through another appropriate interface, on request, in a non-discriminatory way, and without undue delay;
  - (b) ensure that final customers (i) can access their validated metering and consumption data; (ii) can make it available to eligible parties and (iii) receive it in a structured, commonly used, machine-readable and interoperable format;
  - (c) keep a data access log up to date and make this available to final customers through an online or through another appropriate interface, free of charge, without unnecessary delay, and on final customer's request;
  - (d) when transferring data to eligible parties, and respecting relevant personal data protection law, ensure, in cooperation with the permission administrator where applicable, that there is an active permission or another legal basis for the data to be lawfully transmitted or processed, including, where relevant, in accordance with Regulation (EU) 2016/679.
2. Metered data administrators shall keep complementary information on historical metering and consumption data in accordance with Annex I.4 points (a) and (b) to Directive (EU) 2019/944. For the duration of the retention period, the historical metering and consumption data shall be kept available, along with the corresponding log information, for access by final customers and eligible parties on final customers' request.

3. Metered data administrators shall give eligible parties access to testing facilities where the eligible party can test the compatibility of their systems with the systems of the metered data administrator implementing the procedures in this Regulation. The testing facility shall be available before the procedures are implemented and while they are in operation.
4. Where Member States have so provided, a designated entity may share with the metered data administrator, the obligations referred to in paragraphs 1 to 3.

#### *Article 6*

### **Responsibilities of metering point administrator**

The metering point administrator shall inform the permission administrator, and where relevant at national level the metered data administrator, without undue delay, of any changes in the assignment of final customers to metering points, and of any other external occurrences that invalidate active permissions granted in their area of responsibility.

#### *Article 7*

### **Responsibilities of data access provider**

1. In accordance with Article 23(2) of Directive (EU) 2019/944, data access providers shall make publicly available through an online interface
  - (a) all relevant procedures they use for providing access to data as described by the reference model set out in this Chapter and the Annex where the specific case of access by final customers is presented;
  - (b) the means for final customers to access, without unnecessary delay, their historical metering and consumption data, in cooperation with the metered data administrator where applicable. This shall be possible as described in the procedures for access to validated historical metering and consumption data by the final customer in the Annex.
2. Data access providers shall keep and make available to final customers their log information, including the time at which an eligible party or a final customer has been given access to data, and the type of data concerned. This information shall be made available online, free of charge, without unnecessary delay, whenever a final customer requests access.
3. Where Member States have so provided, a designated entity may share with the data access provider, the obligations referred to in paragraphs 1 and 2.

#### *Article 8*

### **Responsibilities of permission administrator**

1. The permission administrator shall
  - (a) grant permission to access validated historical metering and consumption data to eligible parties and revoke permissions, without unnecessary delay, on final customers' request in accordance with the procedures described in the Annex;
  - (b) provide final customers on request, with an overview of active and historical data sharing permissions, as per paragraph (2) of Article 5;
  - (c) process notifications about invalidations of permissions received in line with the procedures in this Regulation;
  - (d) inform the metered data administrator (steps 3.5 and 4.9 in the Annex), the eligible party if needed (step 4.11) and the final customer (step 3.4 and 4.13) as soon as the permission administrator is notified of an invalidation of a permission;
  - (e) keep a permission provision log for the final customers and make this information available to them online, free of charge, without undue delay, and on their request;
  - (f) make publicly available the relevant procedures they use for providing access to data as described by the reference model and illustrated in the Annex, in accordance with Article 23(2) of Directive (EU) 2019/944.

2. Permission administrators shall cooperate with eligible parties and metered data administrators to facilitate testing of the processes to implement the reference model. This cooperation shall take place before the processes are implemented and while they are in operation.
3. Where Member States have so provided, a designated entity may share with the permission administrator, the obligations referred to in paragraphs 1 and 2.

#### Article 9

### **Interoperability requirements and procedures for access to near real-time metering and consumption data**

In order to ensure access to non-validated near real-time metering and consumption data for final customers, through a standardised interface or through remote access, Member States shall apply the methods established according to Procedures 5 and 6 in the Annex of this Regulation.

#### Section 2

### **Transparent and non-discriminatory procedures for access to data – Reporting and repository of national practices**

#### Article 10

#### **Reporting of national practices**

1. In order to ensure the transparency and non-discrimination of national procedures for access to data, in line with Article 23 of the Directive (EU) 2019/944, Member States shall
  - (a) carry out and keep up to date a mapping of national practices at national level that also includes a detailed description and explanation of how the procedural steps of Tables III.1 to III.6 of the Annex of this Regulation are performed setting out which steps, if any, have been combined, and the order in which the steps are carried out; and
  - (b) report to the Commission the mapping of national practices referred to in paragraph (a) which shall be published in a publicly accessible repository to be established pursuant Article 12.
2. The reporting shall include information on the national implementation of the reference model and of the various roles, information exchanges, and procedures.
3. This reporting shall take into account the guidance developed by the Commission referred to in Article 13.
4. Member States shall provide the reporting of national practices referred to in paragraph 1 to the Commission no later than on 5 July 2025.
5. If a Member State has transitioned to a new national data management system before 5 January 2025, the reporting may be limited to the new arrangements provided that this system will cover over 90 % of final customers by 5 July 2026.

#### Article 11

### **Cooperation on data transparency between the EU DSO entity and the ENTSO for Electricity**

1. The cooperation foreseen between the European Network of Transmission System Operators for Electricity (the 'ENTSO for Electricity') and the European Entity for Distribution System Operators (the 'EU DSO entity'), in Article 30(1) points (g) and (k) and Article 55(1) points (d) and (e) of the Regulation (EU) 2019/943, may take the form of a Joint Working Group setting up a process to collect and publish national practices provided by the Member States. ENTSO for Electricity and EU DSO entity may in that way also cooperate to advise and support the Commission in monitoring the implementation of, and further developing the implementing acts on data interoperability under Article 24(2) of Directive (EU) 2019/944.



2. While preparing their advice and undertaking their supporting activities to the Commission, the ENTSO for Electricity and EU DSO entity cooperate closely with representatives of national regulatory authorities, competent authorities and regulated entities with institutional roles at national level regarding the right to access to metering and consumption data, as well as with all relevant stakeholders, including consumer associations, electricity retailers, European standardisation organisations, service and technology providers, and equipment and component manufacturers.

#### Article 12

##### **Tasks under the EU DSO entity and ENTSO for Electricity cooperation on data transparency**

1. In order to ensure transparency of access to data across the EU, the main tasks that ENTSO for Electricity and the EU DSO entity perform under their cooperation on data transparency shall include

- (a) developing guidance to assist Member States in the reporting of national practices as set out in Article 13;
- (b) collecting the reports of national practices provided by Member States regarding the implementation of the reference model, as set out in Article 10;
- (c) publishing the reports of national practices in a publicly available repository which shall be kept up to date.

2. The ENTSO for Electricity and the EU DSO entity may also cooperate in assisting the Commission, following the process set out in paragraph 2 of Article 11, in the monitoring of the implementation of the reference model included in this Regulation and its further development as a result of regulatory, market or technology changes, and support the Commission, upon its request, in developing, as part of future implementing acts, interoperability requirements and non-discriminatory and transparent procedures for access to data required for customer switching, demand response, and other services referred to in Article 23(1) of Directive (EU) 2019/944.

#### Article 13

##### **Guidance for the reporting of national practices**

No later than on 5 July 2024, the Commission shall develop and make publicly available, assisted by the ENTSO for Electricity and the EU DSO entity, a guidance on the reporting of national practices.

#### CHAPTER 3

##### **Final Provisions**

#### Article 14

##### **Entry into force and application**

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 3 shall apply 5 January 2025.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 6 June 2023.

*For the Commission*  
*The President*  
Ursula VON DER LEYEN

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## ANNEX

**The reference model for metering and consumption data access**

The reference model for metering and consumption data is composed of a set of reference procedures for access to data and of the required information exchanges between roles acted by market players relating to this specific case.

The tables in this Annex reflect this set of information that constitutes the reference model. The procedural steps that are set out in this Annex may be combined or carried out in a different order when applied at national level.

Table I contains information regarding the national market structure and environment which is particularly useful to eligible parties that would like to set up their operation in the respective territory and utilise metering and consumption data access in each Member State. Table I is primarily listing information that needs to be accessible for eligible parties to register, on-board or establish prerequisite infrastructure to take part in the procedures listed in Table III and accordingly communicate and exchange information with relevant market players occupying the roles and undertaking the responsibilities indicated in Table II.

Table 1

**General information on Member State environments**

<i>ID</i>	<i>Name</i>	<i>Description</i>	
I1	National competent authority	Name	Name of appointed national competent authority
		Website	Website of appointed national competent authority.
		Official contact	Contact details of the entity responsible for managing the mappings of national practices
		Note: This competent authority can be a public or private entity.	
I2	Information on Member State data management set-up	Name	If applicable, name of data management and exchange environment in accordance with Article 23 of Directive (EU) 2019/944.
		Website	If applicable, link to website explaining the provisions for data access in a Member State
		Official contact	Contact details of the entity responsible for national data management provisions.
		National regulatory basis	Reference to the legal basis for the data sharing infrastructure.
I3	Information about metered data administrators in a Member State  <i>(one mapping per each active metered data administrator in a Member State)</i>	Name	Name of the organisation.
		Type of identification	ACER registration code, Legal Entity Identifier (LEI), Bank Identifier Code (BIC), Energy Identification Code (EIC), Global Location Number (GLN/GS1) or National Identification Code (NIC).
		Identification of organisation	Code or identification of the organisation (nominated as 'metered data administrator') based on the types of identification mentioned in the previous field.
		Website	If applicable, link to website or application that is used to download data.
		Official contact	Contact details of the entity responsible for data access by final customers or eligible parties.
	Metering grid area	Description of the set of metering points for which the metered data administrator is administering metered data.	

I4	Information about metering point administrators in a Member State  <i>(one mapping per each active metering point administrator in a Member State)</i>	Name	Name of the organisation.
		Type of identification	ACER registration code, Legal Entity Identifier (LEI), Bank Identifier Code (BIC), Energy Identification Code (EIC), Global Location Number (GLN/GS1) or National Identification Code (NIC).
		Identification of organisation	Code or identification of the organisation (nominated as 'metering point administrator') based on the types of identification mentioned in the previous field.
		Website	If applicable, link to website or application that is used to download data.
		Official contact	Contact details of the entity responsible for data access by final customers or eligible parties.
		Metering grid area	Description of the set of metering points the metering point administrator is responsible for.
I5	Information about data access provider  <i>(at least one actor must be mapped per each metering point in a Member State)</i>	Name	Name of the organisation.
		Type of identification	ACER registration code, Legal Entity Identifier (LEI), Bank Identifier Code (BIC), Energy Identification Code (EIC), Global Location Number (GLN/GS1) or National Identification Code (NIC).
		Identification of organisation	Code or identification of the organisation based on the types of identification mentioned in the previous field.
		Website	If applicable, link to website of a web application that is used for final customer data access.
		Official contact	Contact details of the entity responsible for final customer data access.
		Permission management responsibility for	Metered data administrators for which the data access provider manages final customer data access.
		Identity service provider	Identity service provider utilised by the data access provider to authenticate final customers.
I6	Information about permission administrators in a Member State  <i>(at least one mapping per each active permission administrator in a Member State)</i>	Name	Name of the organisation.
		Type of identification	ACER registration code, Legal Entity Identifier (LEI), Bank Identifier Code (BIC), Energy Identification Code (EIC), Global Location Number (GLN/GS1) or National Identification Code (NIC).
		Identification of organisation	Code or identification of the organisation based on the types of identification mentioned in the previous field.
		Website	If applicable, link to website of a web application that is used for permission administration.
		Official contact	Contact details of the entity responsible for data sharing.
		Permission management responsibility	Metered data administrators for which the permission administrator manages permissions. Note: it is also valid for a metered data administrator to utilise several permission administrators, and for a permission administrator to act for multiple metered data administrators.

		Documentation of access	A self-sufficient explanation of the Member State provisions with regards to utilising <i>access to validated historical metering and consumption data by an eligible party</i> . It is recommended to also include an English version of this documentation.
		Identity service provider	Identity service provider utilised by the permission administrator to authenticate final customers.
		Eligible party on-boarding	Either a link to the English documentation of the on-boarding procedure or a complete, self-sufficient explanation in English for how an eligible party can on-board to the production environment to utilise access to <i>validated historical metering and consumption data by an eligible party</i> .
		Eligible party test on-boarding	If applicable, either a link to the English documentation of the on-boarding procedure or a complete, self-sufficient explanation in English for how an eligible party can on-board to a test environment to utilise access to <i>validated historical metering and consumption data by an eligible party</i> .
		Price list for access to data by eligible parties	Exhaustive description of all costs for eligible parties.
17	Information about standardised near real-time interfaces of smart meters or smart metering systems in a Member State as by Article 20 point (a) of Directive (EU) 2019/944  (at least one mapping for each interface specification in use for smart meters deployed after July 4 2019 in a Member State must be applicable)	Name	Type designation of the meter model.
		Basic class of interface utilised	Provide voltage level for which meter model is used. For medium and high voltage, please specify in detail standardised interface or remote access being used. For low voltage, answers should follow the classification (choose applicable option(s)): — H1 (as defined in CEN/CENELEC/ETSI TR 50572:2011 <sup>(1)</sup> ) — H2 (as defined in CEN/CENELEC/ETSI TR 50572:2011) — H3 (as defined in CEN/CENELEC/ETSI TR 50572:2011) — Remote access (specify in detail)
		Vendor	Name of the vendor organisation of the smart meter or smart metering system components
		Metering point administrators using the model	Identifiers of the metering point administrators using the model.
		Physical interface standard	Name and version of the standard used.
		Communication protocol	Name and version of the standard used.
		Data formats	Name and version of the standard used.

<sup>(1)</sup> CEN/CLC/ETSI/TR 50572:2011 - 'Functional reference architecture for communications in smart metering systems', by CEN/CLC/ETSI Coordination Group on Smart Meters.

Table II

**Roles**

<i>Role name</i>	<i>Role type</i>	<i>Role description</i>
Final customer	Business	As defined in Article 2(3) of Directive (EU) 2019/944. This refers to a party connected to the grid that purchases electricity for its own use. Note: this also includes the case of active customer and participants of renewable energy communities or citizen energy communities.
Competent authority	Business	A competent authority could be a public or private entity in a Member State.
Eligible party	Business	An 'eligible party' is an entity offering energy-related services to final customers, such as suppliers, transmission and distribution system operators, delegated operators and other third parties, aggregators, energy service companies, renewable energy communities, citizen energy communities and balancing service providers, as far as they offer energy related services to final customers;
Metered data administrator	Business	A party responsible for storing validated historical metering and consumption data and distributing these data to final customers and/or eligible parties.
Metering point administrator	Business	A party responsible for administrating and making available the characteristics of a metering point, including the registrations of eligible parties and final customers linked to the metering point.
Data access provider	Business	A party responsible for facilitating access, including in cooperation with other parties, to validated historical metering and consumption data to the final customer or to eligible parties.
Permission administrator	Business	A party responsible for administering a register of data access permissions for a set of metering points, making this information available to final customers and eligible parties in the sector, on request.
Identity service provider	Business and/or System	A party that manages identity information; issues, stores, protects, keeps up to date, and manages identity information for a natural or legal person and provides authentication services to eligible parties and final customers.
Meter operator	Business and/or System	A party responsible for installing, maintaining, testing, and decommissioning physical meters.
Smart meter	System	An electronic metering device deployed within a smart metering system as defined in the Article 2(23) of the Directive (EU) 2019/944. Note: Such a smart metering system is supporting the functionalities described in Article 20 of Directive (EU) 2019/944.
Near real-time data consumption system	System	A system or device that obtains the flow of non-validated near real-time data from a smart metering system as referred to in Article 20, first subparagraph, point (a) of Directive (EU) 2019/944. Note: this could be for example an energy management system, in-home display or another device.

All roles of type *Business* are expected to be acting in secure, authenticated manner and through trusted communication channels. For this reason, the authentication steps used for these communication partners are not listed in the procedures listed below. These are ‘*access to validated historical metering and consumption data by the final customer*’, ‘*access to validated historical metering and consumption data by an eligible party*’, ‘*termination of service by an eligible party*’, ‘*revocation of an active permission by the final customer*’, ‘*activate near real-time data flow from smart meter or smart metering system*’, and ‘*read near real-time data from smart meter or smart metering system*’.

Table III

<b>Procedure Conditions</b>			
No	<i>Procedure name</i>	<i>Primary actor</i>	<i>Pre-condition</i>
1	Access to validated historical metering and consumption data by the final customer	Final customer	Final customer is on-boarded.
2	Access to validated historical metering and consumption data by an eligible party	Final customer	Final customer is on-boarded. Eligible party is on-boarded.
3	Termination of service by an eligible party	Eligible party	Active permission is available or other legal or contractual basis.
4	Revocation of an active permission by the final customer	Final customer	Active permission is available.
5	Activate near real-time data flow from smart meter or smart metering system	Final customer	Smart meter or smart metering system is installed in metering point of the final customer.
6	Read near real-time data from smart meter or smart metering system	Near real-time data consumption system	Steps in Procedure 5 have been accomplished.

In the procedure ‘*access to validated historical metering and consumption data by an eligible party*’, as detailed in Table III.2, ‘future data’ covered by a permission (but still within the permission period) is treated differently from ‘already available data’. The latter means data that is already available at the metered data administrator at the time the permission is given, whereas ‘future data’ means data that is covered by the permission but not available at that point in time and in most cases because it is made available in the future. In the procedure that involves ‘*access to validated historical metering and consumption data by an eligible party*’, described in Table III.2, access to historical and future data is shown as a unified procedure. In mapping of national practices, these two cases may be described as separate procedures.

The reference model for the provision of *non-validated near real-time data*, as shown in procedure 5 in Table III.5 and in procedure 6 in Table III.6, is based on the functional reference architecture for smart metering defined in standards<sup>1</sup>. This functional reference architecture specifies a generic representation of smart metering infrastructures used in Member States. It defines the so-called ‘H1’, ‘H2’ and ‘H3’ interfaces that may be used for the provision of non-validated near real-time data. However, the same standards and data items may be employed whichever interface is used. Some meter operators also offer remote access to such data. Procedures 5 and 6 are implementation-neutral with respect to the access method provided.

For the provision of non-validated near real-time data through a standardised interface where applicable, Member States shall have due regard for the use of relevant available standards, including standards that enable interoperability. Without prejudice to future developments, standards currently available and in use in national practices at the time of publication of this Regulation, include the following (this is a non-exhaustive list):

- EN 50491-11
- EN 62056 series – DLMS/COSEM
- EN 13757 series – Wired and Wireless M-bus
- EN16836 - Zigbee SEP 1.1

The diagrams below showing the procedures described in Tables III.1 to III.6, are of an illustrative nature and follow the *Business Process Model and Notation 2.0* <sup>(?)</sup>. The information objects referred to in column headed 'Information exchanged (IDs)' are defined in Table IV.

Table III.1

**Procedure 1**

Procedure name		Access to validated historical metering and consumption data by the final customer			
Step No	Step	Step description	Information producer	Information receiver	Information exchanged (IDs)
1.1	Identify data access provider	Final customers identify the data access provider that is responsible for their metering points under consideration.	Competent authority	Final customer	[not relevant]
1.2	Authenticate final customer	Final customers identify themselves to the data access provider.	Final customer	Data access provider	[not relevant]
1.3	Check credentials	Data access provider transfers authentication information to identity service provider.	Data access provider	Identity service provider	[not relevant]
1.4	Inform final customer of credential check results	Data access provider communicates validation result and provides a meaningful indication in case of an invalid request.	Data access provider	Final customer	[not relevant]
1.5	Link final customer and metering point	Final customer finds out metering point id to request data for.	Data access provider	Final customer	A – Metering point identification
1.6	Request data	Final customer specifies the requested data.	Final customer	Data access provider	C - Metered data request
1.7	Validate request at data access provider	The data access provider validates the specified metered data request and provides a meaningful indication in case of an invalid request.	Data access provider	Final customer	D - Request validation information
1.8	Forward request to metered data administrator for validation	Check if the specification of the requested data in terms of time, scope, accessibility etc. is acceptable.	Data access provider	Metered data administrator	C - Metered data request

(?) Business Process Model and Notation 2.0: <https://www.omg.org/spec/BPMN/2.0.2/PDF>.



1.9	Validate specified request at metered data administrator	The metered data administrator validates the specified metered data request.	Metered data administrator	Data access provider	D - Request validation information
1.10	Inform final customer about validation results	If the input is not valid, a meaningful message should indicate the reason.	Data access provider	Final customer	D - Request validation information
1.11	Notify metered data administrator	Metered data request needs to be notified in order to provide the requested data package.	Data access provider	Metered data administrator	C - Metered data request
1.12	Transfer data	Final customers receive without undue delay the requested data.	Metered data administrator	Final customer	E - Validated historical data

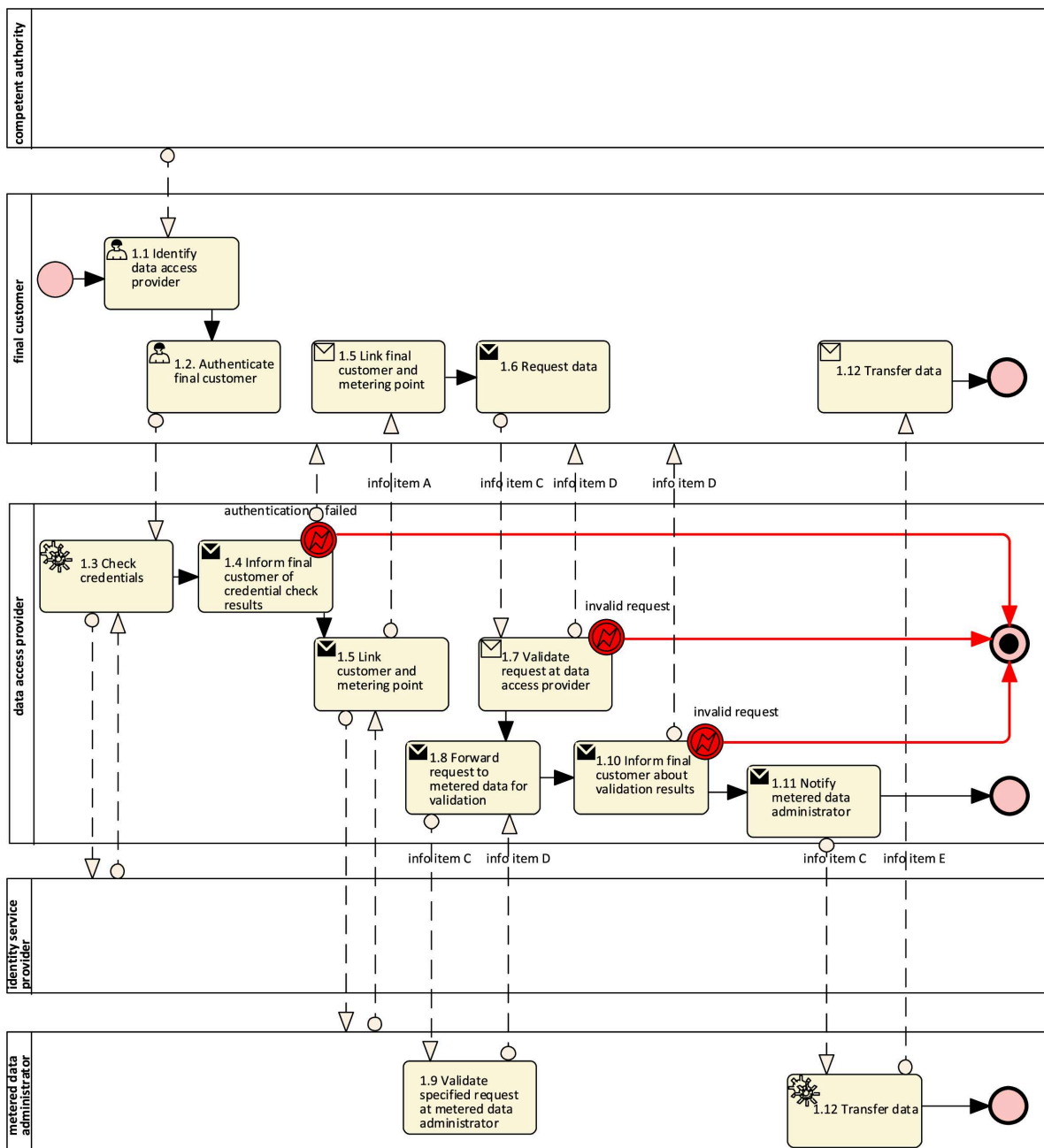


Diagram 1 – Procedure ‘Access to validated historical metering and consumption data by the final customer’

Table III.2

**Procedure 2**

<i>Procedure name</i>		Access to validated historical metering and consumption data by an eligible party			
<i>Step No</i>	<i>Step</i>	<i>Step description</i>	<i>Information producer</i>	<i>Information receiver</i>	<i>Information exchanged (IDs)</i>
2.1	Identify permission administrator	Final customers identify the permission administrator that is responsible for their metering points under consideration.	Competent authority	Final customer	[not relevant]
2.2	Identify eligible party	Final customers identify the eligible party to which they intend to make data available.	[not relevant]	Final customer	[not relevant]
2.3	Preset permission details	Specification of data needed by the eligible party. Optional (but broadly available) means for specifying data needed (for example through a click on a 'share my data'-button) in order to avoid that the final customer has to do complex inputs.	Eligible party	Permission administrator	G - Preset permission information
2.4	Authenticate final customer	Final customers identify themselves to the permission administrator.	Final customer	Permission administrator	[not relevant]
2.5	Check credentials	Permission administrator transfers authentication information to identity service provider.	Permission administrator	Identity service provider	[not relevant]
2.6	Inform final customer of credential check results	Permission administrator communicates validation result and provides a meaningful indication in case of an invalid request.	Permission administrator	Final customer	[not relevant]
2.7	Link final customer and metering point	Final customer finds out metering point id to request data for.	Permission administrator	Final customer	A – Metering point identification
2.8	Specify attributes of permission	Final customers specify the data they intend to make available and confirm their permission to the permission administrator. This can also be assisted by pre-specified permission requests coming from the eligible party through step 2.3.	Final customer	Permission administrator	H - Basic permission information
2.9	Validate specified permission request at permission administrator	The permission administrator validates the specified permission request and provides a meaningful indication in case of an invalid request.	Permission administrator	Final customer	D - Request validation information

2.10	Forward permission request to metered data administrator for validation	If applicable, check if the specification of the requested data in terms of time, scope, accessibility, entitlement, etc. is acceptable.	Permission administrator	Metered data administrator	H - Basic permission information
2.11	Validate specified permission request at metered data administrator	If applicable, the metered data administrator validates the specified permission request.	Metered data administrator	Permission administrator	D - Request validation information
2.12	Inform final customer about validation result	If the input is not valid, a meaningful message should indicate the reason.	Permission administrator	Final customer	D - Request validation information
2.13	Store permission	Permission administrator stores the permission, together with a unique identifier for reference and a timestamp indicating the creation.	Permission administrator	Permission administrator	I – Established permission information
2.14	Notify final customer	The permission administrator informs the final customer that the permission has been established.	Permission administrator	Final customer	I – Established permission information
2.15	Notify eligible party	The permission administrator informs the eligible party that the permission has been established.	Permission administrator	Eligible party	I – Established permission information
2.16	Notify metered data administrator	Optional step. The permission administrator informs the metered data administrator that the permission has been established.	Permission administrator	Metered data administrator	I – Established permission information
2.17	Transfer already available data	Data is transferred from the metered data administrator as specified in the permission either until the requested reading end point or the current timestamp (for instances where the requested reading end point is in the future) to the eligible party. Note: Characteristics for the trigger of the transfer of that sort of data shall be mapped against this step.	[not relevant]	[not relevant]	[not relevant]

2.18	Transfer of data that gets available in the future	For intervals that are not currently available but will be in a future point in time – but also covered by the permission – the respective data is transferred from the metered data administrator using the indication defined by the attribute 'Transmission schedule' of information object described in Table IV. Note: Characteristics for the trigger of the transfer of that sort of data shall be mapped against this step.	[not relevant]	[not relevant]	[not relevant]
2.19	Transfer data	Data is actually being transferred to the eligible party. Note: Communication approach (for example 'pull via REST API', 'push via message-based communication'), prerequisites and characteristics of the actual transfer shall be mapped in this step.	Metered data administrator	Eligible party	F - Validated historical data with final customer information

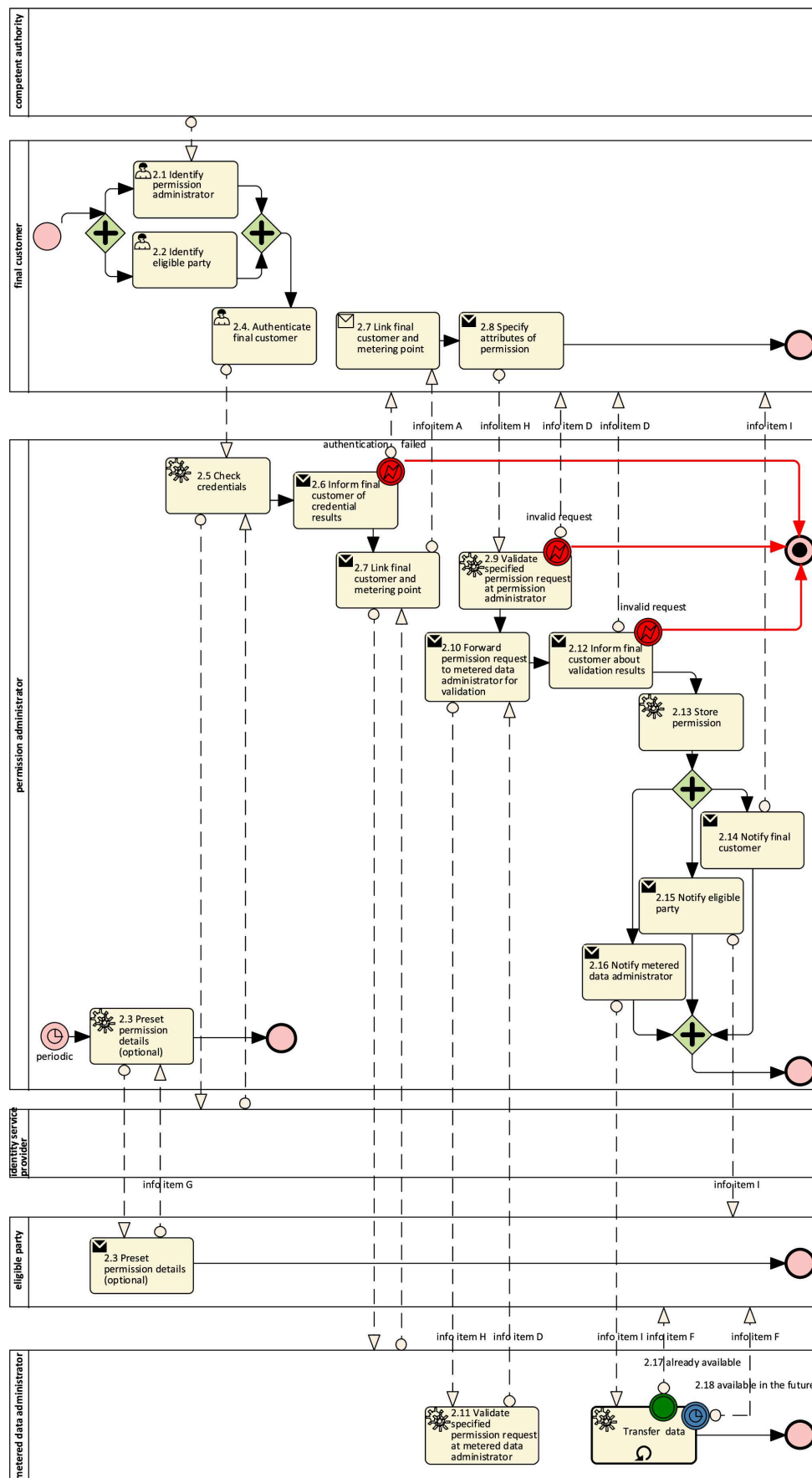


Diagram 2 – Procedure ‘Access to validated historical metering and consumption data by an eligible party’

Table III.3

**Procedure 3**

Procedure name		Termination of service by an eligible party			
Step No	Step	Step description	Information producer	Information receiver	Information exchanged (IDs)
3.1	Trigger termination of permission	Eligible party considers the service or purpose referred by the permission terminated.	Eligible party	-	[not relevant]
3.2	Execute permission end tasks	The eligible party shall perform all tasks required to fulfil its related responsibilities immediately and without undue delay and in accordance with Regulation (EU) 2016/679.	Eligible party	-	[not relevant]
3.3	Notify permission administrator	The eligible party immediately and without unnecessary delay shall inform the permission administrator.	Eligible party	Permission administrator	J – Notification of termination of service
3.4	Notify final customer	The permission administrator makes available the information that the permission has been revoked to the final customer.	Permission administrator	Final customer	J – Notification of termination of service
3.5	Notify metered data administrator	The permission administrator forwards the respective notification to the metered data administrator.	Permission administrator	Metered data administrator	J – Notification of termination of service
3.6	End of data sharing	The metered data administrator stops transferring data to the eligible party.	Metered data administrator	Eligible party	J – Notification of termination of service

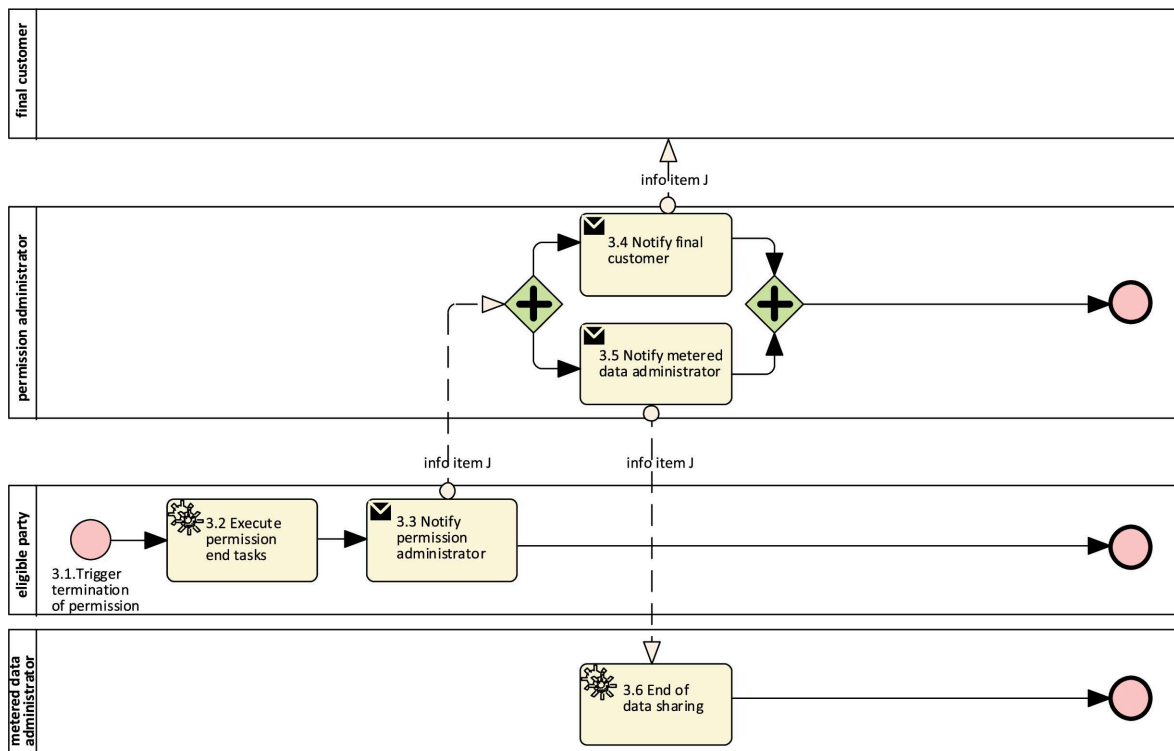


Diagram 3 – Procedure ‘Termination of service by an eligible party’

Table III.4

**Procedure 4**

<i>Procedure name</i>		Revocation of an active permission by the final customer			
<i>Step No</i>	<i>Step</i>	<i>Step description</i>	<i>Information producer</i>	<i>Information receiver</i>	<i>Information exchanged (IDs)</i>
4.1	Identify permission administrator	Final customers identify the permission administrator that is responsible for their metering points under consideration.	Competent authority	Final customer	[not relevant]
4.2	Authenticate final customer	Final customers identify themselves to the permission administrator.	Final customer	Permission administrator	[not relevant]
4.3	Check credentials	Permission administrator transfers authentication information to identity service provider.	Permission administrator	Identity service provider	[not relevant]
4.4	Inform final customer of credential check results	Permission administrator communicates validation result and provide a meaningful indication in case of an invalid request.	Permission administrator	Final customer	[not relevant]
4.5	List of permissions	Permission administrator makes available to the final customer a list of active and expired permissions he has previously given	Permission administrator	Final customer	I – Established permission information
4.6	Trigger permission revocation (explicit)	The final customer indicates to the permission administrator which permission shall be revoked.	Final customer	Permission administrator	I – Established permission information
4.7	Receive change of metering point entitlement (implicit)	External reasons (for example, a move-out) lead to an invalidation of the entitlement of a final customer to a metering point. The metering point administrator informs the metered data administrator about these events.	Metering point administrator	Metered data administrator	[not relevant]
4.8	Notify permission administrator	Metered data administrator informs the permission administrator about the necessity to revoke all permissions for the metering point.	Metered data administrator	Permission administrator	I – Established permission information
4.9	Notify metered data administrator	The permission administrator informs the metered data administrator about the revocation.	Permission administrator	Metered data administrator	I – Established permission information
4.10	End data sharing	The metered data administrator must not transfer data under the scope of the revoked permission anymore.	Metered data administrator	[not relevant]	[not relevant]

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4.11	Notify eligible party	The permission administrator must inform the affected eligible party immediately and without unnecessary delay.	Permission administrator	Eligible party	I – Established permission information
4.12	Execute permission end tasks	The eligible party performs all tasks required to fulfil its related responsibilities immediately and without undue delay and in accordance with Regulation (EU) 2016/679.	Eligible party	[not relevant]	[not relevant]
4.13	Notify final customer	The permission administrator makes available the information that the permission has been revoked to the final customer.	Permission administrator	Customer	I – Established permission information



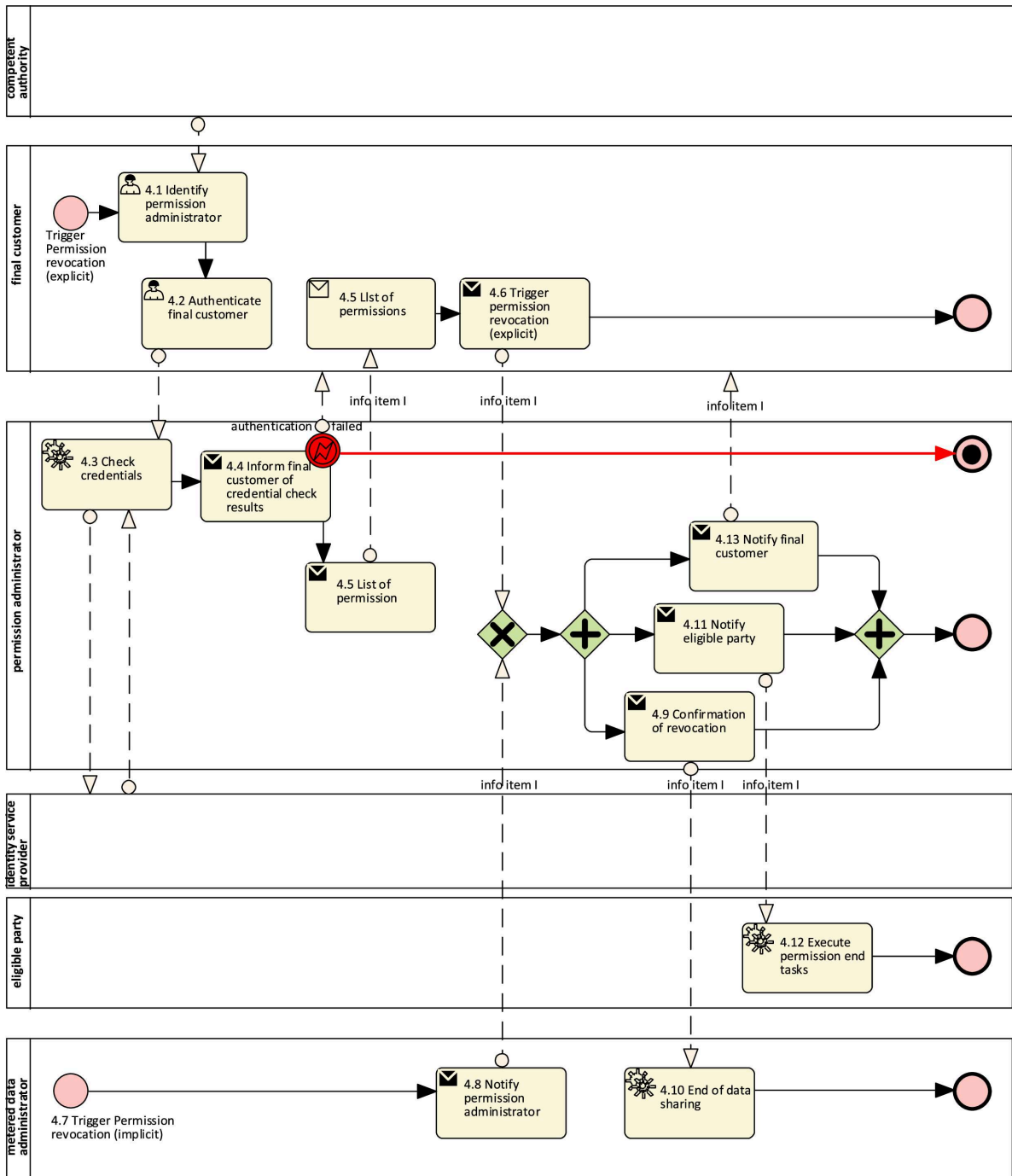


Diagram 4 - Procedure 'Revocation of an active permission by the final customer'

Table III.5

**Procedure 5**

*Procedure name*                      Activate near real-time data flow from smart meter or smart metering system (where applicable)

<i>Step No</i>	<i>Step</i>	<i>Step description</i>	<i>Information producer</i>	<i>Information receiver</i>	<i>Information exchanged (IDs)</i>
5.1	Identify meter operator	Final customer finds out contact information for responsible party to activate data flow.	Competent authority	Final customer	[not relevant]
5.2	Final customer requests near real-time data flow to be turned on	Final customer sends meter operator the necessary information to make data flow accessible.	Final customer	Meter operator	M – Data flow activation request
5.3	Provide meter credentials	Meter operator sends the final customer all information necessary to consume and/or decrypt data flowing out of the meter.	Meter operator	Final customer	N – Confirmation of data flow activation

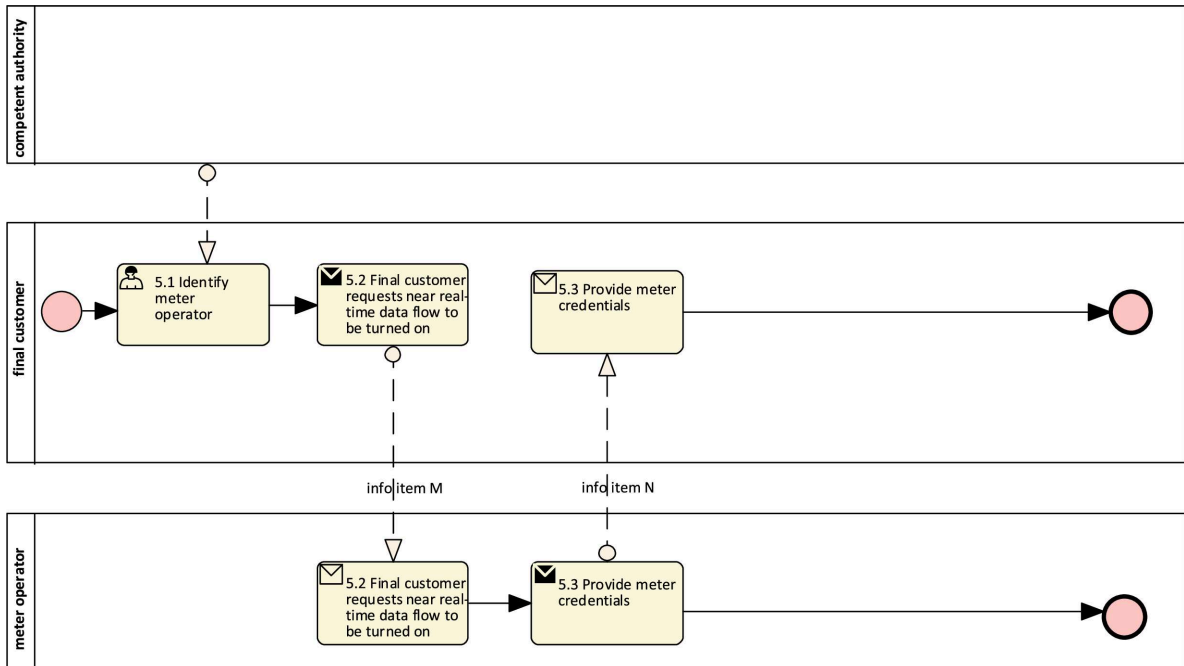


Diagram 5 - Procedure 'Activate near real-time data flow from smart meter or smart metering system'

Table III.6

**Procedure 6**

Procedure name		Read near real-time data from smart meter or smart metering system			
Step No	Step	Step description	Information producer	Information receiver	Information exchanged (IDs)
6.1	Connect near real-time data consumption system to meter	If applicable, final customer connects near real-time data consumption system with near real-time interface and provides credentials or certificates as defined by national procedures.	Final customer	[not relevant]	[not relevant]
6.2	Transfer data through near real-time interface	Push or pull data through meter's (local or remote) near real-time data interface.	Smart meter or smart metering system	Near real-time data consumption system	O – Raw meter data
6.3	Interpret data	Near real-time data consumption system processes the data that was received in the previous step. If required, it de-crypts the data using the cipher provided by the meter operator in step 5.3. It is recommended that at the end of step 6.3, attributes of information object P must be available in a form that can easily be used in the follow-up processes. When mapping this step, it is not enough to refer to a standard - descriptions of all necessary steps must be provided exhaustively. Note: Further use, processing or transfer of process-able meter data is not part of this reference model.	Near real-time data consumption system	Near real-time data consumption system	P – Processable meter data

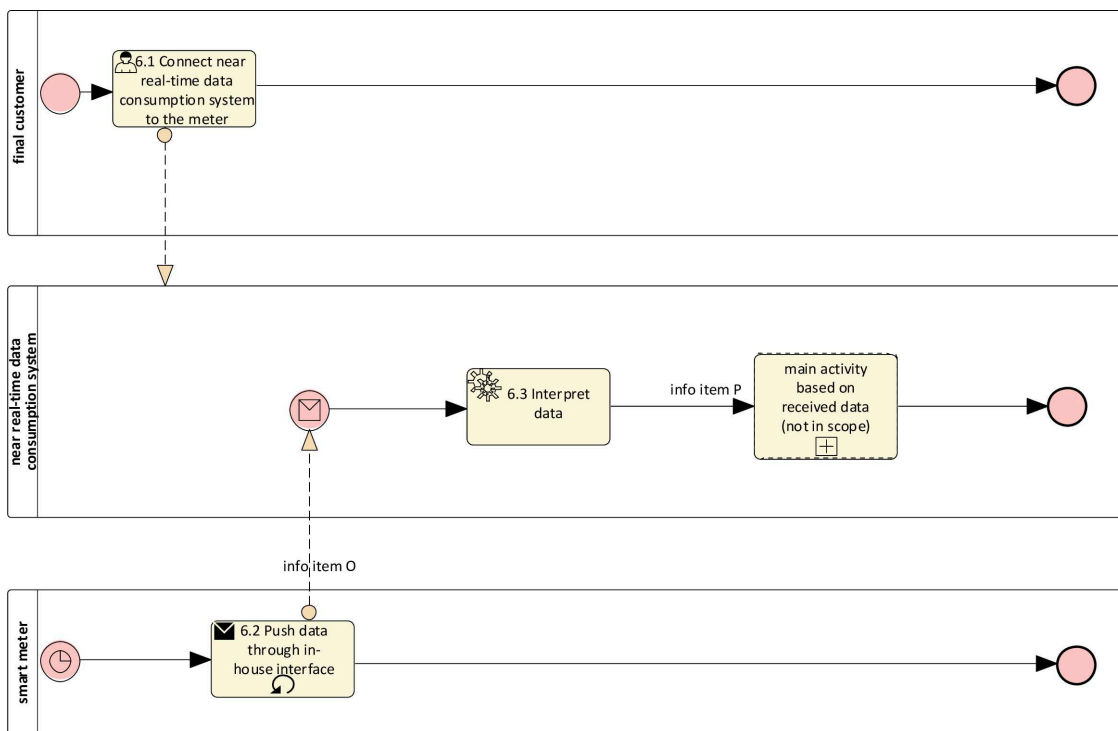


Diagram 6 – Procedure ‘Read near real-time data from smart meter or smart metering system’

Table IV

**Information objects exchanged**

<i>Information exchanged, ID</i>	<i>Name of information</i>	<i>Description of information exchanged</i>	
A	Metering point identification	Metering point identifier	Unique identifier for the metering point within the metered data administrator's meter identification space.
B	Metered data specification	Reading start timestamp	Start of the time interval covered by the data package.
		Reading end timestamp	End of the time interval covered by the data package.
		Direction	Flow direction metered by the metering point. This can be either solely production, consumption, or combined.
		Energy product	Energy product measured by the metering point (for example, active energy, re-active energy).
C	Metered data request	Metering point identifier	Unique identifier for the metering point within the metered data administrator's meter identification space.
		Metered data specification	Information object B– Metered data specification
D	Request validation information	Validation result	Information about the outcome of the validation step.
E	Validated historical data	<i>Meta information</i>	
		Metering point identifier	Unique identifier for the metering point within the metered data administrator's meter identification space.
		Creation timestamp	Timestamp when the data package has been generated.
		Energy product	Energy product measured by the metering point (for example, active energy, re-active energy).
		Reading start timestamp	Start timestamp of the time series.
		Reading end timestamp	End timestamp of the time series.
		Unit of measure	The measurement unit in which the quantities in field 'Quantity' have been stated.

*Time series information (once per interval in reading)*

		Start timestamp	Start timestamp of interval.
		End timestamp	End timestamp of interval.
		Direction	Flow direction metered by the metering point. This can either be production, consumption or combined.
		Quality of reading	Indication of the quality of the interval reading (for instance, based on the fact that the value is metered or estimated).
		Quantity	Volume consumed or generated.
F	Validated historical data with final customer information	Validated historical data	Information object E – Validated historical data
		Final customer	Information that allows the eligible party to potentially verify that it gets the data for the correct final customer.
G	Preset permission information	Eligible party	Eligible party for which the permission has been given.
		Metering point identifier	Optional. Unique identifier for the metering point within the metered data administrator's meter identification space.
		Metered data specification	Information object B– Metered data specification
		Purpose	The specified, explicit and legitimate purpose for which the eligible party intends to process the data. For non-personal data this is optional.
		Transmission schedule	For future data covered by the permission, but not available at the time the permission is established, the periodicity - when and how often - data packages are to be made available where applicable.
		Permission limit timestamp	The timestamp by which the eligible party has to delete the received data, even if the processing purpose is not fulfilled by then.

H	Basic permission information	Final customer	Final customer that has given the permission.
		Eligible party	Eligible party for which the permission has been given.
		Metered data request	Information object C– Metered data request
		Purpose	The specified explicit and legitimate purpose for which data is processed. For non-personal data this is optional.
		Transmission schedule	For future data covered by the permission, but not available at the time the permission is established, the periodicity - when and how often - data packages are to be made available where applicable (for example, in data exchange scenarios where data is pushed rather than requested).
I	Established permission information	Permission identifier	A unique identifier of the permission.
		Creation timestamp	Creation timestamp the permission administrator has attached to the permission.
		Basic permission information	Information object H– Permission information
J	Notification of termination of service	Permission identifier	A unique identifier of the permission referring to information object I – Established permission information.
		Termination timestamp	Timestamp indicating the point in time when the service is considered terminated by the eligible party.
K	Details of information on listed permission	Details of the permission	Attributes of the permission as described in I – Established permission information.
		Reason for the end of permission	If permission is not active anymore, the reason for why the permission administrator considers the permission has ended. For instance, this can indicate fulfilment of purpose, reach of permission end timestamp, revocation of final customer or termination by the eligible party.
		Permission end timestamp	If permission is not active anymore, the timestamp since when the permission administrator considers the permission as ended
L	Revocation notification by permission administrator	Permission identifier	A unique identifier of the permission referring to information object I – Established permission information.
		Permission end timestamp	Timestamp for when the revocation should be considered active.

M	Data flow activation request	Meter identifier	Identifier for the metering device or the metering point required by the meter operator to identify the correct meter.
		Other required information	Listing of all other attributes needed by the meter operator to enable the data flow.
N	Confirmation of data flow activation	Physical connectivity	Information on the physical interface of the meter and how to connect external devices.
		Cipher	Mandatory, if a cipher is needed to de-crypt the flow of information
		Credentials	Mandatory, if credentials are needed to access the smart meter interface.
		Other required information	Listing of all other attributes needed by the meter operator to enable the data flow and interpret it semantically.
O	Raw meter data	Data package	List of attributes in the received raw data. If a reference to a standard is provided here in the mappings of national practices, this standard must be publicly available in an easily accessible form or free of charge. Otherwise, all elements of the respective data package must be listed and mapped.
P	Process-able meter data (attributes described are a minimum – other data items may also be provided and documented if available in national settings)	Meter data timestamp	Time of data capture as regarded by the smart meter or smart metering system.
		Active import power value	Instantaneous forward active power P+ (in W)
		Active import power unit of measure	-
		Active export power value	Instantaneous reverse active power P- (in W)
		Active export power unit of measure	-
		Import active energy A+	Forward active energy A+ (in Wh)
		Import active energy A+ unit of measure	-
		Export active energy	Reverse active energy A- (in Wh)
Export active energy unit of measure	-		