

# Technical specification

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Development of long-term maintenance concept of main equipment of Latvenergo AS combined heat and power plant TPP-2, assistance during procurement of service contracts for main equipment.

## 1. General

The main objective of this specification is to develop long term maintenance strategy of main equipment of Latvenergo AS combined heat and power plant (CHP) Rīga TPP-2 (Riga Thermal Power Plant No.2) and to assist with signing of a contract(s) with the potential maintenance Contractors to assure safe, effective, sustainable, and competitive functioning of the equipment in power system and open electricity market.

The main activities of project are:

- development of main equipment maintenance strategy for next 10 years;
- assistance with the procurement of long term maintenance contracts for main equipment of TPP-2 (gas turbines and steam turbines).

The Consultant shall perform the Technical advisory Services for development of the above concept and assistance for procurement of the long term maintenance contract(s) for combined heat and power plant TPP-2 up to it's signature, considering that Latvenergo AS acts as public service provider under Latvian Public Service Procurement Law.

## 2. Existing situation description

### 2.1. Latvenergo in brief

Latvenergo AS is an Energy Supply Company, owned by the Ministry of Economics of Latvia and active in the:

- Generation of electricity and thermal energy;
- Trade in electricity/natural gas in the Baltic States.

The Latvenergo Group has approximately 3300 Employees, with about 1300 working for AS "Latvenergo".

The Latvenergo Group as an integrated energy utility is engaged in:

- Generation of electricity and thermal energy;
- Distribution;
- Natural gas market (for companies and households);
- Provision of telecommunication and information technology services.

Latvenergo Group has a balanced and environmentally friendly energy generation portfolio, consisting mostly of hydropower plants and highly efficient combined heat and power plants. Most of the electricity and thermal energy is generated by the two combined heat and power plants (TPP-1 and TPP-2) and three Daugava hydropower plants (HPPs) of Latvenergo AS. Energy is also generated by smaller facilities like CHP of Liepājas enerģija SIA, Aiviekste HPP and Ainaži Wind Power Plant (WPP) as well as several other renewable projects. The total installed electrical capacity at the Group's generation facilities is 2606 MW and the thermal capacity is 1793 MW. In 2022, approximately 3822 GWh of electricity and 1777 GWh of thermal energy were generated.

## 2.2. Existing cogeneration plants in brief

The upgraded CHPs of Latvenergo AS are mostly operated in highly efficient cogeneration mode according to the thermal energy demand which in turn depends on weather conditions and the duration of the district heating season as well as competition with other heat production facilities in Riga city (mostly utilising biomass combustion). Electricity generation at the CHPs is also influenced by market (Nord Pool) conditions like electricity and thermal energy demand and price for natural gas and CO2 allowances.

Operation of Latvenergo AS CHPs can be flexibly adjusted to the electricity market conditions and guarantees a significant baseload electricity capacity for Latvia, also contributing to provision of reserve and balancing capacities. Both CHPPs can cover Latvian electricity consumption almost completely in circumstances where, due to certain factors, electricity imports from foreign countries are limited. In 2022, both CHP plants played a very important role in meeting the demand for electricity, as dry weather conditions significantly reduced the water energy output both in Latvia and throughout the Nord Pool market region, and capacity shortages were observed in regional interconnections. In the reporting year, the CHPs generated about 1.1 TWh of electricity, which was 40% lower than comparing with previous year due to high natural gas prices.

The amount of thermal energy generated by TPP-1 and TPP-2 in 2022 was 1.5 TWh, a 15% decrease compared to the previous year. The drop was due to warmer weather conditions as well as due to the increase in competition in the thermal energy market: four new heat producers now operate in the thermal energy zones of Latvenergo AS. The thermal energy generated is sold to Riga heat energy utility *Rīgas siltums AS* at regulated tariffs and on weekly bid basis.

## 2.3. TPP-2 in brief

TPP-2	
Start of operations	1973

Electrical capacity	832 MW (in cogeneration mode) 881 MW (in condensation mode)
Thermal capacity	1124 MW (including 5x heat only boilers)
Energy source	natural gas

Construction of two completely new power units was carried out from 2006 to 2013 (Unit-1 started commercial operation in 2009 and Unit-2 in 2013). Since then, electricity is produced by both new units only. Currently, TPP-2 is the most efficient and advanced combined-cycle power plant in the Baltics. Two combined-cycle gas turbine units and five heat-only boilers are operated at the plant.

In 2022, CHPP-2 generated 1012 GWh of electricity and 881 GWh of thermal energy.

The gas turbine technology is based on General Electric PG9371FB (alternative name 9FB) turbine with sole fuel natural gas, equipped with 2-pole synchronous hydrogen cooled generator. Both gas turbines are upgraded by Opflex Autotune to achieve automatic adjustment of combustion process at variable gas composition as well as to achieve lower part load turndown ratio. Both gas turbines utilise Mark VIe control system. The manufacturer of the gas turbine is General Electric.

The steam turbine for TPP-2 Unit-1 is designed for 3000 rpm with two controlled extractions for district heating and with vertical exhaust to condenser, equipped with 2-pole air cooled synchronous generator. The steam turbine utilises ABB Advant control system. The manufacturer of the steam turbine is Skoda Doosan.

The steam turbine for TPP-2 Unit-2 is designed for 3000 rpm with three controlled extractions for district heating and with vertical exhaust to condenser, equipped with 2-pole air cooled synchronous generator. The steam turbine is of modular design combining several standardised steam turbine components (WK 80/100, HNG 71/63, ENK 90/6,3). The steam turbine utilises Siemens T3000 control system. The manufacturer of the steam turbine is Siemens.

TPP-2 Unit-1 and Unit-2 can be operated in full condensing, full cogeneration, and any intermediate mode. In 2021 heat storage system has been built at TPP-2 to allow greater flexibility on the heat and electricity markets.

## 2.4. Existing Long-term Service and maintenance Agreements (LTSA)

TPP-2 has several LTSAs for Main equipment (maintenance is performed by OEMs of the equipment):

- Unit-1 LTSA. Covers operation support, planned maintenance of gas turbine (supply of parts and technical advisory services) and steam turbine (supply of parts and technical advisory services) with generators, as well as sets conditions for unplanned maintenance. This LTSA is to expire in December 2025.
- Unit-2 gas turbine LTSA. Covers operation support, planned maintenance (supply of parts, technical advisory services, and workforce) as well as covered unplanned maintenance (up to certain limits) and uncovered unplanned maintenance (sets conditions). Additionally, availability and performance

degradation of the gas turbine is covered. This LTSA is to expire in December 2025.

- Unit-2 steam turbine LTSA. Covers operation support as well as planned maintenance (technical advisory services). This LTSA is to expire in September 2025.

Latvenergo policy is to maintain insurance for the equipment of CHP plants (including machinery breakdown insurance).

### **3. Scope of services for the Consultant**

#### **3.1. Project Activity No1. (PA1) Development of TPP-2 main equipment Maintenance concept report for next 10 years, starting from the end of year 2025.**

- review the Latvenergo technical documentation;
- review of the existing Service and maintenance agreements;<sup>1</sup>
- meeting with Latvenergo personnel in Riga, visits to TPP-2 plant (1 visit up to 3 days excluding travelling);
- develop a detailed benefit and risk assessment of possible TPP-2 original equipment maintenance (OEM) service providers offers;
- evaluate the possible principles of organizing TPP-2 maintenance by other maintenance service providers (non-OEM);
- define 2-3 economically most efficient alternatives for maintenance agreements (including condition-based maintenance, transactional model);
- preparation of the preliminary Maintenance strategy report;
- review preliminary Maintenance strategy report with the Latvenergo (telco meeting);
- preparation of final Maintenance strategy report;
- presentation of final Maintenance strategy report to the Latvenergo (meeting in Riga - 1 visit up to 2 days excluding travelling)

Maintenance strategy report shall concern main equipment of the plant (gas and steam turbines with generators and it's auxiliary equipment). The goal of this strategy is to establish the most cost-efficient way to preserve the life time of the equipment and to keep equipment availability at a high level by reviewing the alternatives for main equipment maintenance and defining 2-3 economically most efficient alternatives for CHPs and consequently evaluating long term costs for each selected alternative. The alternatives should comprise following aspects – optimal scope of works and services, OEM only / non-OEM maintenance, planned maintenance versus condition-based maintenance, possible structure of LTSA payments, optimal duration of the contracts,

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<sup>1</sup> Note, existing Service and maintenance agreements are confidential, and the information contained therein shall be used solely for the purpose of the performing of the Contract obligation by Tenderer (Contractor)

transactional model etc. Advantages, disadvantages, and risks shall be described for each evaluated alternative. Forecasted approximate number of operating hours per year will be provided by Latvenergo to the Consultant.

The outcome of this Maintenance strategy report is to provide direct feedback to public procurement for extension of existing LTSAs.

### **3.2. Project Activity No.2 (PA2, OPTIONAL) Assistance during public procurement of TPP-2 LTSA for Gas turbines<sup>2</sup>**

- preparation of technical specification draft;
- review of technical specification draft (telco meeting with Latvenergo);
- preparation of final technical specification;
- assistance in preparation of Tender commercial and legal aspects (qualification criteria, evaluation criteria, etc.);
- participation in site visits with tenderer's, records of minutes of meeting of site visit (1 visit up to 3 days in Riga excluding travelling);
- reply to Tenderer's queries throughout the tendering procedure;
- evaluation of tenders and preparation of evaluation report;
- participation in contract negotiations, preparation of minutes of contract negotiation meetings (this is forecasted to take place as online meetings);
- Final statement to AS "Latvenergo" board before the Contract signing.

### **3.3. Project Activity No.2 (PA3, OPTIONAL) Assistance during public procurement of TPP-2 LTSA(s) for Steam turbines<sup>3</sup>**

- preparation of technical specification draft;
- review of technical specification draft (telco meeting with Latvenergo);
- preparation of final technical specification;
- assistance in preparation of Tender commercial and legal aspects (qualification criteria, evaluation criteria, etc.);
- participation in site visits with tenderer's, records of minutes of meeting of site visit (1 visit up to 3 days in Riga excluding travelling);
- reply to Tenderer's queries throughout the tendering procedure;
- evaluation of tenders and preparation of evaluation report;
- participation in contract negotiations, preparation of minutes of contract negotiation meetings (this is forecasted to take place as online meetings);
- Final statement to AS "Latvenergo" board before the Contract signing.

## **4. Timing of the activities**

For timing of the activities see attached time schedule.

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<sup>2</sup> If transactional model is recommended by PA1, PA2 is a take out option

<sup>3</sup> If transactional model is recommended by PA1, PA3 is a take out option