Slovak Market Outlook for Renewables 2026

SAPI – Slovak Association
of Sustainable Energy

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Foreword

I am pleased to introduce our fourth Slovak Market Outlook for Renewables. At a historic turning point where renewables electricity production have surpassed coal for the first time in 100 years, this document analyzes where the Slovak energy sector stands today and where it must go next.

This publication provides a data-driven analysis of five key renewable electricity sources and battery energy storage systems, evaluating their progress through three distinct development scenarios, namely business-as-usual, the 2025 NECP, and the scientifically grounded Green Scenario aligned with Slovakia's 2050 carbon neutrality targets.

While barriers like high grid costs and lengthy permitting remain, a few legislative reforms and National Recovery and Resilience Plan funding offer new opportunities to accelerate our transition. The Green Scenario, developed with the Slovak Academy of Sciences, outlines a feasible roadmap toward 2050 carbon neutrality.

I want to thank all contributors, especially lead author Boris Valach, and the many stakeholders and organisations who provided data and insights. This document is a call to action for government and industry alike, let us work together to ensure Slovakia becomes a leader in clean, secure, and sustainable energy, at least in the CEE region.

Ján Karaba
Director, SAPI

Executive Summary

The SAPI Market Outlook for Renewables 2026 evaluates the progress of renewable electricity technologies by benchmarking year-end 2025 capacity performance against three distinct growth trajectories: business-as-usual, 2025 NECP, and the scientifically grounded Green Scenario. Data used to assess market growth was provided by three regional Distribution System Operators (DSOs) and the country's leading battery energy storage system distributors, ensuring the accuracy and relevance of the findings. While the market possesses a robust project pipeline, our analysis identifies a critical disparity between the current level of deployment, policy-given capacity targets and the milestones required for 2050 carbon neutrality.

Solar PV remains the primary engine of growth with a cumulative capacity of 1,357 MW, yet Slovakia ranks last in the EU-27 for solar capacity per capita. This expansion is currently dominated by residential installations and corporate-led plants, as utility-scale projects are stifled by high grid-connection fees and the "G-component" access charge. Conversely, wind energy remains stagnant at 3.1 MW due to chronic EIA bottlenecks and local opposition, leaving a 1,700 MW pipeline and pilot acceleration areas' potential untapped. While hydropower and bioenergy have plateaued under strict environmental scrutiny, geothermal energy remains at zero capacity despite legislative reforms intended to accelerate pilot projects. The strategic role of battery energy storage systems (BESS) has become a focal point of the 2026 Outlook, with residential storage estimated to have surpassed 130 MWh. The 2025 NECP targets are insufficient for long-term climate goals; the Green Scenario highlights that reaching net-zero requires a massive scale-up to 15 GW of solar and 7.5 GW of wind by 2050. Achieving these targets will depend on immediate structural interventions to reduce connection costs, streamline permitting, and finalise comprehensive strategies for wind and geothermal development.

Introduction

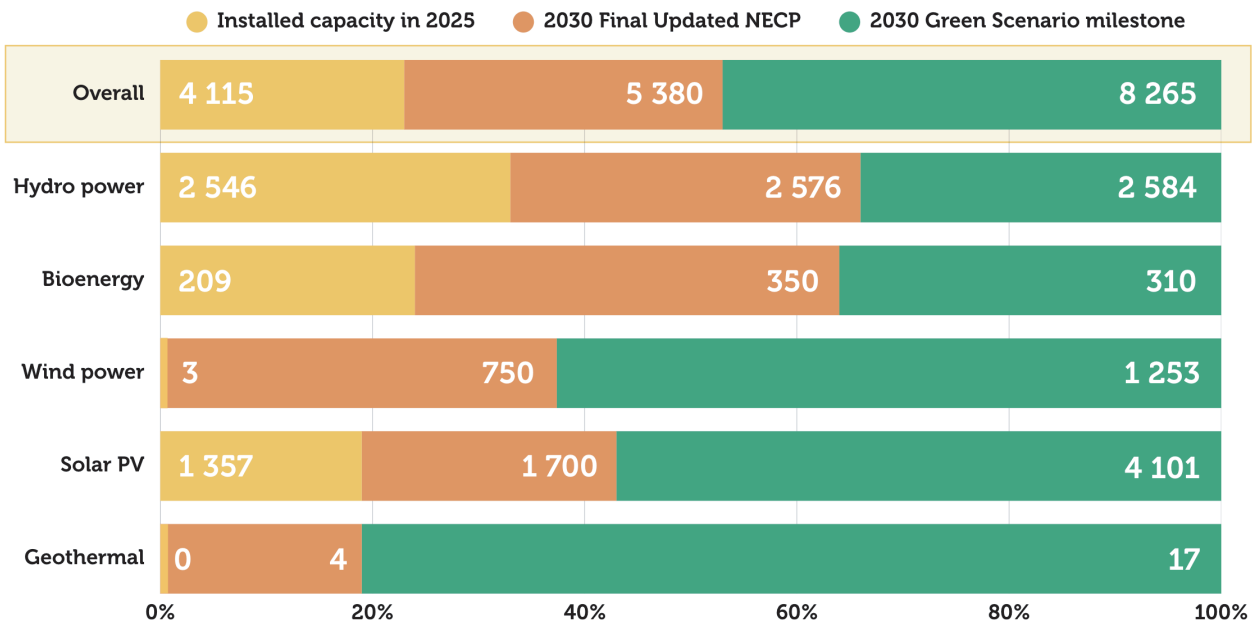
SAPI's annual Outlook offers a data-driven analysis of the Slovak electricity sector, centred on five key renewable technologies (RES-E) poised to shape the national market. Alongside qualitative reviews of policy frameworks and market barriers, the document evaluates the progress of solar PV, onshore wind, hydropower, bioenergy, and geothermal energy. Starting in 2025, the report expanded its scope to include battery energy storage systems (BESS), reflecting their growing significance in the region.

As the fourth edition in a series of annual reports, it tracks Slovakia's renewable progress and projects future growth using three data-driven scenarios. The analysis is built upon detailed annual progress updates for every featured technology, offering a comprehensive view of the market's evolution.

The Final Updated National Energy and Climate Plan (NECP), submitted to the European Commission in April 2025, established the most up-to-date 2030 capacity targets for these technologies. However, outside of bioenergy, the capacities required to achieve 2050 carbon neutrality of Slovakia far exceed the targets set in the document.

Figure 1 tracks progress toward 2030 milestones for each renewable technology, using data from the end of 2025 as a baseline for the zero emissions scenario targets. These projections utilise the Green Scenario, a data-driven model developed for SAPI by the Institute for Forecasting of the Slovak Academy of Sciences (IF SAS) in 2025. The details of its scientific framework are expanded upon below.

Figure 1 | Progress as of 2025 towards the 2030 zero-emission milestones



Source: SAPI (2026); regional DSOs (2026); IF SAS (2025)

To provide a comprehensive market overview, the Outlook reviews RES-E deployment trends since 2010, establishing a baseline for the status of the market at year-end 2025. This historical foundation informs three distinct growth paths: the business-as-usual, NECP, and Green Scenario. Each model follows a distinct set of data and development trajectories, identifying 2030 as the key interim milestone and 2050 as the deadline for national decarbonisation.

The business-as-usual scenario extrapolates historical data to project the future growth of each RES-E technology. This model assumes that existing market conditions and deployment speeds will remain constant. Specifically, these projections are calculated using the average increase in installed capacity recorded over the previous three-year period (2023-2025).

The 2025 NECP scenario is modelled on the targets set in Slovakia's Final Updated National Energy and Climate Plan submitted in April 2025. This pathway maps the specific capacity milestones for each renewable technology through 2030. To project the trajectory toward 2050, the Outlook assumes that the momentum established in the final years of the plan will persist; specifically, it extrapolates the average annual growth recorded between 2028 and 2030. Essentially, this scenario reflects a future where national targets are strictly met by 2030 and that rate of expansion is maintained by 2050.

The Green Scenario serves as an ambitious yet scientifically grounded roadmap for reaching carbon neutrality by 2050. It balances ambitious renewable integration with realistic projections of rising electricity demand driven by the electrification of heating, cooling, and transport. To offset this increased load, the model incorporates significant gains in energy efficiency and the strategic deployment of emerging technologies, such as carbon capture and storage (CCS). Together, these factors define the specific milestones necessary to transition the Slovak energy sector to carbon neutrality by 2050.

The historical market data used in this Outlook is based on proprietary datasets provided exclusively for the purposes of this Outlook development to SAPI by Slovakia's three regional Distribution System Operators (DSOs). To ensure as accurate picture of the storage landscape as possible, the analysis also incorporates sales figures supplied by the country's leading BESS distributors.

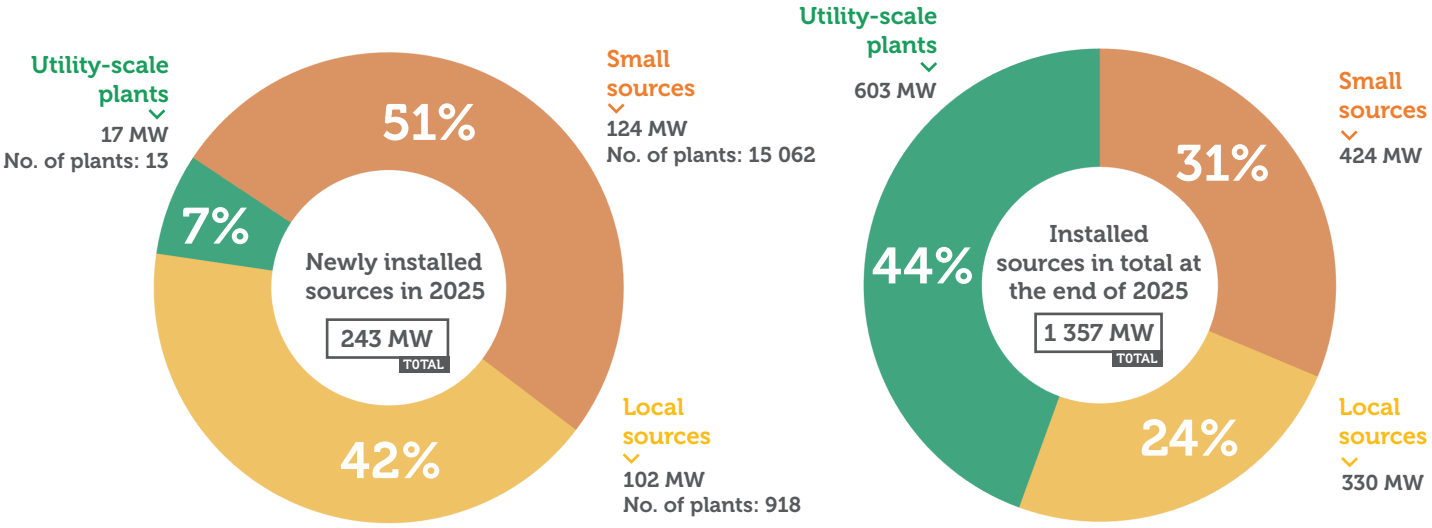
Solar PV

01

By the end of 2025, Slovakia's cumulative solar PV capacity reached a total of 1,357 MW. This total reflects a hybrid measurement of DC and AC power, as reporting shifted from DC-side data to nominal AC inverter output in 2023. While the sector continued to grow, the pace slowed slightly; the 243 MW added in 2025 was 31 MW lower than the previous year's increase. This expansion was driven by a high volume of small-scale projects, with nearly 16,000 new solar PV plants in total commissioned throughout the year.

In contrast to the previous year, Small Sources, primarily residential PV systems, regained their momentum and drove the majority of the solar PV market's expansion. These household installations, which are significantly dependent on a national Green to Households subsidy scheme, accounted for approx. 51% of the annual capacity increase, with an average system size increasing annually over the recent years (from around 7.1 to 8, and to 8.3 kW in the period of 2023-25). Corporate-led plants, categorised as Local Sources[1], followed closely with a 42% share and an average installed capacity of 111 kW. Meanwhile, utility-scale PV plants contributed the smallest portion of growth, adding only 17 MW, or 7% of the total, with an average project size slightly exceeding 1.3 MW. The total composition of solar PV plants connected to the grid by the end of 2025 is visually summarised in Figure 2 below.

Figure 2 | Installed capacity and number of solar PV plants by type in 2025



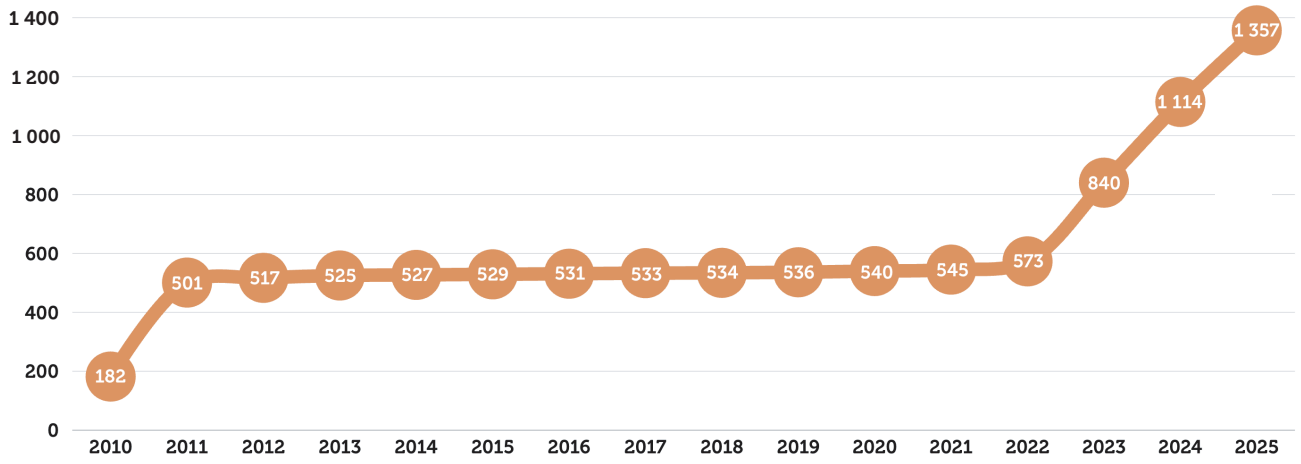
Source: regional DSOs (2026); OKTE (2025)

[1] According to Act No. 309/2009 Coll. on RES, a Local Source is an installation for the generation of electricity from renewable energy sources used to cover own consumption, the installed capacity of which does not exceed the maximum reserved capacity of the place of consumption.

At the end of 2024, 479 utility-scale ground-mounted solar PV plants with almost 586 MW of installed capacity and 528 MW of rooftop PV systems were operated in Slovakia, totalling 1,114 MW. The largest solar PV plant to-date was commissioned in late 2024 in the municipality of Jaslovské Bohunice (Trnava Region) with installed power at 10 MW.

The past development of solar PV capacities is illustrated in Figure 3 provided below.

Figure 3 |Installed capacity of solar PV plants – 2010-25 (MW)



Source: regional DSOs (2026); OKTE (2025)

The development of solar PV, excluding Small Sources up to and including 10.8 kW, was historically suppressed by an eight-year grid connection moratorium that was released in April 2021. Despite the end of this "stop status," significant constraints remain in early 2025 due to capacity limits for variable renewables. The utility-scale segment is particularly burdened by some of the highest grid connection costs in the EU-27. Projects connected directly to the grid at medium or high-voltage levels face connection fees ranging from 32 EUR to 72 EUR per kW. Additionally, as of 1 January 2025, the distribution network access charge (G-component) increased from 15% to 20% of the maximum reserved capacity. This translates to an annual cost of approx. 11,800 EUR to 19,200 EUR per MW, with specific rates varying across the country's three regional DSOs.

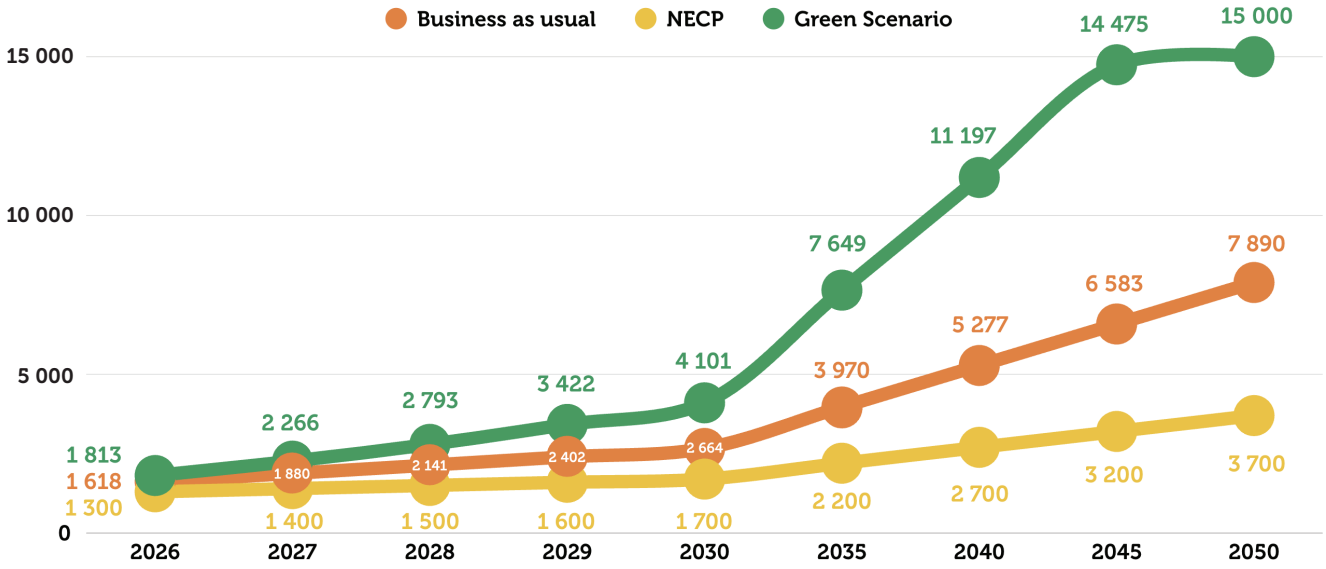
A 2023 Energiewerkstatt report for SAPI highlights that Slovakia has a theoretical rooftop solar potential of 37 GW, yet the nation remains an outlier in actual adoption. According to the April 2025 Photovoltaic Barometer, Slovakia ranks last in the EU-27 for solar capacity per capita. At just 160 W per person, it falls dramatically short of the European average, which recently climbed to 682 W.

Slovakia has experienced notable acceleration in the solar PV sector for the third consecutive year. Similarly to the last year, this growth is primarily fuelled by falling technology costs and relatively high energy prices for businesses, both of which have been keeping intensified interest in PV systems. The expansion has been further supported by a favourable legal framework for prosumers, particularly those categorised as Small Sources and Local Sources. Additionally, various financial mechanisms have been instrumental in sustaining this momentum, including programs funded by the National Recovery and Resilience Plan (NRRP), other EU-funded initiatives, and the Green to Households subsidy scheme reintroduced in 2023.

Future development scenarios

Slovakia has experienced a consistent increase in installed solar PV capacity, with development over the past three years notably accelerating the previous growth trend. Maintaining the average annual growth rate seen between 2022 and 2025 would result in a total capacity of approx. 2,664 MW by 2030, which is around double current levels. Over the long term, this trajectory suggests that Slovakia's solar capacity could reach 7,890 MW by 2050.

Figure 4 | Solar PV development scenarios – 2026-50 (MW)



Source: SAPI (2026); MH SR (2025); IF SAS (2025)

Slovakia's current solar PV capacity has already surpassed the 2025 projections from the 2023 NECP by 357 MW. The 2025 Final Updated NECP raised the 2030 cumulative target to 1,700 MW, a 300 MW increase over the previous draft. Despite this update, the 2025 NECP still does not provide a specific breakdown distinguishing between ground-mounted and rooftop plants. The 2025 NECP is built on an assumed linear growth of 100 MW per year through the end of the decade; if this pace remains constant without further acceleration, Slovakia's total capacity would reach approx. 3,700 MW by 2050.

According to the Green Scenario developed by the Institute of Forecasting of the Slovak Academy of Sciences (IF SAS, 2025) for SAPI, achieving a zero-emissions trajectory requires an increase of 456 MW in installed solar PV capacity by the end of 2026 compared to 2025 levels. To remain aligned with this pathway, Slovakia should reach a total of 4,101 MW of installed capacity by 2030. By 2050, the target should rise to 15,000 MW, ensuring the country meets its climate commitments, particularly the goal of climate neutrality.

Figure 4 above provides a graphical comparison of the three potential development scenarios for Slovakia's solar PV sector through 2050.

Wind power

02

By the end of 2025, Slovakia's wind power capacity remained stagnant at 3.1 MW. As of 2024, Slovakia and Slovenia shared the second-to-last rank in the EU-27 for wind energy utilisation, surpassing only Malta.

Slovakia's wind infrastructure is currently limited to 2 operational farms totalling 5 turbines. The Ostrý Vrch facility (Trenčín Region) contributes 0.5 MW and has been active since 2004, while the Cerová farm (Trnava Region) has provided 2.6 MW via 4 turbines since 2003. As no new capacity has been added in over two decades, the industry has reached a standstill, with the existing fleet now nearing the end of its projected operational life.

While a grid connection moratorium stalled progress from 2009 to 2021, several other obstacles continue to hamper Slovak wind energy. The notable examples are weak municipal land-use planning and low public support, often attributed to the NIMBY ("Not In My Backyard") effect and a lack of successful local examples. On a positive note, as of January 2025, small-scale projects (under 100 kW) are exempt from the EIA, while projects up to 1 MW benefit from a streamlined scoping process.

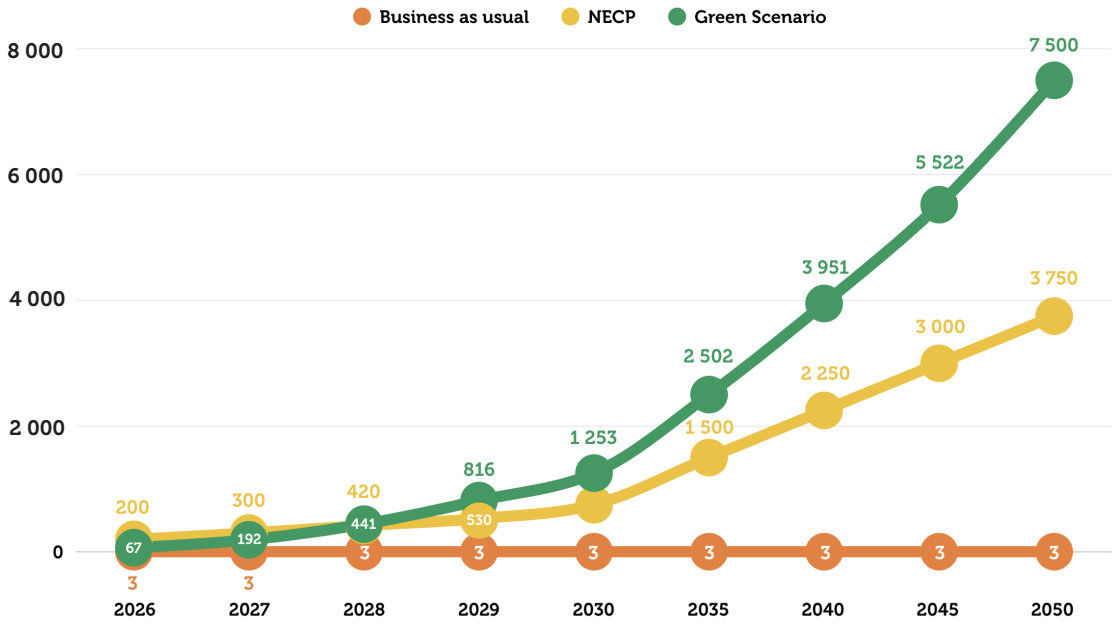
According to a 2022 study by Energiewerkstatt for SAPI, Slovakia possesses significant theoretical wind energy potential. The report indicates that even after accounting for spatial and regulatory constraints, approx. 20% of the country is suitable for wind development, representing a potential capacity of 168 GW. These results confirm that Slovakia's minimal wind energy output is not due to a lack of natural resources, but is instead the result of deep-seated structural and legislative hurdles.

Following the April 2023 REPowerEU update to the NRRP, Slovakia has taken concrete steps to establish wind energy acceleration zones totalling at least 300 MW. By late 2025, the framework for these zones was finalised through a series of key milestones. The semi-state company JESS identified 2 pilot locations near Hlohovec (Western zone) and Michalovce (Eastern zone) in October 2025, while the Ministry of Environment provided the legal and technical guidance through Decree No. 354/2025 Coll. in the following month. Subsequently, in December, the final version of the Methodology for the Development of Wind Energy in the Slovak Republic was published. So far the plan to establish these 2 pilot zones has been largely suffering from inadequate consultation with local authorities. The absence of meaningful stakeholder engagement has sparked considerable pushback from local authorities and the public alike. Coupled with a tight timeline, Slovakia's ability to fulfill its NRRP commitment of creating two pilot wind acceleration zones, remains highly uncertain.

Future development scenarios

Should historical growth trends persist without intervention, Slovakia's wind power sector will remain entirely stagnant. In this scenario, installed capacity would fail to expand beyond the current 3.1 MW, leaving the country's wind energy output unchanged through 2050. However, a total standstill is unlikely given the current surge in project development. According to the Ministry of the Environment's EIA/SEA Information System, as of April 2026, there are 35 active wind energy projects in the pipeline. These projects comprise approx. 275 turbines with a combined potential total capacity of 1,700 MW. Additionally, the plan to establish the 2 pilot acceleration areas identified the Western zone, comprising 69 wind energy plants with a capacity of 430 MW, and the Eastern zone, encompassing 45 plants totalling 315 MW. Despite the rising volume of project applications and the aforesaid pilot zones, the bottleneck remains firm. To date, no new wind project has successfully cleared the full EIA process.

Figure 5 | Wind power development scenarios – 2026-50 (MW)



Source: SAPI; MH SR (2025); IF SAS (2025)

The 2025 Final Updated NECP maintains the ambitious target of 750 MW for onshore wind capacity by 2030, a 250 MW increase over the 2019 target. While the plan anticipates 20 MW of new capacity by the end of 2026, the current backlog in the EIA process makes both short- and medium-term milestones unrealistic. The NECP's roadmap projects a linear growth of 100 MW annually through 2027, culminating in a sharp 220 MW surge between 2029 and 2030. Should this trajectory be maintained beyond the current decade, Slovakia's total capacity would reach 3,750 MW by 2050, consistent with the former Market Outlooks.

In contrast, the Green Scenario, developed by IF SAS (2025) for SAPI, outlines a more rigorous path toward zero emissions. This trajectory requires an immediate capacity increase of approx. 64 MW by the end of 2026 relative to 2025 levels. To remain on track for climate neutrality, the scenario argues that Slovakia must achieve 1,253 MW of wind capacity by 2030, eventually scaling to 7,500 MW by 2050 to achieve its long-term climate commitments.

Figure 5 above provides a graphical comparison of the three potential development scenarios for Slovakia's wind energy sector through 2050.

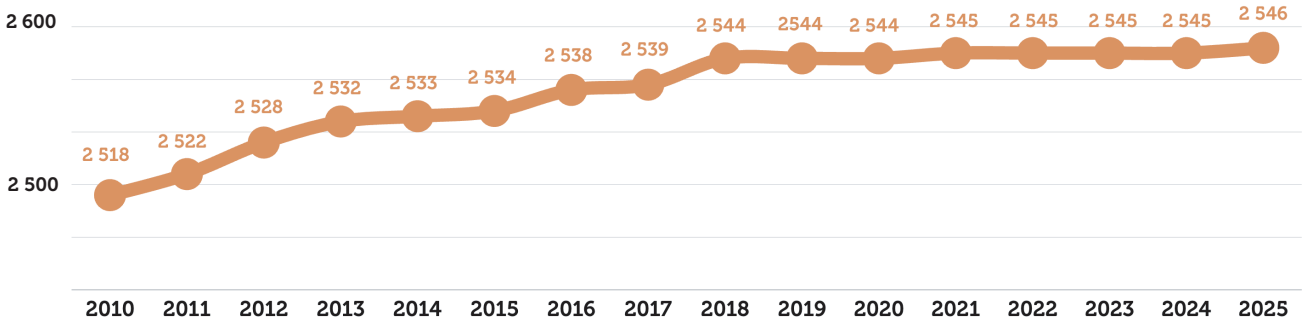
Hydro energy 03

By the end of 2025, Slovakia's total hydropower capacity reached 2,546 MW, with an addition of only around 1 MW of new installed capacity in 2025. The hydropower capacity comprises 1,630 MW from conventional hydropower plants (HPPs) and 916 MW from pumped hydroelectric storage plants (PHSPs). Beyond the hydro power sector's contribution to clean energy production, it, particularly through its storage capabilities, plays an indispensable role in maintaining grid stability and securing the overall electricity supply.

Over the past decade, Slovakia has seen a steady rise in installed hydropower capacity, fuelled largely by the expansion of small HPPs (up to 10 MW) and micro-installations (up to 100 kW). The country's current fleet consists of 26 large facilities, 129 small plants, 120 micro-units, and 4 PHSPs. The cornerstone of this hydropower infrastructure is the Gabčíkovo Hydropower Plant in the Trnava Region; commissioned in 1992, which remains the nation's largest facility with an installed capacity of 720 MW.

The past development of hydropower capacities is illustrated in Figure 6 provided below.

Figure 6 | Installed capacity of hydropower plants – 2010-25 (MW)



Source: regional DSOs (2026); OKTE (2025)

The development of new hydropower projects in Slovakia remains largely stalled, a trend rooted in an ongoing EU infringement procedure initiated in 2014 regarding the improper assessment of biodiversity and hydro-morphology. In early 2026, the regulatory environment remains restrictive; while the government seeks to increase RES-E capacity, hydropower projects continue to face the most rigorous environmental scrutiny. The Ministry of Environment and environmental NGOs maintain a cautious stance, supported by Supreme Court rulings in cases like Žiar nad Hronom and Hronský Beňadik, which effectively prioritise river ecosystem integrity over new small-scale hydropower development.

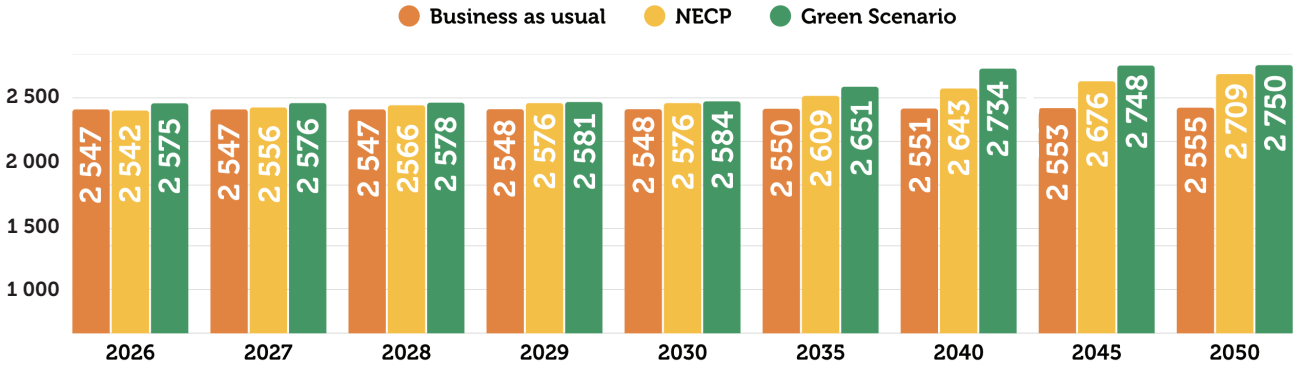
According to the Updated Concept of Hydroelectric Use of Waterways in Slovakia (2017), the nation's technically exploitable hydropower potential is estimated at 6,683 GWh, with approx. 70% already in use. While the largest untapped technical potential resides in the development of small HPPS, of which only about a quarter had been harnessed by late 2024, the actual prospects for further expansion in this segment are considered limited. Instead, significant opportunities for increasing installed capacity lie in the reconstruction and modernisation (repowering) of existing hydropower facilities.

As of 2025, the regulatory environment for hydropower has undergone significant changes following Price Decree No. 402/2024 Coll., issued by the Regulatory Office for Network Industries (RONI). This decree led regional DSOs to start charging the so-called G-component, a network access fee, to hydropower plants with a capacity of up to 5 MW, which had previously enjoyed an exemption. Although this shift threatened to degrade investment conditions across the sector, RONI partially mitigated the impact in March 2025 by voiding the fee specifically for smaller facilities with an installed capacity of up to 1 MW. The legislative landscape regarding environmental impact assessments (EIAs) remains equally complex, as the 2024 revision of the EIA Act failed to include an expected exemption that would have limited small HPPs to a simpler scoping process. Ultimately, the long-term trajectory of the sector hinges on the formal adoption of Slovakia's Updated Hydropower Potential Concept and the implementation of a modernised National Water Policy.

Future development scenarios

In 2025, Slovakia's hydropower capacity grew by only 1 MW, a minimal increase that aligns with "business-as-usual" projections. Under this scenario, the grid is expected to see only marginal growth, moving from 2,546 MW in 2025 to 2,555 MW by 2050. The most significant recent advancements in Slovakia's hydropower sector centre on the Čunovo II HPP and the Málinec PHSP projects. In early September 2025, the Ministry of Environment issued a favourable EIA opinion for the Čunovo II plant, a project representing a 50 million EUR investment with a planned installed capacity of 14.83 MW. More recently, in April 2026, the state-owned enterprise Vodohospodárska výstavba began geophysical surveys at the site of the proposed Málinec PHSP. While this ambitious 2,400 MW project carries an estimated investment cost of 2.4 billion EUR, it has not yet entered the formal EIA process and remains a subject of significant scrutiny and criticism from both environmental activists and political opposition.

Figure 7 | Hydropower development scenarios – 2026-50 (MW)



Source: SAPI (2026); MH SR (2025); IF SAS (2025)

The 2025 Final Updated NECP sets a target of 2,576 MW of total installed hydropower capacity by 2030, reflecting a reduction of 95 MW compared to the 2023 Draft Updated NECP. This decrease is

primarily attributed to anticipated declines in the capacity of large HPPs. The majority of new capacity is expected to be added between 2026-29. Under current assumptions, hydropower capacity would reach 2,709 MW by 2050.

According to the Green Scenario developed by IF SAS (2025) for SAPI, achieving a zero-emissions trajectory requires an increase of approx. 29 MW in installed hydropower capacity by the end of 2026 compared to 2025 levels. To remain aligned with this pathway, Slovakia should reach a total of 2,584 MW of installed capacity by 2030. By 2050, the target should rise to 2,750 MW, ensuring the country meets its climate commitments, particularly the goal of climate neutrality.

Figure 7 above provides a graphical comparison of the three potential development scenarios for Slovakia's hydropower sector through 2050.

Bioenergy

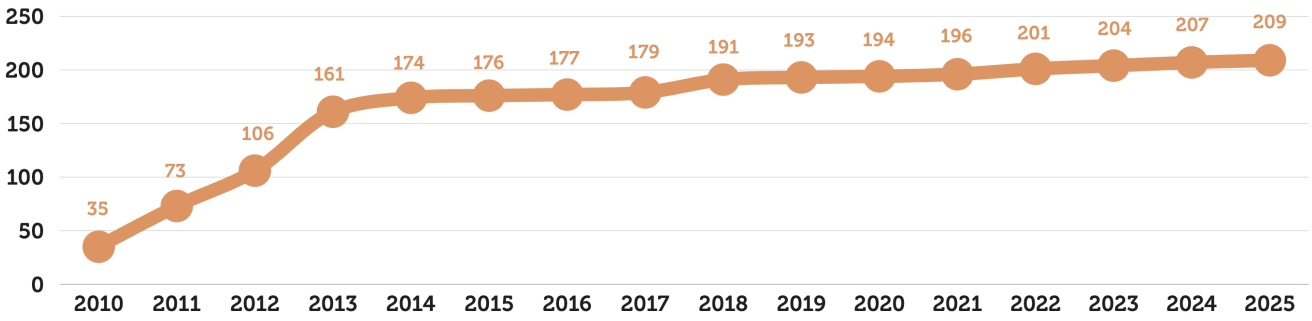
04

By the end of 2025, Slovakia's total installed electrical capacity of bioenergy[2] facilities reached approximately 209 MW, marking a modest year-on-year increase of 1.8 MW. The country's bioenergy fleet consists of 25 biomass power plants (60 MW) and 122 biogas facilities (102 MW), of which an estimated 81 remain operational. The largest plant is the 11 MW Žarnovica facility in the Banská Bystrica Region, in operation since 2010.

According to 2022 data from the national regulator, 88 biogas and 18 biomass plants benefited from feed-in tariff support. However, the sector is approaching a key transition, as the 15-year support period for most biogas facilities is due to expire by the end of 2028. At the same time, Slovakia's biomethane segment is beginning to emerge, with grid injection capacity reaching roughly 3.5 MW across 4 plants following the commissioning of BPS Ožďany I. (Banská Bystrica Region) in April 2026.

The past development of bioenergy capacities is illustrated in Figure 8 provided below.

Figure 8 | Installed capacity of bioenergy sources – 2010-25 (MW)



Source: regional DSOs (2026); OKTE (2025)

Bioenergy was instrumental in Slovakia officially meeting its 2020 renewable energy targets. This milestone was primarily reached by incorporating estimated household data, specifically biomass heating and heat pump usage, into the national share. Despite this statistical success, the growth of biogas was hindered by a connection moratorium that blocked the integration of new projects.

[2] Energy from biological materials can come from two different types of fuel - biogas, including biomethane, and solid biomass. Energy-rich biogas can be produced from a number of sources, including waste from wastewater treatment plants, municipal waste, and agricultural and livestock waste. Solid biomass, on the other hand, includes wood, waste produced from its extraction and processing, and energy crops grown for their high energy potential, such as maize and rapeseed.

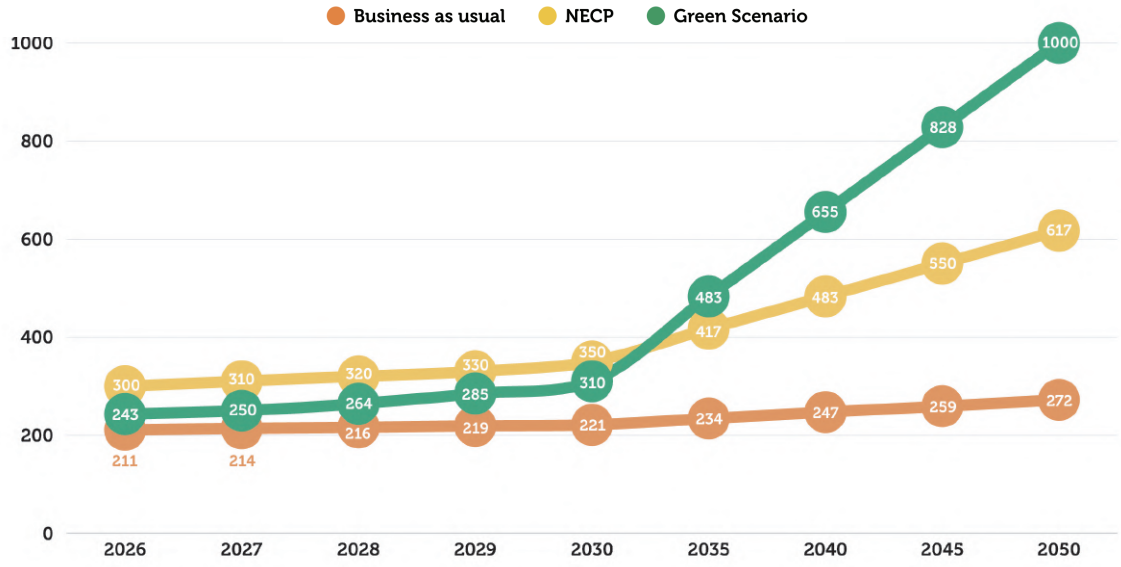
The number of operational biogas plants in Slovakia has seen a steady decline since 2014, when over 140 facilities were active. This downturn was driven by a grid connection moratorium that effectively blocked all new projects during that period. Even after the restrictions were removed in 2021, the sector's recovery has been slow; only a few new plants have come online, and these are now being designed primarily for local energy consumption rather than grid injection.

The National Forestry Programme 2025-2030, approved in March 2024, sets the optimisation of wood biomass as a primary goal for Slovakia's energy sectors. Rather than expanding forest harvesting, the strategy focuses on maximising the efficiency of current power plants. This sustainable direction is echoed in the REPowerEU chapter of the NRRP, which prioritises efficiency upgrades and provides a framework for expanding biogas and biomethane infrastructure.

Future development scenarios

Due to the sluggish expansion of the bioenergy sector in recent years, "business-as-usual" projections estimate a marginal annual increase of only 2.54 MW. Following this trajectory, Slovakia's bioenergy capacity is expected to reach 221 MW by 2030 and potentially 272 MW by 2050, provided the current slow rate of development remains unchanged.

Figure 9 | Bioenergy development scenarios – 2026-50 (MW)



Source: SAPI (2026); MH SR (2025); IF SAS (2025)

The 2025 Final Updated NECP lowers Slovakia's 2030 bioenergy capacity target to 350 MW, down from 400 MW in the 2023 draft. The 50 MW reduction mainly reflects weaker expectations for the biogas segment, with the revised plan projecting 200 MW from solid biomass and 150 MW from biogas by the end of the decade. While growth is expected to remain modest through 2030, based on the projections, a stronger long-term expansion leading to 617 MW in total by 2050 is expected. With current installed capacity at around 209 MW, Slovakia is already close to the revised 2030 target, but this also highlights the limited pace of expected growth over the next five years.

According to the Green Scenario developed by IF SAS (2025) for SAPI, a pathway consistent with net-zero emissions would require a much faster rollout. This scenario calls for an additional 34 MW by the end of 2026 compared with 2025 levels, reaching 310 MW by 2030. Longer term, capacity would need to nearly quintuple to 1,000 MW by 2050 to support Slovakia's climate neutrality goals.

Figure 9 above provides a graphical comparison of the three potential development scenarios for Slovakia's bioenergy sector through 2050.

Geothermal power 05

By the end of 2025, Slovakia had yet to commission its first geothermal power plant. The use of this resource remains restricted to thermal spas, recreational facilities, and district heating systems. Consequently, geothermal energy is currently the only renewable technology in the country with zero installed electrical capacity, making no contribution to the national power grid.

The expansion of geothermal power in Slovakia has long been hindered by the substantial capital required for exploratory drilling and complex administrative requirements surrounding environmental impact assessments (EIA) and operational permits. However, legislative reforms that took effect in January 2025 have significantly lowered these hurdles. Under the new rules, shallow wells up to 300 meters no longer require an EIA, while deeper projects exceeding 600 meters are now subject to a simplified screening process that often bypasses the need for a comprehensive assessment. These changes, implemented as part of the NRRP, are designed to expedite the permitting timeline and foster the growth of the country's untapped geothermal potential.

Slovakia possesses immense, yet largely dormant, renewable energy potential within its geothermal resources. Data from the Dionýz Štúr State Institute of Geology (2019) estimates the nation's probable geothermal heating potential at approx. 6,200 MWt. Furthermore, the technical potential for power production is calculated at an annual output of roughly 6,300 GWh, highlighting a major opportunity for the country's energy transition.

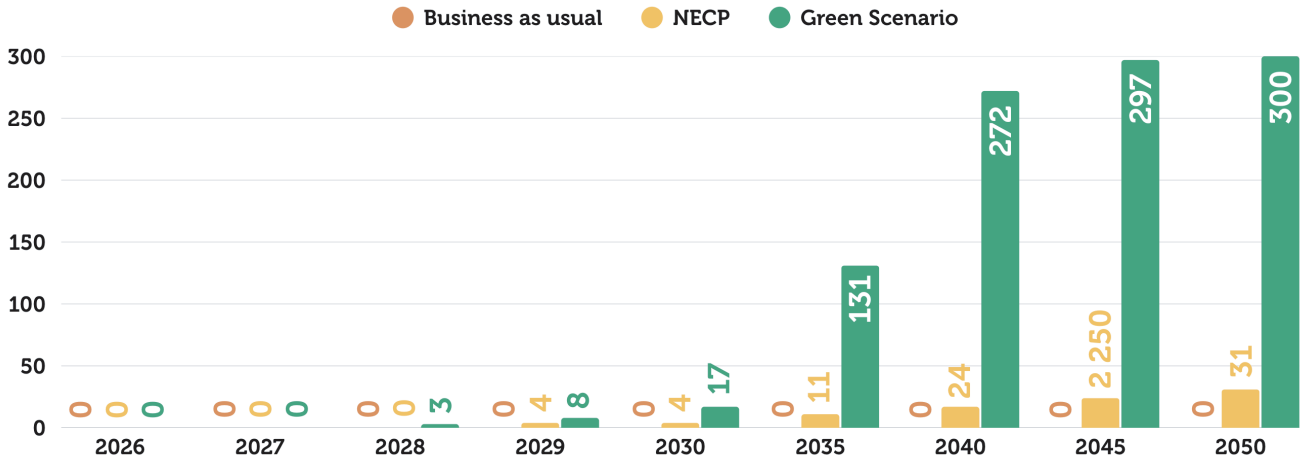
Although Slovakia's updated NRRP and REPowerEU provisions partially reflect the European Parliament's 2023 recommendations on geothermal energy, Slovakia still lacks a specific sectoral strategy for this technology.

Future development scenarios

Because no geothermal plants were in service by late 2025, standard "business-as-usual" projections often conservatively suggest the sector will remain inactive for decades. This outlook, however, likely underestimates the market, given that three significant projects are already in development.

As noted in the 2025 Market Report, the 4 MW Ďurkov plant remains the most advanced project. Although two of its three new wells were completed in March 2026, the facility still awaits connection to the district heating system and is scheduled for commissioning in 2028. Meanwhile, two larger 20 MW projects in Žiar nad Hronom and Prešov are working toward 2030 approvals. The deployment of these projects will be dependent on public support in terms of investment subsidies or an off-take price (e.g. through a contract for difference).

Figure 10 | Geothermal power development scenarios – 2026-50 (MW)



Source: SAPI (2026); MH SR (2025); IF SAS (2025)

The 2025 Final Updated NECP preserves a 4 MW target for geothermal capacity by 2030, a figure that has remained consistent since the original 2019 plan and the 2023 draft. This goal marks the anticipated debut of large-scale geothermal power production in Slovakia, which is now expected to come online in 2029. Should development proceed along this path after 2030, the country's geothermal capacity is projected to reach 31 MW by 2050.

According to the Green Scenario developed by IF SAS (2025) for SAPI, achieving a zero-emissions trajectory requires an increase of approx. 17 MW in installed geothermal capacity by the end of 2030 compared to 2025 levels. By 2050, the target should rise to 300 MW, ensuring the country meets its climate commitments, particularly the goal of climate neutrality.

Figure 10 above provides a graphical comparison of the three potential development scenarios for Slovakia's geothermal power sector through 2050.

Battery energy storage systems

06

Since 2025, the SAPI Market Outlook for Renewables has included a dedicated chapter on Battery Energy Storage Systems (BESS), reflecting their growing strategic importance in the energy transition. Battery storage technologies, most commonly based on lithium-ion chemistry, alongside emerging alternatives, are becoming an essential component of a modern, flexible and resilient electricity system. BESS enables the efficient integration of variable renewable energy sources such as solar PV and wind by storing surplus electricity during periods of high generation and discharging it when demand increases or renewable output declines. In this way, storage contributes to balancing supply and demand, reducing curtailment, supporting system services, and strengthening overall grid stability and security of supply.

Recent developments[3]

This analysis provides an overview of Slovakia's battery energy storage market in 2025 across the residential, commercial and industrial (C&I), and utility-scale segments. As no centralised reporting framework currently exists for residential and C&I installations, the estimates presented here combine verified data from regional distribution system operators (DSOs) with market intelligence gathered from Slovakia's leading BESS distributors and suppliers.

In the residential segment, data from regional DSOs indicates that around 8% of newly commissioned residential PV systems up to 10.8 kW in 2025 were installed together with battery storage. Assuming an average battery size of 7 kWh per system, this would correspond to more than 1,200 newly deployed units with an aggregate capacity of approximately 9 MWh. However, feedback from market participants suggests that actual deployment was considerably higher. Sales volumes reported by distributors indicate that the residential storage market may have ranged between 50 and 60 MWh in 2025, pointing to a significant number of installations not yet fully reflected in official grid connection statistics. While total installed residential storage capacity is not officially available, SAPI estimates that it has likely surpassed 130 MWh.

In the C&I segment, DSO data shows that nearly 12% of newly commissioned "Local Sources" in 2025 were combined with battery storage. Based on an average storage capacity of 178 kWh per installation, this suggests that approximately 105 systems were deployed during the year, representing close to 18.7 MWh of additional capacity. This figure is also likely conservative. Market data from distributors indicates that annual sales could have reached 30 MWh, suggesting stronger uptake than currently captured in available administrative records. Although total

[3] In early 2025, available information on the deployment of BESS in Slovakia is limited and incomplete, based on the data provided through statistically reported sources. Therefore, the figures presented in this section should be considered preliminary, derived from simplified statistical data. More accurate estimates are expected to be available in future outlook reports.

installed capacity in the C&I segment is not officially reported, SAPI estimates that it has likely exceeded 80 MWh.

In the utility-scale segment, the most robust data is available from regional DSOs, which maintain official grid connection records. According to these sources, 24 stand-alone large-scale BESS projects were commissioned and connected to the grid in Slovakia during 2025, representing a combined power output of nearly 33 MW and an estimated storage capacity of 41 MWh. This would bring the total installed utility-scale BESS fleet in Slovakia to 67 MW of power and almost 84 MWh of capacity by year-end 2025.

Notable projects

The large-scale segment saw record growth in 2025, driven by new technical standards for ancillary services and industrial decarbonisation goals. In January 2025, TESLA Blue Planet (Tesla Energy Group) commissioned a BESS in Vlkanová (Banská Bystrica Region) with an output of 3.78 MW and a storage capacity of 5.59 MWh, integrated with a 2 MW solar plant to provide flexibility services for the Slovak electricity TSO SEPS. In July 2025, Stellantis Slovakia secured environmental approval for a massive 25 MW BESS (with 49.74 MWh of storage capacity) at its Trnava automotive plant, designed to work in tandem with a 36 MW photovoltaic system for on-site consumption and peak shaving.

The first quarter of 2026 marked a turning point for Slovakia's energy infrastructure as several landmark storage projects reached operational status. In March 2026, UCED (the energy division of the CREDITAS Group) commissioned a 10 MW (16.7 MWh) BESS at the Považská Bystrica industrial park; with an investment of nearly EUR 5 million. Simultaneously, InoBat, under its specialised BESSMONT brand, completed a 10 MW (30 MWh) installation at the OFZ metallurgical plant. Co-funded by the Slovak Recovery Plan, this system is engineered to stabilise the extreme energy spikes inherent in alloy production, with its final technical handover scheduled for late March. During the same period, Slovenské elektrárne expanded its portfolio at the Nováky site (Trenčín Region) with a dual-system deployment totaling 36 MW in output and 72 MWh in storage capacity.

Future development scenarios

The Slovak battery energy storage market entered a new growth phase in 2025, following the first wave of larger deployments recorded in 2024. Market development across all three segments indicates that battery storage is shifting from a niche flexibility technology toward a core pillar of the future electricity system.

In the residential segment, deployment trends from 2024 and 2025 suggest that batteries are becoming a standard complement to rooftop solar PV rather than an optional add-on. Distributor sales data indicates that actual market penetration is materially higher than reflected in grid statistics, implying that many retrofits or off-record installations are not yet captured. This mirrors developments in leading EU markets such as Germany, Austria and Italy, where household batteries are increasingly installed alongside solar systems to maximise self-consumption, reduce peak imports, and provide backup power. According to recent European market data, residential batteries continue to represent the largest share of annual storage additions in several mature solar markets. Slovakia is therefore likely to follow the same path, particularly if retail electricity prices remain volatile and subsidy schemes for households continue.

In the C&I segment, the market outlook is similarly positive. The share of newly commissioned Local Sources combined with storage increased sharply in 2025, while average system sizes also rose substantially compared with 2024. This suggests that Slovak businesses are moving beyond

pilot projects toward larger operational assets designed to reduce demand charges, optimise solar self-consumption, and participate in balancing markets. Further expansion of this segment will depend on tariff reform, clearer market access rules, and monetisation opportunities for ancillary services.

The strongest medium-term growth is expected in the utility-scale segment. After 13 large-scale systems deployed in 2024 and 24 additional projects connected in 2025, Slovakia now has a clear pipeline of grid-scale battery projects. This reflects broader European trends highlighted by recent storage market reports, where front-of-meter batteries are becoming the fastest-growing segment due to their ability to provide balancing reserves, congestion management, and renewable integration.

Based on current market momentum, three broad scenarios can be considered for Slovakia through 2030. Under the business-as-usual scenario, growth continues under the current regulatory framework, led mainly by residential and selected utility-scale projects. Total installed battery capacity could exceed 350-450 MWh by 2030. An accelerated market scenario would entail improved regulation, access to ancillary services, NRRP funding, and falling battery costs unlock stronger C&I and utility-scale investment. Total capacity could reach 700-900 MWh by 2030, broadly consistent with regional market trends. Finally, under the system transformation scenario, battery storage becomes a strategic pillar of power sector modernisation, integrated with large-scale solar, EV charging, flexibility markets, and grid reinforcement planning. In this case, Slovakia could surpass 1.2 GWh of installed battery capacity by 2030 and continue expanding rapidly thereafter.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