

**Technical specification for CBA and CBCA consultancy of 4<sup>th</sup> electricity offshore interconnection between Estonia and Latvia****Background**

The 4<sup>th</sup> Estonia and Latvia electricity interconnection project is development project to increase the capacity of the electricity transmission network between Estonia and Latvia, which is related to the implementation of the "National Energy and Climate Plans" developed by the Ministry of Climate and Energy in Latvia and "Sustainable Development Strategy of Latvia until 2030 and 2050" and the European Union energy package "Fit for 55" in all countries of European Union. Objective of the project is to increase power flows between the bidding zones of the Baltic States after the synchronization with continental Europe in 2025, ensuring the security and reliability of the electricity transmission network and power system energy supply.

4th electricity interconnection between Estonia and Latvia will have many benefits not only for Latvia and Estonia but to the whole Baltic Sea region as well:

- It would enable more efficient transmission of electricity to the markets that need it;
- more connections allow for a more secure network by mitigating risks of outages or third-party interference;
- the connection strengthens security of supply and enables further renewable energy integration in the region, which
  - affects the price of electricity in a positive way by reducing the difference of the price of electricity in Baltic countries;
  - would help reduce CO2 emissions in the region.
- It would add additional capability to exchange frequency reserves and other system services over HVAC links;

The interconnector is expected to be implemented as HVAC (high voltage alternative current) offshore solution with landing points in Latvia Ventspils region and in Estonia Saaremaa island. The technical solution of the interconnection is planned to find in the technical study, preparing by AS "Augstsprieguma tīkls" (hereinafter – AST) and Elering in 2025. The output of the technical study will be prefeasibility design (including the selection of the transmission voltage level, cable cross section, number and capacity of cable lines (most cost efficient and optimal solution) as well as possible cable routes corridors for selected technologies). After technical study, the preliminary costs of the interconnection, will be fixed and be used in the cost-benefit analysis (CBA), aimed by this technical requirements. Preliminary technical parameters are following:

- Technical transfer capacity of the interconnection 1000MW,
- High Voltage Alternative Current offshore cables technology
- Possible preliminary investment decision in 2029, and start of construction of supporting grid reinforcements and infrastructure;
- Completion 2033

**Aim of the procurement**

The aim of the procurement is for the Service Provider to prepare in collaboration with AST and Elering ("Contracting Parties" hereafter) Cost-Benefit Analysis (hereinafter – CBA) and proposal on Cross-Border Cost Allocation (CBCA) on 4<sup>th</sup> electricity interconnection project between Latvia and Estonia

(hereinafter – 4.EE-LV interconnection). Contracting Parties procure the services of the Service provider to compile a CBA and CBCA proposal.

Taking into consideration that 4.EE-LV interconnection project has already gone through the PCI assessment and has been listed in the PCI list, it is likely that the Contracting Parties wish to submit an Investment Request in future to the relevant regulators, according to the Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure, amending Regulations (EC) No 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944, and repealing Regulation (EU) No 347/2013.

### **The scope of the service**

The scope is divided into three parts:

#### **1) Cost-Benefit Analysis (CBA)**

- a. A physical kick-Off meeting in either Estonia or Latvia in the premises of the Contracting Parties prepared by the Service Provider consisting of at least the following topics:
  - i. Introduction of team (physically available at the meeting the key persons of the Service Provider, travel cost covered by Service Provider)
  - ii. Introduction of approach to implement the CBA methodology (link: [https://acer.europa.eu/Recommendations/ACER\\_Recommendation\\_02-2023\\_CBCA.pdf](https://acer.europa.eu/Recommendations/ACER_Recommendation_02-2023_CBCA.pdf))
  - iii. By-weekly or agreed by Parties online meetings are held between the Contracting Parties and the Service Provider online on time suitable for all parties. and agreed in the Kick-off meeting.
- b. Market simulations
  - i. Compiling and doing market simulations on the **reference scenarios** (see also Annex 1. Scenario tree)
    1. The Service Provider compiles reference scenarios based on TYNDP. 2024 scenarios ('Distributed Energy' and 'Global Ambition') for years 2040 and 2050.
    2. The Service Provider presents the reference scenarios input data.
    3. Contracting Parties will review and accept the reference scenarios input data or submit additional questions/requests to the dataset.
    4. The Service Provider will perform market simulations with the approved dataset.
    5. The Service Provider submits and presents the simulation results to the Contracting Parties.
  - ii. Compiling and doing market simulations on the **sensitivity scenarios**
    1. The Contracting Parties after the reference scenario simulation results introduction will prepare a joint proposal with the help of the Service Provider during 15 working days unless agreed otherwise. The Contracting Party will budget one sensitivity scenario (DE+) and 3 sensitivity parameters, with an option to utilize additional sensitivity parameters for additional price. The sensitivities include:
      - a. Sensitivity scenario (DE+) where a **change of more than one input parameter** for the Nordic-Baltic market area based on

the Contracting Parties views from e.g. grid development plans or similar sources (variable might be, but not limited to different demand levels, generation units, interconnectors); or

- b. Change **not more than one** input parameter for the EU market area (variable might be, but not limited to CO2 prices, fuel prices). These changes will be made into either the DE or GA reference scenario.
  2. The Service Provider will perform simulations on the sensitivity scenarios.
  3. The Service Provider submits and presents the sensitivity scenarios simulation results.
  4. The Contracting Parties will comment on the simulation results.
- iii. The Service Provider will submit necessary data from the reference and sensitivity scenario for the network simulations from which to calculate network losses. Calculation will either be performed by the Contracting Parties and given as input for the CBA calculation or taken from TYNDP network simulations.
- iv. The Service Provider will submit the draft CBA introduction to the Contracting parties.
- v. The Contracting Parties will provide their feedback within 10 working days unless agreed otherwise.
- c. The Service Provider considers the Contracting Parties' comments for the simulations and draft CBA and submits final CBA to them.
- d. Compiling the CBA, and tables in ACER's CBCA recommendation (No 02/2023) Annex 1.
  - i. Calculations based on market simulations for relevant countries.
  - ii. Quantification of various costs and benefits like socioeconomic welfare, security of supply benefit, reserve sharing benefit, HVDC technical services, CO2 externalities, CAPEX, OPEX, cost of funding, WACC.
  - iii. Sensitivity on CAPEX and OPEX spread
  - iv. Output at least disaggregated per country and aggregated for whole project. Indicators at least 1) present value per cost and benefit type based on ACER's CBCA recommendation (No 02/2023) Annex IV, 2) IRR and 3) impact to tariff.
  - v. Qualitative storylines for three levels of regions:
    1. Estonia and Latvian project developers, society and other stakeholders;
    2. All the benefiting (or non-benefiting) countries that exceed 10% of the overall project benefit;
    3. The Baltic Sea region as a whole.

## **2) Compiling the Cross-Border Cost Allocation (CBCA) proposal**

- a. The Service Provider prepares a draft CBCA based on the CBA results, according to ACER's CBCA recommendation (No 02/2023).
- b. The Service Provider conducts a CBA results and CBCA workshop to the Contracting Parties

- i. The Contracting Parties will comment on the CBCA draft
- ii. The Service Provider takes into account the Contracting Parties' comments on the CBCA and submits edited CBCA for final feedback and approval
- iii. *Depending on the CBCA proposal, if a public or relevant authorities consultation is needed then the consultation for CBA and CBCA proposal will be held by the Contracting Parties which will last for one month. The Service Provider shall take the comments from the public consultation into account considering Contracting Parties guidelines.*

## **Methodology and limitations**

- 1) The Cost-Benefit Analysis (CBA) should fulfill the ACER recommendations<sup>1</sup>, follow ENTSO-E methodology<sup>2</sup> unless agreed otherwise, and be compliant with the Investment Request requirements.
  - a. Service Provider is responsible for the market simulations for the CBA while the Contracting Parties are responsible for providing data from network simulations in order to account for grid losses in the CBA.
  - b. **The CBA must analyze the societal benefit derived from the project by countries that are significantly impacted (threshold of 10 % of benefits)**, at minimum the Nordic and the Baltic countries.
  - c. The CBA must describe and rationalize the deviations from ACER recommendations and ENTSO-E methodology if such deviations exist.
- 2) Market simulation
  - a. The Service Provider shall submit a proposal for the 10 climate years (CYs) used in the modelling for the target years (TYs) 2040 and 2050 and for 10 samples.
    - i. Number of climate years to be used: 10
  - b. Security of supply benefit assessment methodology
    - i. There are two approaches to assessing security of supply benefits of the project depending on whether the reference scenarios are adequate
      1. If removing 4th interconnection between Estonia and Latvia from the reference grid (see Annex 1 Scenario tree) produces unserved energy in the grid, then security of supply benefits will be estimated after following Monte Carlo method from the ENTSOE CBA guideline<sup>3</sup>;
      2. If removing 4th interconnection between Estonia and Latvia from the reference grid does not produce any unserved energy, then a scenario with an extraordinarily long outage of the largest elements or a realistic crisis scenario is defined (instead of having a previously determined forced outage rates of these elements which correspond to business as usual situations).
    - ii. Security of Supply simulations need to be performed for TYNDP scenarios DE, GA and the "sensitivity scenario" which is based on ENTSO-E scenarios and updated for Baltic and/or Nordic region (see scenario tree in Annex)

<sup>1</sup> [https://acer.europa.eu/Recommendations/ACER\\_Recommendation\\_02-2023\\_CBCA.pdf](https://acer.europa.eu/Recommendations/ACER_Recommendation_02-2023_CBCA.pdf)

<sup>2</sup> [https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2024/CBA%204%20Guideline\\_v%202.0\\_for\\_EC\\_Approval\\_clean.pdf](https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2024/CBA%204%20Guideline_v%202.0_for_EC_Approval_clean.pdf)

<sup>3</sup> [https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2024/CBA%204%20Guideline\\_v%202.0\\_for\\_EC\\_Approval\\_clean.pdf](https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2024/CBA%204%20Guideline_v%202.0_for_EC_Approval_clean.pdf)

1. Both target years of 2040 and 2050
  2. The number of simulations per target year and scenario must enable a convergence of unserved energy in the model, but not more than a 100.
  3. Security of supply benefit calculation will take into account the energy not served and values of lost load of relevant countries
- c. Geographical scope should include at least the Baltic Sea Area countries (DE, DK, NO, SE, FI, EE, LV, LT, PL) with their respective bidding zones (onshore and offshore). The exchange between the listed countries and non-modelled countries could be simplified by fixing flows, price, or other approaches the Service Provider deems fit. The level of demand detail for the modelled countries should be on a bidding zone level. The generation assets
- i. in Estonia and Latvia should be modelled on a unit level for thermal power plants (over 100 MW, under 100 MW can be aggregated). Wind, solar and other capacity can be aggregated, but the capacity must be distributed to different climate zones (TYNDP PECD zones).
  - ii. For the rest of the countries can be aggregated into technological categories (based on fuel and/or other characteristics).
- d. Temporal resolution must enable a realistic dispatch of hydro reservoirs and hourly intermittency of renewables.

### **Inputs**

The Contracting Parties will provide:

- TYNDP 2024 Datasets available from: <https://2024.entsos-tyndp-scenarios.eu/#download> (Pan-European Market Modelling Database and Pan-European Climate Database). Further datasets might be available upon request from ENTSO-E and NDA might be required to be signed by the consultant and the project developers. It is foreseen, that the datasets available at the link would be sufficient for the work. .
- Updated project description after signing of the service contract
- Cost calculation inputs and sensitivities for the project and
  - CAPEX. The CAPEX figures shall be a range of +-10% for cost sensitivity
  - OPEX
  - WACC
  - interest rates
- Sensitivity analysis parameters
- Quantified network losses for the CBA
- Optional input if IR compilation is called: Feedback from public consultation

The Service Provider will provide:

- necessary data for network losses calculation
- any data gaps between TYNDP dataset and necessary data

### **Deliverables**

1. Cost-Benefit Analysis (CBA)

- 1.1. The simulation results include hourly generation, consumption and exchange patterns so that the Contracting Parties can conduct network simulations to calculate network losses, which will be used as input in the cost calculations in the Excel model.
  - 1.2. During the CBA phase of market simulations, the Service Provider will enable the Contracting Parties to access hourly simulation results for at least Estonia and Latvia in order to validate the merit order and realistic. The result files must include hourly demand, generator dispatch, bidding zone prices and flows between bidding zones.
  - 1.3. An Excel model with adjustable calculations, where all previously calculated and simulated data is gathered into a quantitative analysis showing projects discounted cash flows per countries including cost sensitivities.
  - 1.4. Storylines for three levels of regions impacted by the project.
2. Cross-border Cost Allocation (CBCA) proposal
    - 2.1. Based on the Financial Analysis and CBA the CBCA would propose investment cost allocation to the countries receiving the benefits described in the CBA.

### **Time schedule of the study**

The duration of the study will be a maximum of 7-8 months. The following timeline points shall be contractual milestones:

- 1) Milestone 1. The Service Provider submits and presents the market simulation reference scenario results to the Contracting Parties within 4 months after signing the contract.
- 2) Milestone 2. The Service provider submits the final CBA and CBCA proposal to the Contracting Parties within 8 months after contract signing.

### **Time schedule for Options of the contract are described in the "Instructions to Tenderers" p 15**

The Contracting Parties shall give a single set of comments to submitted models/documents within 10 working days unless agreed otherwise.

The Contracting Parties shall give a single set of sensitivity scenarios within 15 working days after presenting the reference simulation results unless agreed otherwise.

If the contracting parties do not comment on the submitted material within the foreseen timeframe this does not constitute an automatic approval of submitted materials.

The Contracting Parties have compiled a sample time schedule below. The Service Provider shall submit it's own time schedule taking into account the contractual milestones (see "Procurement Contract" clause 3.1)).

Annex 1.

Scenario tree:



