



Dynamic Line Rating solution implementation and support

## **Technical specification**

General part

## Content

<b>1. Definitions .....</b>	<b>3</b>
<b>2. Object of purchase .....</b>	<b>4</b>
<b>3. Scope of the purchase .....</b>	<b>4</b>
<b>4. Place of performance of contractual obligations .....</b>	<b>4</b>
<b>5. Requirements for the purchase scope .....</b>	<b>4</b>
5.1 Current situation .....	4
5.2 Description of the scope of the purchase .....	5
<b>6. Contract implementation and documentation to be provided .....</b>	<b>7</b>
<b>7. Commitments regarding access to data and facilities.....</b>	<b>8</b>
<b>8. Annexes.....</b>	<b>8</b>

## 1. Definitions

AD	Active Directory
Contractor (or Seller)	as defined in the Contract
DR	Disaster Recovery
EMS	Energy Management System
IPA	Application Programming Interface
ITIL	Information Technology Infrastructure Library
IT	Information Technology
OHL	Over Head Line
OT	Operation Technology
PS	Power System
PSSE	Power System Simulation for Engineering
Purchaser (or Litgrid)	as defined in the Contract
RPO	Recovery Point Objective
RTO	Recovery Time Objective
SAT	Site acceptance test
SCADA	Supervisory control and data acquisition system
Services	as defined in the Contract
SIEM	Security Information and Event Management system
SSO	Single sign-on authentication
TSO	Transmission system operator

## 2. Object of purchase

Implement the Dynamic Line Rating (hereinafter - DLR) solution into Lithuanian power grid and DLR solution support.

## 3. Scope of the purchase

- 1) DLR system implementation:
  - a. DLR software installation and configuration.
  - b. DLR solution integration with SCADA and operational planning systems.
  - c. Staff training.
- 2) Sensors.
- 3) DLR system maintenance and support.
- 4) Additional DLR system development services.

## 4. Place of performance of contractual obligations

Services are to be provided at Purchaser's premises (Karlo Gustavo Emilio Manerheimo g. 8, Vilnius, Lithuania) or remotely by prior agreement.

## 5. Requirements for the purchase scope

### 5.1 Current situation

Currently, Lithuania's electricity energy grid has 30 renewable energy parks integrated (27 wind parks and 3 solar park) which total installed capacity reach approximately 1,5 GW. In fact, that Lithuania's power system most of the time is in deficit and about 30-60% of electricity is imported from neighbouring countries, these amounts of renewables did not cause any major problems on the grid.

In 2023 Lithuania's government has taken decision to move forward with renewables and until 2030 to become independent from electricity import and produce all necessary electricity locally from renewables.

According to new legalization and ambitious plans, during 2023-2024 TSO received a lot of new requests to integrate renewables to the grid. It is estimated that by the end of 2030 total installed capacity of renewables could reach 9GW. These significant amounts of new renewables will definitely have a huge impact to transmission grid reliability; therefore, it is necessary to implement new advanced technologies which could allow to manage all these amounts of energy in real time process in most efficient way.

Litgrid has implemented pilot DLR project in 2023 where were tested DLR solutions on several power lines. Based on the pilot project results it was decided to implement DLR into Lithuania power grid.

## 5.2 Description of the scope of the purchase

Purchaser is procuring DLR solution implemented by Contractor which calculates load capacities for power lines based on weather data. The solution must utilize at least temperature and wind in its calculations.

The Contractor shall perform DLR solution implementation in accordance with the requirements set out in this Technical Specification and its annexes.

### 5.2.1 DLR system implementation

#### 5.2.1.1 DLR software installation and configuration

DLR solution consists of a software-based application that calculates DLR values for Litgrid's power lines and physical sensors installed on selected power lines (hereinafter – System or DLR system).

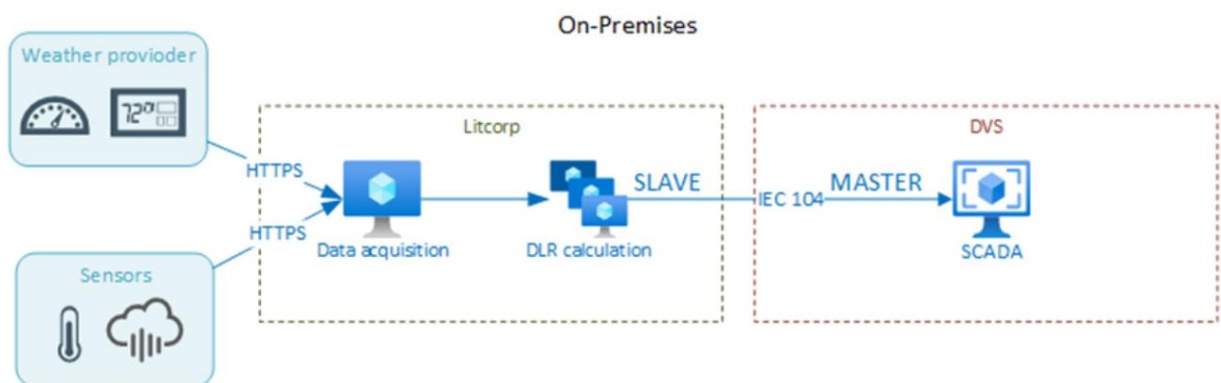
The weather data, combined with the line type based physical line parameters should be then used to calculate the permanent applicable transmission loading values as amperes.

Target is to start to use the System within 38 power lines (24 – 110kV, 14 – 330kV; approximately 1507 km). 13 power lines (of 38 in total) should be sensor-based (with physical sensors), the remaining 25 power lines should be sensor-less (without physical sensors):

- Sensor-based: 327 km of 110 kV power lines (13 power lines).
- Sensor-less: 1180 km (972 km – 330kV and 208 km – 110kV) power lines (25 power lines).

Details of the power lines (profiles, columns high and coordinates, conductor type, diameter, static rating) constitute confidential information and will be provided upon request and submission of signed Commitment of Confidentiality (according to Annex X to the Special Procurement Conditions) only to tender participants whose applications are not rejected after they are invited to submit Initial tenders.

The proposed System must be installed on premises at Purchaser servers.



The contractor shall perform DLR system implementation in accordance with the requirements set out in Annex I.

#### 5.2.1.2 DLR solution integration with SCADA and operational planning systems

DLR solution must be integrated with the Litgrid systems:

- 1) SCADA/EMS (real-time).
- 2) PSS ODMS/PSS E (planning).

The Contractor shall perform DLR system integration in accordance with the requirements set out in Annex I.

#### 5.2.1.3 Staff training

The Contractor must perform training for application regular users, super/power users and administrators, and training for sensors installation.

The Contractor shall perform staff training in accordance with the requirements set out in chapter 7 of Annex I.

#### 5.2.2 Sensors

The Contractor must provide sensors for the installation on power lines. Approximate number of sensors is 41. Exact number will be decided during the negotiation phase based on the proposed solutions.

Requirements for the sensors are set out in chapter 6 of Annex I.

Installation of the sensors will be performed by Purchaser sub-contractors, and it is not a scope of this Contract. Sensors will be installed on power line during the outage, therefore sensors' delivery dates must be communicated and coordinated with Purchaser in advance. The general sensors delivery and installation plan need to be provided and coordinated with Purchaser until the 1st of October for next year period (to reserve necessary outages in Y-1 outages planning process). If this deadline is missed, then not later than 90 days before first sensor delivery. The general sensors delivery and installation plan need to be revised and updated (if necessary) once a month until 5th of current month.

During the Contract implementation Purchaser may acquire additional sensors from the Contractor. The maximum number of additional sensors is 15.

#### 5.2.3 DLR solution maintenance and support

The Contractor shall have support and maintenance services available.

The Contractor shall perform maintenance and support services in accordance with the requirements set out in chapter 8 of Annex I.

#### 5.2.4 Additional DLR solution development services

During the performance of the Contract, the Purchaser shall be entitled to place orders for additional System development services related to introduction of additional power grid lines into the System, sensors relocation and other System development works, up to a total volume of 500 working hours. Each time the Purchaser identifies a need for potential additional development services, the Contractor shall be obliged to

prepare an estimate for the additional development services with the required number of working hours based on the volume of the potential order received. The Purchaser will have the right to accept the estimate and to order the additional development work.

There should be a possibility to include up to 5 additional power lines into DLR system under Purchaser request during contract implementation. The Contractor must extend software licensing, maintenance and support for those additional power lines.

## 6. Contract implementation and documentation to be provided

DLR solution implementation can be divided in several phases:

1. **Specification/preparation:** Purchaser provides the necessary input data. The Contractor will analyse the power lines' data, identify critical spans, define sensors' locations and prepare technical solution for the DLR system implementation. This study must be provided to Purchaser within 40 working days from the Contract signature.
2. **Implementation:** The Contractor configures the System in Purchaser's test environment. Integration with Purchaser's systems is performed. The Contractor delivers physical sensors and integrates them into the System after they are installed on power lines by Purchaser.
3. **Testing:** Purpose of tests phase is to verify that the System delivered by the Contractor meets all functional and non-functional requirements specified by the Purchaser. Testing is requiring close cooperation between Contractor and Purchaser. Both the Contractor and the Purchaser will provide dedicated teams with the necessary competences to perform all the work required in the tests. A positive result of the SAT is necessary for commissioning of the System and start of the trial operation.
4. **Go Live:** The System will be transferred to production use at Litgrid.
5. **Trial operation:** There should be at least 1 month period for the System trial operation. As part of the trial operation, an availability test should be performed. A positive result of the trial operation and availability test is necessary for acceptance of the System by the Purchaser and signing the Deed.
6. **Maintenance and support:** The Contractor provides support and maintenance.

The Contractor must provide a project implementation plan with a detailed schedule (necessary tasks, durations, resources), identified risks and its mitigation plans for the Purchaser approval in 10 calendar days from the contract signature.

The Contractor will prepare and agree minutes of meetings with the Contractor within 5 working days of the meeting.

Documentation provided by the Contractor:

- Power lines analysis (study) document;
- Testing documentation (tests plans, protocols, reports, etc.);
- System user/administrator manuals;
- Sensor's data sheets, installation and user manuals;
- Training material;

- Minutes and reports.

The documents must be prepared in English language, .pdf or other mutually agreed format.

## 7. Commitments regarding access to data and facilities

7.1 The Purchaser undertakes to provide the Contractor with the necessary information to enable it to fulfil its contractual obligations. The information to be provided includes:

- The necessary input data for the power grid lines study/analyses and software configuration (e.g. conductor type, diameter, min/max current).

7.2 The Purchaser undertakes to the Contractor during the performance of the Services to:

- provide the necessary access for the Services implementation.
- provide an opportunity to use the necessary facilities.

7.3 The Contractor undertakes to perform the Services and supply the goods specified in the Technical Specification and to provide the documentation referred to in chapter 6 of Technical Specification during the period of performance of the Contract.

## 8. Annexes

Annex I -Technical requirements

Annex II - Minimum information security requirements for the provision of services