

Project 170 - Baltic synchronization

Based on geographical location and the feasibility studies carried out so far, the Baltic States are focusing on three main synchronising/desynchronising scenarios which are:

- Baltic States synchronous operation with continental Europe (HVAC Lithuania-Poland interconnector), and also soft coupling supported by existing HVDC-links;
- Baltic States synchronous operation with Nordic countries (HVAC Estonia-Finland), and also soft coupling supported by existing HVDC links;
- Baltic States isolated island operation, however soft coupling supported by HVDC links.

Classification	Future Project
Boundary	Baltics - Nordic - Continental Europe
PCI label	
Promoted by	AST;ELERING;LITGRID



Investments								
Investment ID	Description	GTC Contribution	Substation 1	Substation 2	Present Status	Commissioning Date	Evolution since TYNDP 2014	Evolution Driver
380	New single circuit 330kV OHL VAE-Kruonis.	100%	Visaginas (LT)	Kruonis (LT)	Under Consideration	2024	Delayed	Investment implementation time depends from decisions about new Visaginas NPP and project 170. Baltic synchronization".
382	New single circuit 330kV OHL (943 MVA, 50km).	100%	Vilnius (LT)	Neris (LT)	Planning	2024	Delayed	Investment implementation time depends from decisions about new Visaginas NPP and project 170. Baltic synchronization"
1004	internal reinforcement of Paide-Sindi 330kV overhead line	100%	Sindi	Paide	Cancelled	2025	Cancelled	we have developed an operational procedure to overcome the overloading issues, therefore the investment can be postponed
1010	Tartu (EE)-Valmiera (LV) 330 kV overhead line reconstruction	100%	Tartu	Valmiera	Under Consideration	2025	Rescheduled	Baltic States desinchronisation
1011	Reinforcement of Valmiera (LV) - Tsirguliina (EE) 330 kV crossborder overhead line	100%	Tsirguliina	Valmiera	Under Consideration	2025	Rescheduled	-
1012	Tartu-Balti 330 kV overhead line reinforcement	100%	Balti	Tartu	Planning	2024	Rescheduled	-

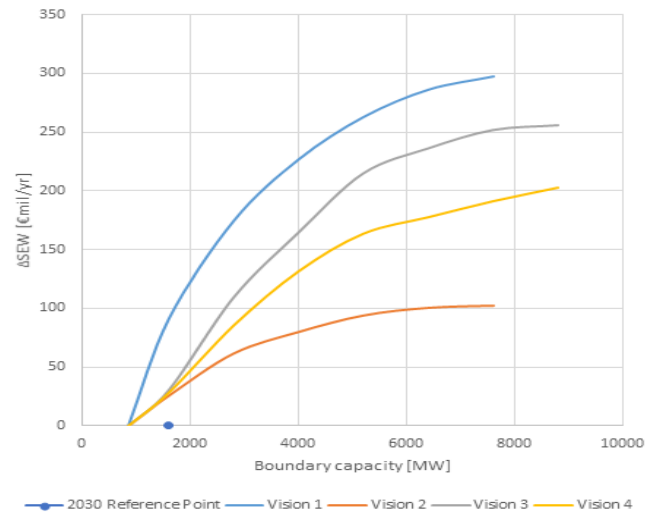
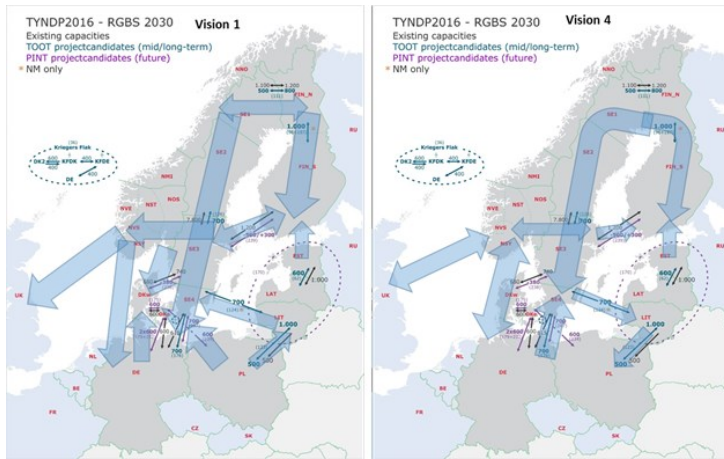
1013	internal reinforcement of Eesti-Tsirguliina 330kV overhead line	100%	Eesti	Tsirguliina	Planning	2025	Rescheduled	-
1034	New 400 kV interconnection line from substation in Lithuania to state border.	100%	New planned 400 kV Marijampole substation or existing 400 kV Aytus substation.	State border	Under Consideration	2031	New Investment	New line routing and implementation time depends from decisions for project 170. "Baltic synchronization".
1063	Investment increases transmission capacity within Baltic States	100%	TEC1	TEC2	Under Consideration	2025	Rescheduled	-
1064	The investment increases transmission capacity within Baltic States	100%	Viskali (LV)	Musa (LT)	Under Consideration	2025	Rescheduled	Commissioning date changed from 2030 to 2025, to avoid splitting project 170. "Baltic synchronisation" in two stages.
1065	Investment increases transmission capacity on border LT-LV	100%	Aizkraukle (LV)	Panevežys (LT)	Under Consideration	2025	Rescheduled	Commissioning date changed from 2030 to 2025, to avoid splitting project 170. "Baltic synchronisation" in two stages.
1117	B2B station in Narva connecting Estonia and Russia by existing 330 kV AC line	100%	Eesti		Planning	2024	New Investment	The investment is related to Baltic synchronisation cluster.
1118	Voltage stabiliser units (SVC), AGC systems; WAMS, WAMPAC systems; PSS units at power stations	100%	Eesti 330 kV		Planning	2024	New Investment	New investment

Additional Information

The power system of the Baltic States which includes Estonia, Latvia, Lithuania (Baltic Integrated Power System) currently is operating in parallel with the Integrated/Unified Power System (IPS/UPS) of Russia and Belarus. The Russian power system ensures primary power reserves for the frequency regulation and the secure system operation within BRELL (Belarus, Russia, Estonia, Latvia and Lithuania) ring.

Besides the interconnections with Russia and Belarus, the Baltic States have interconnectors with the Nordic countries via Finland (Estlink 1 and Estlink 2) and Sweden (NordBalt), and an interconnector to Poland towards Continental Europe. A common goal for the Baltic States is greater energy supply independence through the diversification of primary energy sources. Furthermore the integration of Latvia, Lithuania and Estonia within common EU energy market has been identified as a strategic priority for Baltic States in the previous Pan-European TYNDPs 2012 and 2014 and it is a strategic priority for all three countries.

Investment needs



Project Cost Benefit Analysis

This project has been assessed by ENTSO-E in line with the Cost Benefit Analysis methodology, approved by the EC in February 2015.

The indicators B6/B7 reflect particular technical system aspects of projects based on a summation of qualitative performance indicators, in line with the CBA methodology; these cannot be used as a proxy for the security of supply indicator.

General CBA Indicators

Delta GTC contribution (2020) [MW]	LT-PL: 0
	PL-LT: 0
Delta GTC contribution (2030) [MW]	LT-PL: 0
	PL-LT: 0
Capex Costs 2015 (M€) Source: Project Promoter	1069 ±200
Cost explanation	<p>Baltic synchronisation project high costs are because they covers a lot of new projects - new long 330 kV HVAC lines; DC convertor stations on borders with Russia, Belarussia and/or Kaliningrad area; internal grid reinforcements (e.g. Voltage stabiliser units, upgrades of PSS in power stations); internal 110 kV network reinforcement required for synchronization and separation of 110kV Baltic grid from IPS/UPS system; additional studies.</p> <p>High uncertainty range is because currently under investigation are 3 options of Baltic synchronisation (Baltic States synchronous with continental Europe, synchronous with Nordic countries, Baltics in island operation but soft coupling by HVDC), and each option would have different costs, and only first option has significant studies carried out yet.</p>

S1	NA
S2	NA
B6	+
B7	++

Scenario specific CBA indicators	EP2020	Vision 1	Vision 2	Vision 3	Vision 4
B1 SoS (MWh/yr)	N/A	N/A	N/A	N/A	N/A
B2 SEW (MEuros/yr)	N/A	N/A	N/A	N/A	N/A
B3 RES integration (GWh/yr)	N/A	N/A	N/A	N/A	N/A
B4 Losses (GWh/yr)	N/A	N/A	N/A	N/A	N/A
B4 Losses (MEuros/yr)	N/A	N/A	N/A	N/A	N/A
B5 CO2 Emissions (kT/year)	N/A	N/A	N/A	N/A	N/A

Because immaturity of project the CBA evaluation was not conducted.

As the accurate location and project scope are still under investigation, B4 indicator (impact on losses) was not assessed

Complementary information about the border on which the project is located	Vision 1	Vision 2	Vision 3	Vision 4
Average marginal cost difference in the reference case [€/MWh]	6.85	6.89	17.24	7.66
Standard deviation marginal cost difference in the reference case [€/MWh]	10.25	10.62	24.71	15.77
Reduction of marginal cost difference due to all mid-term and long-term projects [€/MWh]	9.87	9.56	11.56	8.50