National Resource Adequacy Assessment & Flexibility Needs Assessment of the Lithuanian power system for 2028-2035 – Public Report

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Executive Summary

Lithuania's power system is undergoing a major transformation, driven by rapid renewable deployment, synchronisation with Continental Europe, evolving interconnection patterns, and the progressive retirement of thermal dispatchable assets. In this context, the study combines a National Resource Adequacy Assessment and a Flexibility Needs Assessment over the 2028–2037 horizon, following ENTSO-E and ACER methodological principles to assess Lithuanian energy system adequacy and flexibility.

First, the Economic Viability Assessment indicates that wholesale energy market revenues alone are not sufficient to support new thermal generation or battery storage investments. In addition, only existing thermal units that do not require a lifetime extension remain economically viable (except combined cycle unit of the Elektrenai complex LE_KCB) over the 2028–2037 period, together with new explicit DSR potentials starting in 2033. The continued operation of plants requiring lifetime extensions, as well as LE_KCB, is not economically viable.

Relying on this mix of capacities, adequacy in the Central Scenario complies with the 8-hour criterion in 2028 - the average number of Loss of Load hours over the Monte-Carlo simulations is lower than 8 hours - but exceeds it from 2030 onwards. Adequacy events are concentrated in extreme scenarios driven by adverse weather conditions. Further sensitivities show that adequacy is highly sensitive to interconnection availability: short-term HVDC outages increase Expected Energy Not Served (EENS) by a factor of about 4 on average, while long-duration losses of NordBalt and Estlink lead to much larger deficits (around a factor of 30). To address these adequacy issues, remedial installation of thermal capacities proves effective, making it possible to meet the 8-hour criterion with 0.4 GW of new CCGT in the Central Scenario, 0.8 GW under short-term HVDC outages, and up to 2.6 GW in the Baltic region under long-term HVDC outages. These results highlight the importance of Baltic interconnection reliability, domestic thermal capacity and, where necessary, capacity remuneration mechanisms to bridge the gap between market viability and adequacy needs.

While RES capacities do not play a key role in Lithuanian adequacy, they are a key component in Lithuanian net position as soon as the Lithuanian electricity system is sufficient flexible to capture this variable generation. Based on the simulations handled, flexible capacities are able to handle RES curtailment, which remains moderate overall but increases by 2035 and becomes highly sensitive to interconnection availability. Flexibility needs are predominantly short-term and are mainly covered by interconnections, batteries and electrolysis, while thermal units play only a marginal role in RES integration. Additional large-scale storage investments considered are viable over the period, contributing to both flexibility and adequacy.

Overall, the results underline the need to coordinate adequacy measures, interconnection development, cost-efficient DSR, storage deployment and non-fossil flexibility development in order to support both security of supply and renewable integration.

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1 Introduction

Lithuania's electricity system is undergoing a profound transformation. Renewable capacity is expanding rapidly, synchronisation with Continental Europe has been completed, dispatchable assets face potential retirement, and regional balancing and market arrangements are evolving. These developments are changing the way security of supply and system flexibility need to be assessed over the coming decade.

A central feature of the Lithuanian power system is its strong interaction with neighbouring systems. Cross-border interconnections play an important role in meeting demand, integrating renewable generation and balancing the system across different timeframes. As a result, Lithuania's adequacy outlook depends not only on domestic generation, demand and storage developments, but also on the availability of interconnection capacity and regional market conditions.

Recent European adequacy assessments have identified medium-term adequacy concerns for Lithuania. These concerns may evolve with future infrastructure developments, including new interconnection projects and offshore wind deployment, but they also require a dedicated assessment of stressed operating conditions, including potential outages affecting major HVDC links such as NordBalt and Estlink.

Against this background, the present study combines a National Resource Adequacy Assessment (NRAA) and a Flexibility Needs Assessment (FNA). The NRAA evaluates whether available resources are sufficient to meet demand under a large range of scenarios. Prior to adequacy outcomes, it includes an Economic Viability Assessment to identify which generation; storage and explicit demand-side response capacities can recover their costs through energy-market revenues.

The FNA complements the adequacy analysis by assessing the system's ability to manage renewable surplus, residual-load variability and flexibility needs across different timeframes. It also considers the economic viability of additional storage capacities.

The combined assessment provides the analytical basis for evaluating Lithuania's security of supply, flexibility requirements and adaptation to increasing renewable penetration over the 2028-2037 horizon.

2 Methodology

The study relies on a common European power system modelling framework for both the NRAA and the FNA. This ensures consistency between the assessment of adequacy risks, flexibility needs and economic viability. The model represents generation, demand, storage, interconnections and flexibility assets at bidding-zone level, with additional Lithuanian-specific data provided by Litgrid where available.

The reference scenario is based on the ERAA 2025 dataset[1] and implemented in ***Artelys Crystal Super Grid***[2]. The model is calibrated against publicly available ERAA adequacy indicators, notably Expected Energy Not Served (EENS) and Loss of Load Hours (LOLH), to ensure consistency with the European adequacy framework.

[1] https://www.entsoe.eu/eraa/2025/reports&results/
[2] https://www.artelys.com/crystal/super-grid/

The model covers the ten-year period 2028-2037, with an explicit modelling of the target years 2028, 2030, 2033 and 2035. The geographical scope includes the European Union and neighbouring countries, represented at bidding-zone level. For Lithuania, Litgrid provided more granular inputs, enabling unit-level modelling of selected thermal units, hydropower units and battery storage, as well as assumptions on reserve capacity reservation and cross-border net transfer capacities.

2.1 National Resource Adequacy Assessment methodology

The NRAA follows ERAA 2025 methodology[3] starts with an Economic Viability Assessment (EVA), whose purpose is to determine whether existing and future generation, storage and explicit demand-side response (DSR) capacities can recover their costs through market revenues alone over the 2028–2037 period. **The EVA therefore defines the market-based reference capacity portfolio used in the adequacy assessment**.

The EVA follows a capacity-expansion workflow consistent with ERAA principles. Commissioning, decommissioning and lifetime-extension options are parametrised for existing gas-fired thermal units, selected lifetime extensions, new CCGT and OCGT investments, explicit DSR options differentiated by activation price, and battery storage. Each asset is represented through techno-economic parameters including CAPEX, fixed and variable operating costs, availability, technical constraints, fuel and CO_2 costs where relevant, and economic lifetime.

A **joint optimisation of European economic dispatch and capacity evolution** is then carried out for each target year. **It identifies cost-optimal commissioning, decommissioning and lifetime-extension decisions** under security-of-supply constraints. The mono-annual results are then processed to ensure consistency over the ten-year horizon and implementation constraints.

For the resulting portfolio, Net Present Values (NPV) are computed over 2028–2037. Revenues are based on wholesale electricity market revenues from hourly simulations, while costs include annualised CAPEX, fixed and variable operating costs, start-up costs, fuel costs and CO_2 costs where applicable. Reserve revenues are excluded, as the EVA focuses on energy-related capacities and Day-Ahead market revenues. Assets with negative NPVs are removed iteratively until a stable economically viable portfolio is obtained.

Based on the capacity mix resulting from the EVA, the **Resource Adequacy Assessment is performed using Monte Carlo simulations**. In the Central Scenario, 36 historical climate years are combined with 15 thermal forced-outage scenarios, resulting in **540 realisations for each target year**. This framework captures both climatic variability and stochastic outages. The main adequacy indicators are Expected Energy Not Served (EENS, GWh) and Loss of Load Hours (LOLH, h) assessed through mean, median, quartiles and dispersion metrics. Lithuania's security of supply is considered ensured when average LOLH remains below 8 hours per year.

The Central Scenario is complemented by sensitivity and remedial action scenarios, as depicted on Figure 1. **Sensitivities include short-term and long-duration interconnection outage cases**, labelled STRANS0 to STRANS3, as well as **reduced renewable deployment and electrification scenarios**, labelled SRES1 and SRES2. STRANS0 represents random short-term outages of NordBalt and Estlink, while STRANS1 to STRANS3 represent progressively more severe long-duration reductions of cross-border capacity. SRES1 and SRES2 explore slower renewable, storage and hydrogen deployment, with SRES2 also including lower electricity demand.

[3] https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/sdc-documents/ERAA/ERAA_2025_Annex2_Methodology_ENTSOEProposal_Dec2025.pdf

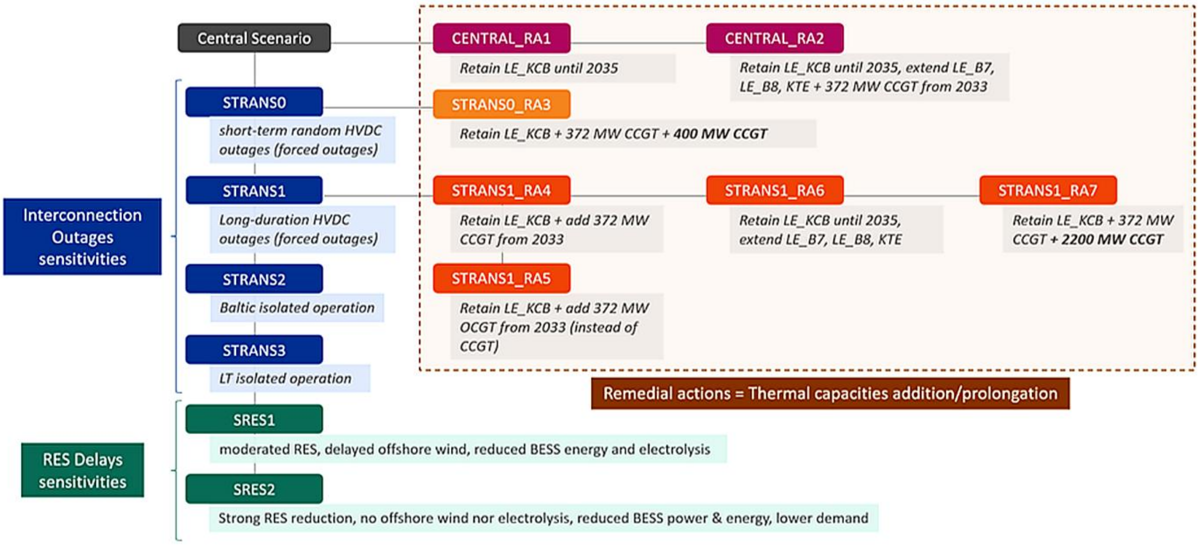

Figure 2-1 - Overview of Sensitivities and Remedial Actions scenarios

Remedial action scenarios assess whether retaining existing thermal units or adding new thermal capacity can mitigate adequacy concerns. They include LE_KCB retention, lifetime extension of LE_B7, LE_B8 and Kaunas TE, and additional CCGT or OCGT capacity. For computational reasons, sensitivities and remedial actions are assessed on a representative panel of 15 realisations selected from the full set of 540 realisations.

2.2 Flexibility Needs Assessment methodology

Based on ACER methodology[4] the FNA complements the adequacy assessment by **analysing the ability of the Lithuanian power system to integrate renewable generation and handle residual-load variability**. It is structured around three dimensions: RES curtailment, flexibility needs and contributions, and the economic viability of additional storage capacities. Simulations are performed on three weather scenarios consistent with the EVA and an average outage configuration, in line with the ACER methodology.

- **Renewable integration is assessed through annual RES curtailment**, expressed both in energy terms and as a share of total renewable generation. Curtailment profiles are also analysed to identify the periods in which surplus renewable generation is most likely to occur. The analysis relies on residual load, defined as fixed electricity demand minus solar, wind and run-of-river generation, to capture the timing and magnitude of system flexibility needs.
- **Flexibility needs are derived from variations in residual load over different timeframes**. The assessment distinguishes short-term needs, driven by hourly and daily variations, from longer-term variations. These indicators measure the magnitude of residual-load variability and help identify whether flexibility needs are mainly associated with daily or seasonal imbalances.
- **The contribution of different technologies is assessed by analysing how asset operation responds to residual-load variations**. The contribution of physical assets is assessed for interconnections, storage, electrolysis and thermal generation.

[4] www.acer.europa.eu/sites/default/files/documents/Individual%20Decisions_annex/ACER-Decision-05-2025-FNAM-Annex-I.pdf

Finally, the FNA assesses whether additional storage capacities are economically viable under the modelled market conditions. Based on joint optimisations of additional storage investments and the economic dispatch, the assessment considers short-duration battery storage options and a long-duration CAES (Compressed Air Energy Storage) option and identifies the additional storage capacities that would be cost-effective to deploy, together with their impact on RES curtailment.

3 National Resource Adequacy Assessment results

3.1 Economic Viability Assessment outcomes

The EVA results show that, under the assessed market conditions, **no new investments in thermal generation or battery storage are economically viable over the 2028-2037 horizon**. This reflects insufficient market revenues to cover investment costs, fixed operating costs and investor risk parameters under the current market framework.

Among existing thermal assets, the optimised and NPV-based process leads to the decommissioning of several units from 2028 onwards: LE_B7, LE_B8, Kaunas TE and LE_KCB. **Only a limited subset of thermal units remains economically viable over the horizon: Mazeikiai E TG1, Mazeikiai E TG2, Panevezio E TG1, Panevezio E TG2 and decentralised industrial units** (OtherNonRES).

The results also show that explicit DSR is economically viable only for the lowest-activation-cost options. The DSR options selected from 2033 onwards correspond to 1 MW at an activation price of €250/MWh, 19 MW at €500/MWh and 38 MW at €900/MWh. Higher-cost DSR options, including the €1500/MWh band, are not retained after the NPV assessment because their expected revenues are insufficient.

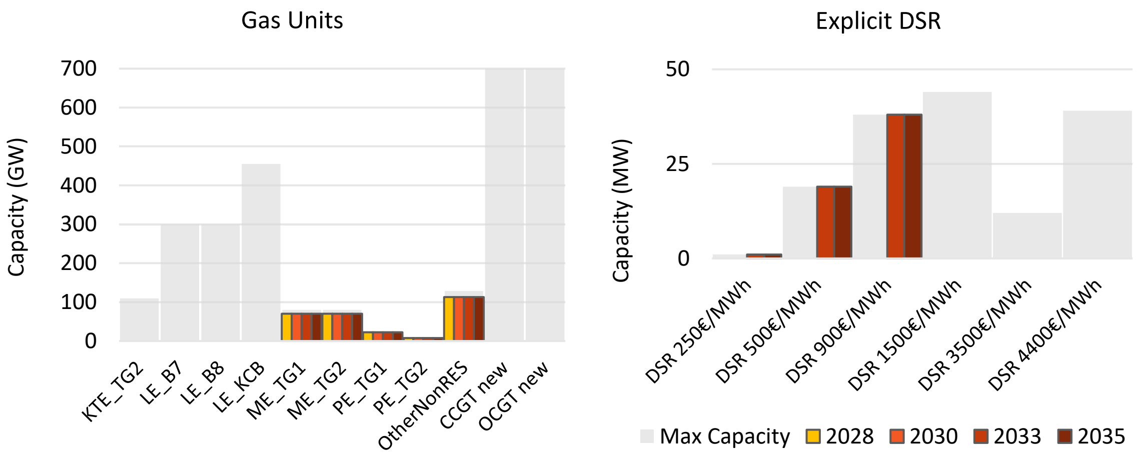

Figure 3-1 - Results from the Economic Viable Assessments for Gas Units (left) and Explicit DSR potentials (right)

Based on the EVA results, the Central Scenario is not a technical maximum-capacity case: it reflects a market-based capacity portfolio after the removal of assets that are not economically viable under energy-only revenues.

3.2 Central Scenario adequacy results

The Resource Adequacy Assessment of the Central Scenario shows **that the Lithuanian system remains adequate in 2028**, but adequacy metrics deteriorate from 2030 onwards. In 2028, the average

Loss of Load duration remains below the 8-hour reliability criterion, with average LOLH around 0.5 hours. **From 2030 onwards, the criterion is no longer met**, with average LOLH reaching 31.7 hours in 2030, 10.6 hours in 2033 and 20.9 hours in 2035.

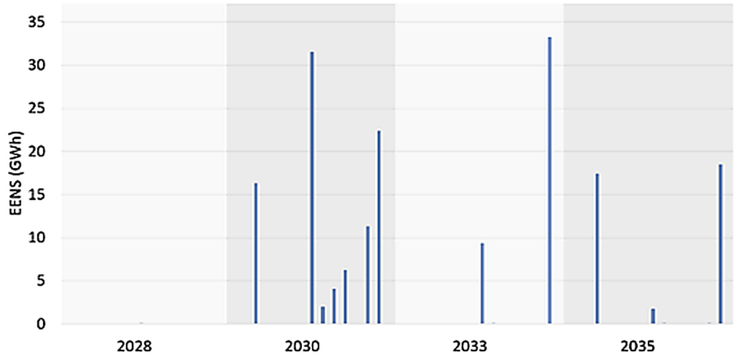

Figure 3-2 - EENS volumes in Lithuania for each of the 15 representative realisations in the Central scenario

The distribution of EENS across Monte Carlo realisations shows that **adequacy risks are concentrated in a limited number of adverse cases rather than spread evenly across all simulations**. Most realisations show very low or zero Expected Energy Not Served, while a limited set of adverse cases accounts for the bulk of the adequacy deficit, with EENS reaching around 50 GWh in some extreme situations over the 540 simulated.

These adverse cases are **primarily driven by weather conditions** combining high demand with low renewable generation, indicating the dominant role of climate variability in the Central Scenario. Forced-outage patterns have a more limited and less systematic impact. The year 2030 is the most exposed target year, with more than 25% of realisations exceeding 9 GWh of EENS.

Loss of Load events remain rare in 2028 but become more frequent from 2030 onwards. They are **mostly multi-hour events concentrated in stressful system periods**, with a maximum hourly Loss of Load of around 1,347 MW in 2033, equivalent to roughly one third of peak demand.

3.3 Key results of sensitivity analyses

The sensitivity analyses highlight that **interconnection capacity is the primary determinant of Lithuanian adequacy**. Any reduction in cross-border exchange capability leads to a deterioration of adequacy indicators, **increased reliance on domestic thermal generation, higher RES curtailment and a less favourable net position**.

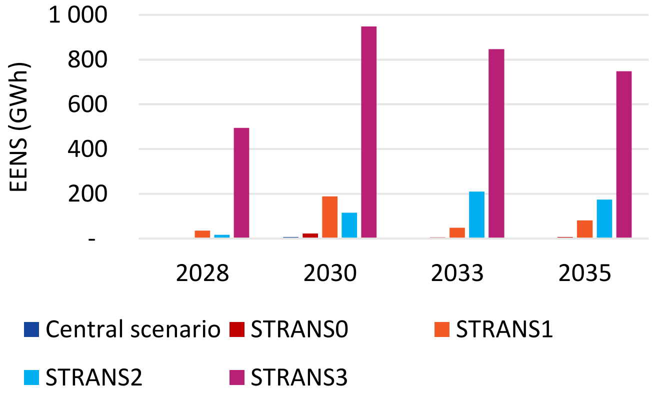

Figure 3-3 - Average EENS volumes in transmission outages sensitivities

Scenario STRANS0, which represents random short-term outages of NordBalt and Estlink HVDC links, leads to EENS and LOLH values significantly higher than in the Central Scenario, although still in the same order of magnitude. In 2030, average EENS increases from around 6 GWh in the Central Scenario to around 23 GWh under STRANS0. This shows that even **short-duration HVDC outages materially affect Lithuanian adequacy**.

Long-duration interconnection outage scenarios lead to a step change in adequacy risks. Under STRANS1, which simulates long duration HVDC outages, average EENS rises to 188 GWh in 2030 (30 times than in the Central Scenario). The stress further increases in STRANS2 (Baltic isolated operation) and STRANS3 (LT isolated operation), which represent progressively more constrained cross-border configurations. In the most severe case, STRANS3, the average EENS reaches up to 949 GWh in 2030 (5% of Lithuanian electricity demand). The difference between STRANS1 and STRANS2 also illustrates the value of the Lithuania-Poland reinforcement. From 2033 onwards, adequacy outcomes are more severe in STRANS2, where the reinforced LT-PL interconnection is not available. **This confirms the role of Harmony Link in reducing adequacy risks after its commissioning.**

The temporal analysis of Loss of Load profiles shows that long-duration HVDC outages affect both the frequency and severity of events. On the example of Figure 3-4, events are concentrated in winter, with 5–10 occurrences in STRANS1 versus a single event in the Central Scenario. Peak Loss of Load increases from around 500 MW (Central Scenario) to about 3,000 MW in STRANS1, driven by reduced HVDC transmission capacity.

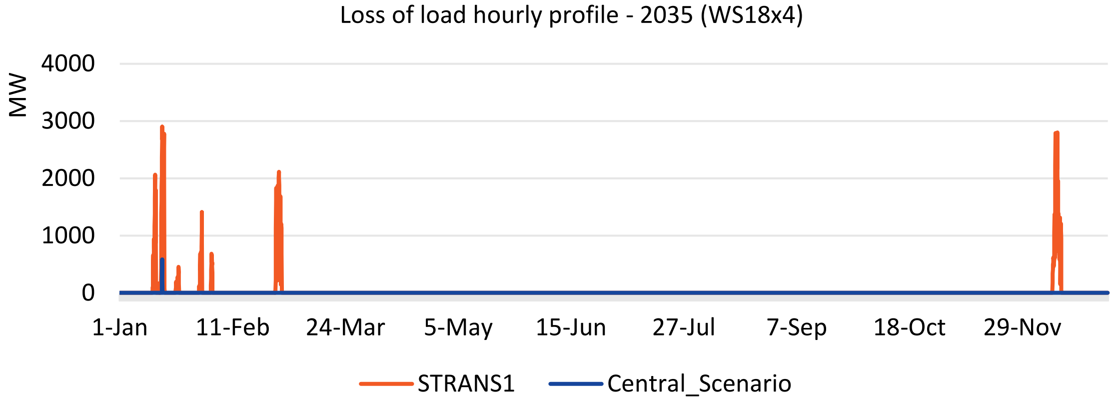

Figure 3-4 - Temporal Analysis on one Loss of Load profile

Renewable deployment sensitivities have a more limited effect on adequacy than interconnection assumptions. In SRES1 and SRES2, EENS remains close to the Central Scenario or even lower in some years, partly because the lower demand assumed in SRES2 offsets part of the reduction in renewable storage and RES deployment. However, **lower renewable deployment materially worsens the system balance: Lithuania becomes more structurally import-dependent and loses exportable renewable surplus**.

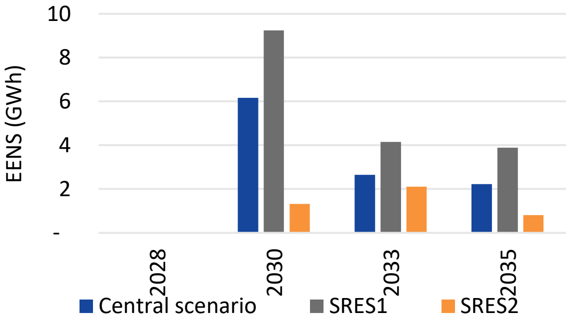

Figure 3-5 - Average EENS volumes in RES deployment sensitivities

3.4 Remedial action scenarios outcomes

The remedial action scenarios indicate that **retaining or adding domestic thermal capacity is an effective way to reduce adequacy shortfalls**. The improvement is broadly proportional to the amount of firm capacity added, but the required volume depends strongly on the severity of the interconnection stress.

In the Central Scenario, extending LE_KCB already reduces adequacy risks significantly, although it does not fully eliminate residual scarcity. CENTRAL_RA1 lowers average LOLH and brings third-quartile adequacy indicators to zero, meaning that scarcity remains limited to a small subset of adverse realisations. CENTRAL_RA2 provides a more robust response by combining LE_KCB retention, lifetime extensions of LE_B7, LE_B8 and Kaunas TE, and additional 372 MW of distributed CCGT capacity from 2033. **This scenario meets the 8-hour criterion across the target years and further reduces EENS.**

Under short-term HVDC outage conditions, additional thermal capacity remains highly effective. In STRANS0_RA3, the **extension of LE_KCB, 372 MW of new distributed CCGT capacity and an additional 400 MW CCGT** unit reduce EENS to around or below 1 GWh across the target years and **ensure compliance with the 8-hour criterion**. This configuration also increases gas-fired generation and improves Lithuania's net export position in several years.

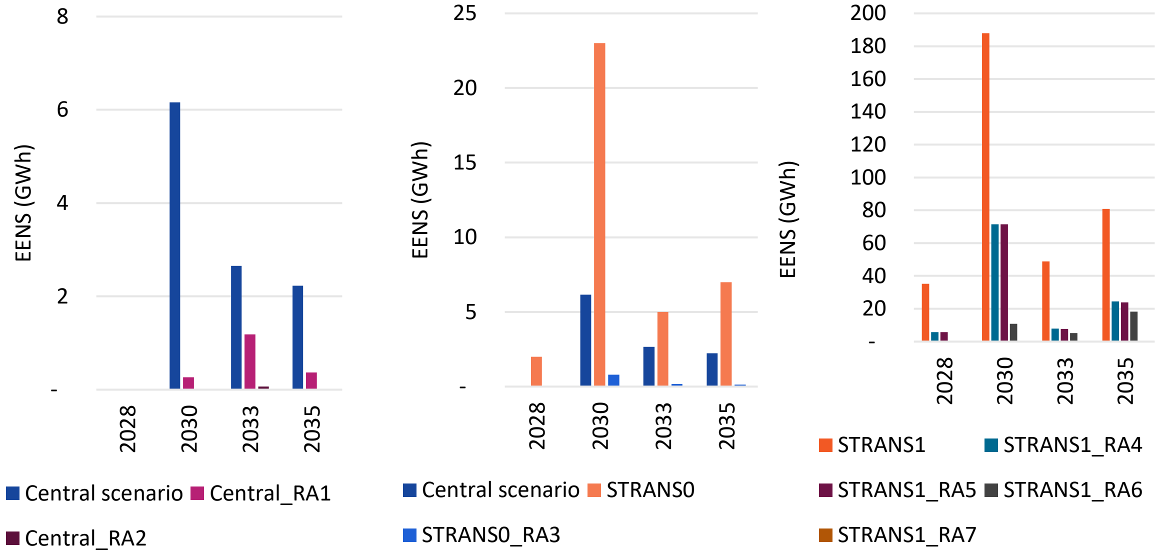

Figure 3-6 - Average EENS volumes in remedial actions scenarios

More severe interconnection stress requires a much larger response. Under STRANS1, i.e. long duration HVDC outages, the comparison between additional CCGT and OCGT capacities shows that the technology choice has limited impact on adequacy outcomes: **the scale of firm capacity addition matters more than whether the capacity is CCGT or OCGT**. The technology choice nevertheless affects system costs, market prices, dispatch patterns and Lithuania's net position.

In the most robust STRANS1 remedial case, **STRANS1_RA7 combines LE_KCB extension, additional CCGT capacity from 2033 and 2,200 MW of additional CCGT capacity from 2028**. This eliminates EENS across all target years and **ensures compliance with the reliability criterion** under long-duration HVDC outage conditions. The required capacity level is broadly consistent with the cross-border capacity lost in the stressed configuration.

Overall, the remedial action analysis identifies indicative domestic capacity needs for different levels of interconnection stress. Under **short-term interconnection outage conditions** (STRANS0), the addition of around 0,8 GW of new thermal capacity, is necessary from a system perspective to ensure compliance with the 8-hours criterion under normal system operation. Under **extreme system operation** (long-duration interconnection outages, STRANS1), addressing system adequacy issues would require maintaining around 2,6 GW of new thermal capacities.

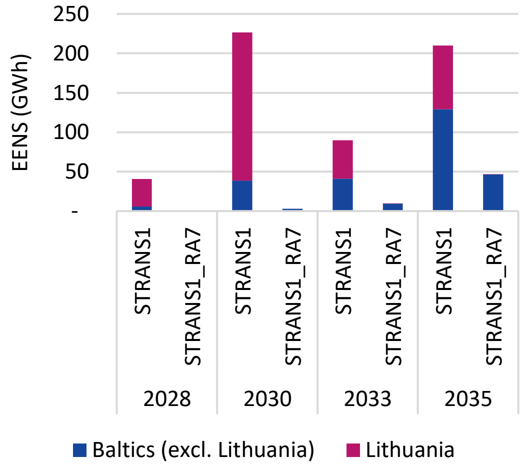

Figure 3-7 – Average EENS volumes in Lithuania and Baltic region in STRANS1_ and STRANS1

It should be noted that the additional thermal capacity identified in remedial actions **contribute not only to Lithuanian adequacy but also to the**

adequacy of the wider Baltic region, as the optimisation framework minimises total European system costs. For instance, the deployment of 2.2 GW of additional thermal capacity in STRANS1_RA7 significantly reduces EENS in the Baltic region outside Lithuania, by around 36 GWh in 2030 (99%) and up to 83 GWh in 2035 (65%), highlighting substantial cross-border adequacy benefits.

3.5 System operation and market implications

The analysis of sensitivities and remedial actions highlights consistent adequacy patterns at both national and regional levels.

At the national level, **thermal units show persistently low usage**, **with capacity factors generally below 4% across all target years in the Central Scenario**. This confirms that their primary role is to ensure security of supply rather than to produce significant energy volumes. Their utilisation increases when interconnection capacity is reduced (from the Central Scenario to STRANS0 and STRANS1) and in more stressed years, particularly 2030, which emerges as the most critical horizon.

This limited operation directly translates into weak profitability. The Economic Viability Assessment (EVA) indicates that market revenues alone are insufficient to support investment in dispatchable capacity. While additional thermal capacity is effective in reducing adequacy deficits and ensuring compliance with the 8-hour reliability criterion, it does not constitute a viable business case under current market conditions. This highlights a structural gap between adequacy value and market viability, pointing to the need for dedicated remuneration mechanisms such as capacity markets.

Adequacy constraints also materialise through market outcomes. Reduced interconnection capacity limits access to imports during scarcity periods, increasing reliance on domestic gas-fired generation and leading to higher electricity prices. Thermal units are therefore dispatched more frequently at high output levels during stressed situations, reinforcing both price spikes and system costs.

On a regional perspective, the analysis also shows that **Lithuanian adequacy is closely linked to the wider Baltic region**. Loss of Load events can coincide with scarcity in neighbouring bidding zones, particularly when interconnection availability is reduced. This highlights **the importance of Harmony Link, NordBalt and Baltic internal interconnections in reducing both national and regional adequacy risks**.

4 Flexibility Needs Assessment results

4.1 RES curtailment and residual load

The FNA indicates that **RES curtailment remains moderate in the Central Scenario**, even though Lithuania produces more renewable electricity than domestic demand on an annual basis. Curtailment increases in 2035 with the expansion of wind capacity, reaching around 900 GWh, equivalent to 3.3% of renewable production.

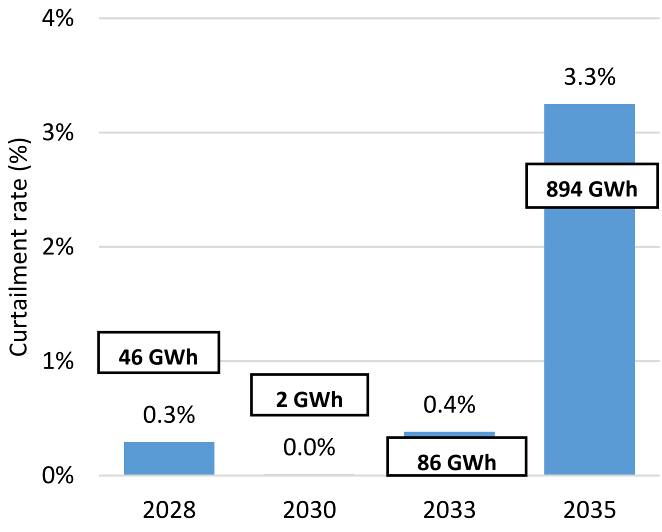

Figure 4-1 - Central Scenario average RES curtailment

The main driver of curtailment is not the annual renewable surplus itself, but the system's ability to absorb or export this surplus at the time it occurs. **Curtailment is therefore highly sensitive to interconnection availability**. When cross-border exchange capacity is reduced, Lithuania's ability to export excess renewable generation decreases, leading to significantly higher curtailment. In the stressed case involving the loss of NordBalt and Estlink, curtailment rises to around 1.9 TWh, or approximately 7% of domestic renewable production. **However, across all scenarios, curtailment levels remain sufficiently low for RES generation to exceed Lithuania's domestic power demand.**

Thermal remedial actions do not materially change this outcome. While additional firm capacity improves adequacy during scarcity periods, it does not address the main drivers of renewable curtailment, namely temporal mismatches between renewable output, demand, storage availability and export capability.

Curtailment is concentrated during periods of high renewable output and limited demand, especially in spring and around midday when solar generation is high. **With increasing wind penetration, curtailment becomes more spread across the year**, reflecting the more diversified generation profile of wind compared with solar.

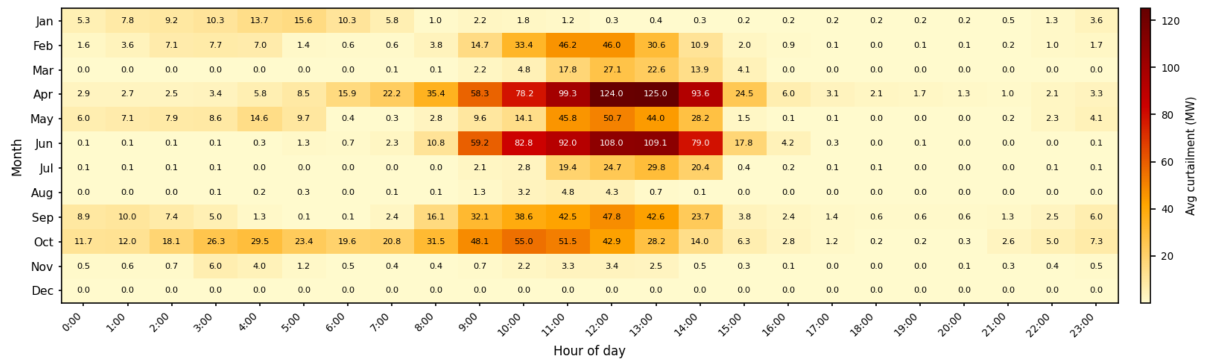

Figure 4-2 – Monthly average hourly curtailment (MW) in Central scenario 2033

Reduced renewable deployment sensitivities result in lower curtailment, but mainly because less renewable energy is produced. In SRES1, lower curtailment is accompanied by a shift towards greater import dependence in later years. In SRES2, lower demand and reduced renewable and storage capacities also limit curtailment.

Overall, the residual-load analysis indicates that flexibility needs are driven by the temporal structure of the system rather than by the annual energy balance alone. **Lithuania may have sufficient renewable generation over the year, while still facing short-term periods of surplus, curtailment, scarcity and Loss of Load risk**.

4.2 Flexibility needs and contributions to flexibility needs outcomes

Flexibility needs are predominantly short-term, driven by daily and weekly residual-load variations rather than by seasonal imbalances. These needs increase towards 2035, reflecting higher renewable penetration and greater variability in residual load.

When estimating contributions to flexibility needs, interconnections provide the largest flexibility contribution in the model (more than 50% of Lithuanian flexibility needs are met by interconnections in the Central Scenario). They allow Lithuania to export renewable surplus during high-generation periods and to import electricity during low-renewable or scarcity periods. When interconnection availability is reduced, the system's ability to manage residual-load variations deteriorates, resulting in higher RES curtailment and, in adequacy-stressed situations, Loss of Load.

Domestic flexibility assets play complementary roles. **Batteries support short-term energy shifting across hours, while electrolysis can absorb excess renewable generation when prices are low**. Thermal units remain important for adequacy during scarcity periods, but their contribution to flexibility is limited, as they do not directly absorb renewable surplus.

4.3 Identification of additional viable storage capacities

The results of the flexibility investment optimisation over the target years shows additional storage deployment, mainly driven by RES surplus and high prices during stress periods.

- In 2028, investments are scarce and only materialise under severe interconnection outage scenarios. In 2030, strong stress signals and price incentives trigger investment despite limited energy surpluses.
- In 2033 and 2035, higher surpluses and adequacy revenues enable a significant storage deployment—especially for long-duration technologies like CAES.

However, the introduction of additional thermal capacity in remedial action scenarios significantly reduces storage investment, suggesting that RES integration alone provides insufficient economic signals to ensure storage profitability.

5 Recommendations and conclusions

The study confirms that **Lithuania faces adequacy risks from 2030 onwards** in the market-based Central Scenario. The Economic Viability Assessment indicates that **energy-market revenues alone are not sufficient to retain or develop the dispatchable capacity required to meet the reliability standard** under the assessed conditions. This creates a gap between market viability and adequacy needs, supporting the **implementation of a capacity remuneration mechanism to secure the required firm capacity**.

Interconnection availability is a key driver of Lithuanian adequacy outcomes**. The reliability of NordBalt and Estlink, together with the development of Harmony Link, is central in Lithuania and Baltics adequacy and should remain central to system planning.** Domestic dispatchable capacity is effective in reducing EENS and LOLH, but the required volume depends strongly on the level of interconnection stress. **The analysis indicates a need for close to 1 GW of additional domestic capacity** under short-term HVDC outage conditions, and **more than 3 GW under long-duration outage conditions**. While the choice between CCGT and OCGT has limited impact on adequacy metrics, it affects system costs, dispatch patterns and market prices. Adequacy analyses also underline that thermal capacities can be complemented by demand-side potentials exploitation that appear viable within the EVA.

These adequacy results can be compared with the flexibility needs assessment. First, **RES curtailment in Lithuania remains relatively low across all scenarios, with renewable generation consistently exceeding domestic demand.** This indicates that the system is generally able to absorb RES production, with limited energy losses.

As for adequacy, **interconnection capacity plays a key role in Lithuanian system flexibility**. It significantly contributes to handling short- and medium-term flexibility needs, alongside storage and electrolysis, by enabling surplus RES to be exported and balancing variability across the region. However, these results also highlight potential trade-offs. Additional thermal capacity, while beneficial for adequacy, may weaken market signals for investments in storage and other flexibility assets by reducing price volatility and limiting the value of capturing RES surplus. Overall, this points to the need for **coordinated planning between adequacy and flexibility** measures to ensure a balanced and efficient development of the system.