Approved by Decision No. 53-1/2025 of the Management Board of Elering AS dated 01.07.2025

Data Exchange Requirements for the Client's Electrical Installation

Valid from 31.07.2025

Table of Contents

1 Introduction and General Provisions

1.1 This guide establishes the requirements for measurement, status, and control signals (hereinafter also referred to as the data volume) transmitted by the transmission system operator and the client, as well as the conditions that the transmitted information must meet. The guide shall be applied together with the standard terms and conditions for connecting to the electricity transmission system of Elering AS (hereinafter the Connection Conditions).

1.2 Measurement, status, and control signals shall be exchanged between the client's electrical installation and the primary and backup control centres of the transmission system operator (hereinafter referred to collectively as *the energy system control centre*).

1.3 The data communication connection used by the client and the generator connected to the distribution network (hereinafter referred to jointly or separately as the client) for communication with the transmission system operator's SCADA system must comply with the EVS-EN 60870-5-104 standard. To control the client's equipment and transmit data, the client must install a separate remote terminal unit (RTU) with a communication protocol compatible with the transmission system operator's SCADA communication protocol. Data exchange between the client's RTU and the transmission system operator's RTU is not permitted.

2 Real-Time Information

2.1 Real-time measurements, control commands for generating units, and position signals must be transmitted from the client's electrical installation, generating unit, and/or generating unit connected to the client's power network to the energy system control centre in accordance with the data volume table form provided in the guide "Requirements for Data Exchange Related to the Electrical Installations of Clients" (hereinafter the Data Volume Table). When applying the Data Volume Table to the electrical installation to be connected, factors such as the direction of electricity flow at the connection point, the installed capacity, and the type of generating unit must also be taken into account.

2.2 The transmission system operator has the right to add additional data objects to the Data Volume Table during the performance of the connection contract, in the course of approving the electrical design documentation, only if the addition of such data objects is technically justified, does not result in unreasonable costs for the client, and is strictly necessary to ensure the security of supply of the system.

2.3 All position signals must be given directly from the auxiliary contacts of the primary devices, without using auxiliary relays, as so-called *double-contact signals*.

2.4 The wind speed transmitted by a wind power plant to the energy system control centre may, by agreement, consist of a single measurement, a set of individual measurements, or an average of wind speed measurements from the wind power plant. Each individual measurement must be taken from the height of the wind turbine nacelle above ground, either from a separate meteorological mast or from the electric wind turbine itself.

2.5 If a wind power plant connected to the transmission grid is dispersed in groups across several different geographical areas, but has a single connection point to the transmission grid power network, then real-time active load and meteorological measurements, as set out in section 2.6, must be transmitted separately for each group of wind turbines. The measurement set shall include at least the group's total active power (MW), wind speed (m/s), and wind direction (in degrees) for each geographically separated group. A dispersed wind power plant refers to a situation where the plant consists of several groups of wind turbines located at such a geographical distance from each other that wind conditions at a given moment differ statistically significantly between groups.

2.6 Meteorological measurements transmitted by a wind power plant to the energy system control centre must additionally meet the following requirements regarding the measurement location:

2.6.1 Wind speed and direction must be measured at the height of the wind turbine nacelle;

2.6.2 Ambient air temperature must be measured at ground level.

2.7 The solar irradiance (W/m^2) transmitted by a solar plant to the power system control centre may, by agreement, consist of a single measurement, a set of individual measurements, or an average of solar irradiance measurements from the solar plant.

2.8 If a solar plant connected to the transmission grid is dispersed in groups across several different geographical areas, but has a single connection point to the transmission grid power network, real-time active load and meteorological telemetry measurements must be transmitted separately for each group of the solar plant. The measurement set shall include at least the group's total active power (MW), solar irradiance (W/m^2), and ambient air temperature (in degrees °C) for each geographically separated group. A dispersed solar plant refers to a situation where the plant consists of several groups of inverters located at such a geographical distance from each other that solar irradiance conditions at a given moment differ statistically significantly between groups.

3 Requirements for the Communication Connection and Rules for Its Establishment

3.1 For the purposes of this document, a communication connection is a set of equipment and data communication channels that enables data exchange between the energy system control centres and the client's RTU.

3.2 The client must establish the communication connection using an IPSec-based Virtual Private Network (VPN). The client's equipment shall not be connected to the transmission system operator's computer networks, and the client's communication connections shall not be routed through the transmission system operator's data communications networks.

3.3 The communication link must be configured in such a way that queries to the client's devices are permitted from at least four (4) IP subnets of the transmission system operator, of which two (2) originate from one IPSec VPN connection and two (2) from another separate IPSec VPN connection.

3.4 The RTU configuration must support four (4) simultaneous logical connections (EVS-EN 60870-5-104, Section 10, *Redundant connection*, N=4). N=4).

3.5 If the communication connection fails, the transmission system operator shall have the right to disconnect the client's circuit breaker(s) at the point of consumption if the client's equipment causes disturbances or emergency operation in the power system. The requirements for the operational reliability of the communication connection are set out in section 3.6.

3.6 The operational reliability the client's communication connections must be at least 0.9836 (allowing for a maximum of 144 hours of downtime per year), and any single communication interruption must not exceed 16 hours.

3.6.1 The IPSec VPN tunnel of the communication connection must not disconnect more than once in 24 hours.

3.6.2 The *Average Round Trip Time* between the transmission system operator's SCADA and the client's devices (RTU, etc.) must be below 100 ms.

3.6.3 The *Average Bandwidth* of the communication connection between the transmission system operator's SCADA and the client's devices (RTU, etc.) in both directions (*Uplink* ja *Downlink*) must be at least 1 Mbps.

3.6.4 The *Average Packet Loss* on the communication connection between the transmission system operator's SCADA and the client's devices (RTU, etc.) must be less than 1%.

3.6.5 The *Jitter* of packets on the communication connection between the transmission system operator's SCADA and the client's devices (RTU, etc.) must be less than 50 ms.

3.7 The electrical design documentation of the communication solution must include the following information on the communication connection: the schematic diagram of the communication connection for the electrical installation and an explanatory memorandum containing at least the following data:

3.7.1 The static IP address of the client's VPN concentrator;

3.7.2 The IP addresses of all devices (RTU, etc.) polled by the transmission system operator's SCADA, as provided and approved by the transmission system operator;

3.7.3 An explanation (with diagrams if necessary) of how the client ensures the availability requirements specified in section 3.6.

4 Procedure for Opening the Communication Connection

4.1 The communication connection shall be opened according to the following procedure:

4.1.1 The client shall submit a communication solution design containing the data specified in section 3.7, which shall be approved as part of the electrical design documentation;

4.1.2 Following the approval of the project, the client shall submit a request to open the communication connection to the transmission system operator's connection project manager, or in the case of generating units connected to the distribution network, to the e-mail address kliendihaldur@elering.ee, at least seven (7) working days before the desired connection date. The request to establish the communication connection shall include the client's contact person for data communications, the name of the site, and the desired date for establishing the data communications;

4.1.3 Within five (5) working days, the transmission system operator shall provide the client with a document containing the parameters required for configuring the VPN tunnel;

4.1.4 Once the client has configured their communication equipment, the client shall agree on a date for communication connection testing with the connection project manager at least one (1) working day in advance. Upon successful testing, the data communication connection shall be considered established.

4.2 The client's final Data Volume Table must be approved as part of the electrical design documentation before the start of data volume testing.

4.3 The exact start time of the testing shall be agreed with the transmission system operator's IT department at least three (3) working days in advance.

5 Measurement Accuracy

5.1 The calculated total margin of error for measurements transmitted to the energy system control centre (P, Q, I, U) must remain below 1%. To ensure this, the client must provide instrument transformers in their installation that meet the required accuracy specifications.

5.2 The measuring error of the client's generating unit control system must remain below 1%. The client must use measurements for the control of the generating unit that are as close as possible to the connection point (preferably at the same voltage class).

5.3 The measurement ranges for transmitted frequency, current, and voltage values shall be specified during the approval of the electrical design documentation.

5.4 The client's RTU must exchange data volumes with the energy system control centre with a time-stamping accuracy equal to or better than ±20 ms (with a resolution of 1 ms).

6 Other Information

6.1 The client must submit to the transmission system operator all schedule-related active power outages and curtailments in accordance with Article 46 of COMMISSION REGULATION (EU) 2017/1485, using the data exchange format required by the transmission system operator.

7 Volume of Signals Transmitted from Clients' Electrical Installations to the Energy System Control Centre

7.1 The volume of signals transmitted from generating units connected to distribution networks to the energy system control centre is provided in Appendices 1 to 3 of this guide:

7.1.2 Appendix 1 – Data volume table for Type B generating modules to be connected to the distribution system;

7.1.3 Appendix 2 – Data volume table for Type C generating modules to be connected to the distribution system;

7.1.4 Appendix 3 – Data volume table for Type D generating modules to be connected to the distribution system.

7.2 The volume of signals transmitted to the energy system control centre from electrical installations connected to the transmission system operator's network is set out in Appendices 4 and 5 of this guide:

7.2.1 Appendix 4 – Data volume table for generating units to be connected to the transmission system;

7.2.2 Appendix 5 – Data volume table for a consumer to be connected to the transmission grid and the signal volume of a distribution system operator.