frank bold

Smarter Grid, Safer Future

Eight Steps to Cut Electricity System Costs in Czechia Based on International Good Practice

List of abbreviations

ACER	The European Union Agency for the Cooperation of Energy Regulators
CR	Czech Republic
DSO	distribution system operator
ERO	Energy Regulatory Office
FERC	Federal Energy Regulatory Commission
GWp	Gigawatt-peak
LV	low-voltage (level)
MIT	Ministry of Industry and Trade
MVA	megavolt ampere
NAP SG	National Action Plan for Smart Grids
NECP	National Energy and Climate Plan
PV	photovoltaic power plant
RLC	remote load control (switching between two static time-of-use tariffs)
RES	renewable energy sources
SPV	Special Purpose Vehicle
TSO	Transmission System Operator
HV	High voltage (level)
UK	United Kingdom
VHV	Very high voltage (level)
WPP	Wind power plant

Contents

Introduction

Modernisation of the electricity system is crucial for the efficient integration of renewable energy sources (RES) and for strengthening the energy security and competitiveness of the Czech Republic (CR). Traditional infrastructure expansion in the form of new construction is necessary, but time and money consuming. Financial investments are inevitably and significantly reflected in the electricity network tariffs and thus in the price of electricity for consumers.

Unless existing electricity system capacity is used more efficiently, the network tariffs will rise by 50–100%.[1]

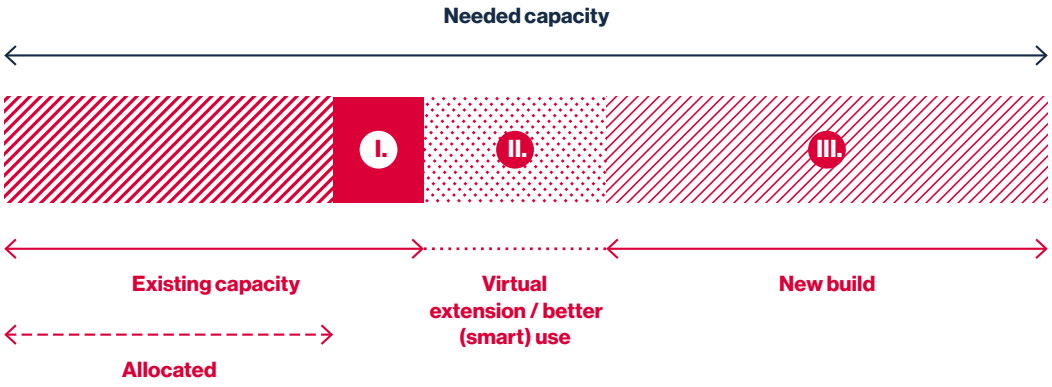
There are 3 parallel paths to solving this problem:

I. **(re)allocation of existing unused capacities,**

II. **better (or smarter) use of existing network capacities,**

III. **building new capacities (network reinforcement, new construction, modernisation).**

How can we increase network capacity?



Source: Zsuzanna Pató, Regulatory Assistance Project

How big is the problem?

Energy Regulatory Office[2] (ERO) data show that distributors have seen **a more than threefold increase in new connection requests between** 2022 and 2023 compared to 2021, with more than 76% of the requested capacity rejected (totalling almost 70 GWp).

Despite this, currently contracted but unrealised photovoltaic and wind projects total **23 GW of grid reservations**[3], which is more than double the Czech Republic's RES target by 2030 according to the National Climate and Energy Plan (NECP).

Smart non-investment measures will allow existing capacity to be optimised, reduce costs for consumers, and accelerate the connection of new RES or battery storage facilities, which support the energy security of the Czech Republic.

This analysis **proposes eight measures** that will enable better use of existing grid capacity. The measures are inspired by the practice **of eleven countries** from Europe and the rest of the world and serve as a contribution to further debate on how to strengthen network capacity **at the lowest possible cost and without negative impacts on consumers**.

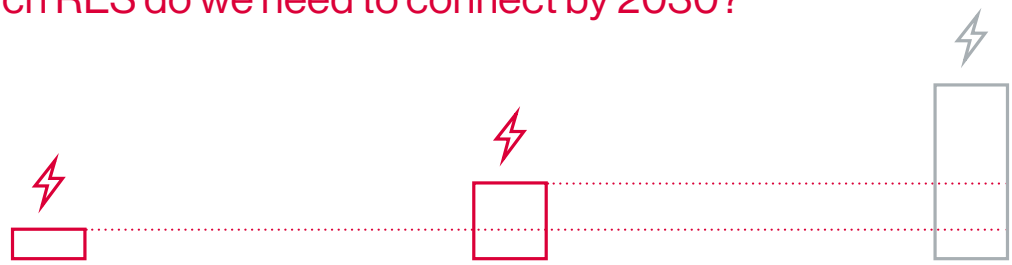
1 ACER: Getting the signals right: Electricity network tariff methodologies in Europe, 26 March 2025, p. 4. Available from: https://www.acer.europa.eu/sites/default/files/documents/Publications/2025-ACER-Electricity-Network-Tariff-Practices.pdf

2 Energy Regulatory Office website: https://eru.gov.cz/en

3 EGÚ Brno, Options for improving the integration of renewable energy sources into the electricity grid, 2025. Available from: https://hnutiduha.cz/publikace/moznosti-zlepseni-integrace-obnovitelnych-zdroju-do-elektrizacni-soustavy

Eight measures to cut costs while strengthening the electricity system

How much RES do we need to connect by 2030?



4.8 GW
Renewable power currently installed in the Czech Republic

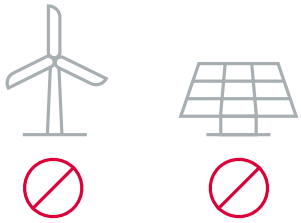
11.6 GW
Target by 2030 according to the NECP

23 GW
Reserved capacity

We need to increase the installed capacity of RES by 6.8 GW by 2030. However, the reserved capacity in the grid is almost four times higher. Many of these projects will never get built and are only blocking capacity for better-prepared projects by developers and citizens.

The proposed measures will release up to 17.8 GW of capacity on the grid, with the potential to save up to CZK 226 billion (ca 9, 058 mil. €) in investment in infrastructure reinforcement.[1]

1. Release of unused capacity reservations

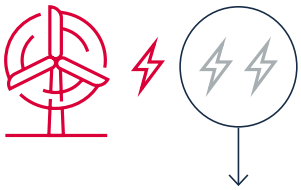


At least 23 GW of network capacity is reserved for unrealised solar and wind power projects.

We estimate that up to 10 GW of reserved capacity can be released.

BEST PRACTICE United Kingdom

2. Adequate capacity reservations – "use it or lose it"



Reserved grid capacity does not always correspond to the actual installed capacity or electricity consumption. Network users should either use the capacity or lose it.

We estimate that up to 3.8 GW of reserved capacity can be released.

BEST PRACTICE Netherlands

3. Prioritization in connecting to the network

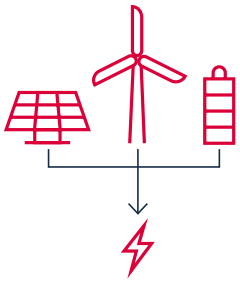
We need to change the principle used to determine whether to connect a project to the grid. Instead of the "first-come, first-served" rule, we recommend ranking projects according to criteria such as project readiness or the benefit to society and the network.

We should connect the renewables and battery systems that we need most in the electricity grid.

BEST PRACTICE Netherlands

[1] This amount is based on an estimate of the average costs of distribution system development related to the connection of RES. According to a study by EGÚ Brno (Options for improving the integration of renewable sources into the electricity grid, April 2025), the cost of connecting 1 kW of RES (PV, CHP) is estimated at CZK 12 700 (cca 510 €).

4. Cable pooling

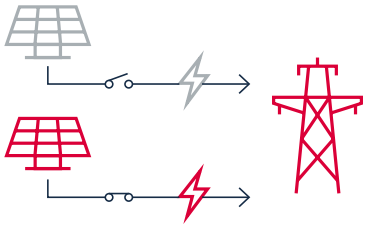


Solar and wind power generation is complementary throughout the year, so they can share grid connection. This reduces the cost of building RES and ensures the capacity of the electricity grid is used more efficiently.

We estimate that up to 2 GW of reserved capacity can be released.

BEST PRACTICE Poland

5. Flexible grid connection agreements

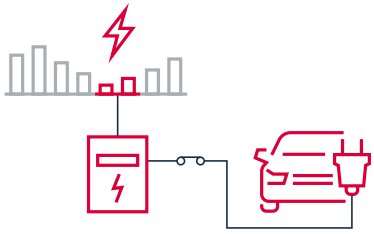


Flexible connection agreements allow network operators to respond to congestion in locations with limited capacity. Customers who sign up for it are not guaranteed uninterrupted access to the network and their electricity production can be limited by the DSO. However, they can be incentivised through other benefits, such as discounts on the electricity distribution tariff or compensation for undelivered electricity.

We estimate that up to 2 GW of new capacity can be made available for RES.

BEST PRACTICE Belgium

6. Dynamic network tariffs



Dynamic network tariffs incentivise users to adjust consumption according to network load, e.g. by shifting EV charging to off-peak hours. They can thus react to the current state of the network. Their operation requires the installation of a smart meter.

Thanks to dynamic distribution tariffs, we will learn to understand the grid better and optimize its use.

BEST PRACTICE Switzerland

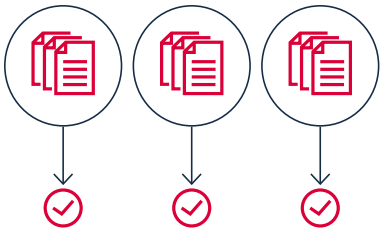
7. Transparency when connecting new RES

Developers of new RES projects need to know the connectivity options in the area where they want to invest. Interactive maps are convenient, as well as required by the Czech Energy Act, and must be updated regularly at all voltage levels.

We will find out where developers can invest and at what cost.

BEST PRACTICE Belgium

8. More efficient connection of RES – clustering method



The cluster approach speeds up RES connection by grouping applications into groups (clusters) and assesses their connectivity at the same time. This reduces administration, saves time, and reduces costs.

We can connect more renewables to the grid at lower costs.

BEST PRACTICE USA

Eight recommendations for the Czech Republic

1.

Release unused capacities

Audit existing connection agreements (analyse the scope of the problem).

Use the amnesty for leaving the grid connection queue (positive motivation).

Introduce mandatory milestones in connection agreements (in consultation with representatives of the investors).

Cancel capacity reservations in case of non-achievement of milestones within the set deadlines.

2.

Adequate capacity reservations

Transfer unused part of the reserved capacity from sources already in operation.

Accelerate changes in the tariff structure at HV and VHV levels, but also consider the use of a tool that would allow DSOs to remove unused capacity under specific conditions.

3.

Prioritization in connecting to the network

To support connection of community energy projects and battery storage in the short term.

The key and systemic solution is moving away from the first-come, first-served principle (“first to join”), and instead favouring better prepared projects and projects of strategic importance to the country.

4.

Cable pooling

Official and improved promotion of the possibility of shared connection, especially for PV and WPP, where production overlaps only for a limited time, and, on the contrary, complements each other over the course of the year. This will reduce costs for the construction of RES and make more efficient use of the capacity of the electricity grid. It is also important to enable the use of shared connections for projects of multiple RES investors.

5.

Flexible grid connection agreements

Add financial incentives to enter flexible contracts that allow DSOs and TSOs to respond better to network congestion. Ideally, as a form of support, we recommend a discount on network tariffs. Introduce a threshold above which it is mandatory for electricity producers to receive compensation.

6.

Dynamic network tariffs

Introduce dynamic network tariffs that motivate network users to behave more “grid friendly”. We recommend that tariffs are first tested in pilot projects on LV levels.

7.

Transparency when connecting new RES

Continue to improve “network capacity maps” maintained and managed by DSOs. Display information in greater detail even at HV and VHV levels, adding anonymised information about the current connection queue in a given area, estimating the time for connection for a specific project or a cost estimate for the connection of the intended RES.

8.

More efficient connection of RES – clustering method

Evaluate the introduction of the clustering method as a possible element of connection reform in the Czech Republic. Introduce the principle that connecting priority should go to better prepared projects which can be implemented faster.

Together, these measures have the potential to release up to 17.8 GW of grid capacity for RES.

Release of unused capacity reservations

Across Europe, to varying degrees, we are dealing with long-standing unrealised power plant projects that, either intentionally (speculatively) or unintentionally block the capacity to connect other sources. The number of connection requests is still rising, and we need to address this issue proactively.

The essence of the measure described below is therefore:

1) to **release blocked capacity in the network** and redirect it to projects who will use them,
2) to **prevent speculation** with reserved capacities.

Possible solutions?
Positive motivation and strict requirements

Experience from abroad shows that it is important to introduce the **right incentives** in the connection process, whether **positive**, by forgiving a financial penalty that projects would otherwise have to pay if they leave the queue, or **negative**, by introducing stricter entry requirements and cancellation of reservations if certain milestones are not met. In the UK and Spain, they have even combined these two approaches and in this way successfully addressed the network capacity problem.

United Kingdom

In the **UK**, prior to the cancellation of capacity reservations, they first carried out an extensive analysis of the problem, based on which they developed a strategy to release unused power reservations in the network[1]. This was followed by a series of two steps.

The first was a **positive incentive** in the form of an amnesty for leaving the queue[2]. The regulator gave inactive projects with reserved capacity the opportunity to leave the so-called connection queue without recovering the costs that network operators had already spent on connection-related energy infrastructure modifications. Projects with a total capacity of **8.2 GW** applied for the amnesty from October 2022 to the end of April 2023.

In the second step, the UK proceeded with a **negative incentive**. The rather strict measure was to add mandatory milestones to new and existing connection contracts, with a corresponding deadline for their fulfilment, set by the local regulator Ofgem.

Projects that fail to meet these milestones will have their capacity reservations cancelled and must also pay a charge that takes into account costs already incurred for the connection (the so-called cancellation fee). In total, there are eight milestones, primarily concerned with securing the necessary permits, rights to the land in question, or securing financing. It is estimated that up to **86 GW** of currently reserved capacity will be released[3].

Spain

Spain has also **found a way** to remove unused reservations. A royal decree from 2020 required old RES projects with an approved connection application to obtain an environmental permit by 31 months after the decree was issued[4]. Similar to the UK, projects were allowed up to 3 months after the decree to leave the queue, in exchange for a refund of the financial advance for the connection.

If projects failed to deliver the permits mentioned above, the network operators cancelled their capacity reservation and connection agreement. According to the Spanish TSO, this **freed up 15 GW of capacity** – 5 GW for wind and 10 GW for solar projects. This capacity was then offered to more prepared RES projects.

1 Connections action plan: speeding up connections to the electricity network across Great Britain, available from: https://www.gov.uk/government/publications/electricity-networks-connections-action-plan/connections-action-plan-speeding-up-connections-to-the-electricity-network-across-great-britain

2 Our five-point plan, TEC Amnesty, available from: https://www.neso.energy/industry-information/connections/our-five-point-plan

3 Connections action plan: speeding up connections to the electricity network across Great Britain, available from: https://www.gov.uk/government/publications/electricity-networks-connections-action-plan/connections-action-plan-speeding-up-connections-to-the-electricity-network-across-great-britain

4 News From Spain – 15,000 MW in grid connection points have been "freed up" since February 2023, available from: https://www.roedl.com/insights/renewable-energy/2023/june/news-from-spain

Situation in the Czech Republic: Reservations reach unrealistic levels

As of the beginning of 2025, about **4.8 GW** of PV[1] and WPP[2] are in operation. By 2030, the Czech Republic has set a target of around **12 GW** under its NECP[3]. Yet, according to current DSO data, investors have contractually reserved **23 GW of grid capacity**.

Given such a high total of reservations, the question arises **whether it is even possible to implement all these projects**. It is highly likely that a significant proportion of the applications already approved will not be implemented at all, thus blocking capacity on the grid for better prepared projects.

The DSO in our country does not have significant powers **to prevent or remove such reservations**. Specifically, under § 25 (3)(j) of the Energy Act, it has the right to cancel a capacity reservation or power input if the applicant for connection demonstrably fails to meet the terms and conditions of connection.

According to the explanatory memorandum, this means the right to unilaterally cancel the obligation under the connection contract, i.e. that the cancellation of the reservation should simultaneously imply the cancellation of the connection agreement itself, negotiated between the DSO and the connection applicant. This means that exercising this right must always **be based on the terms and conditions set out in the connection agreement**.

This measure is hardly used because the DSOs (rightly) fear litigation from investors, and due to the fact that it is only a right, not an obligation.

Recommendations on how to implement the measure

Due to the significant differences between the legal systems of the Czech Republic and the UK, we cannot fully adopt the approach used there. However, we recommend a four-step plan taking inspiration from this general approach:

1) **Audit** existing connection contracts (analyse the extent of the problem).

2) Use the **amnesty** for leaving the connection queue.

3) Introduce **milestones** in the connection agreements (in consultation with RES investor representatives).

4) Broaden the debate on **systemic changes** to the connection process in the future.

Audit of existing connection contracts

In the Czech Republic, the reserved capacity totals 23 GW, but more detailed information is not available, e.g. on the readiness of individual projects, or barriers they face. Therefore, as a first step, **we need to define the extent of the problem by auditing existing reservations**. Related to this is the need to quantify the costs and benefits of individual measures listed below.

1 The number of sources connected to the electricity grid increased by a quarter last year. The total installed capacity in the Czech Republic was increased by Temelín unit #2, Available from: https://www.solarniasociace.cz/2025/01/pocet-pripojenych-zdroju-do-elektrizacni-soustavy-se-loni-zvysil-o-ctvrtinu-celkovyinstalovany-vykon-v-cr-vzrostl-o-temelinsky-blok-2/

2 Installations in the Czech Republic, available from: https://www.csve.cz/instalace/instalace-v-cr/

3 Czechia – Final updated NECP 2021–2030, available from: https://commission.europa.eu/publications/czechia-final-updated-necp-2021-2030-submitted-2024_en

Positive incentives to voluntarily release reserved capacity

The second step should be a **positive incentive** to voluntarily release reserved capacity, following the UK and Spain model. We propose offering stagnant projects amnesty for leaving the connection queue, by forgiving the obligation to pay the costs of network reinforcement already incurred by the relevant DSO. This obligation arises in particular in cases where the reservation (connection contract) is terminated by the reservation holder (connection applicant).

Costs incurred for network reinforcement

These are costs that the distributor has reasonably incurred in connection with the intended connection of the applicant's installation (renewable source) according to the concluded connection contract.

The scope of the distributor's work on the network modifications is defined in advance in the connection contract and its annexes. This may typically include costs for line extensions to the location of the connection applicant's RES project or reinforcement of the substation, etc.

The DSO would thereby give up the ability to enforce its rights, but at the same time the ERO would guarantee that **all costs incurred by them to date would be considered deductible**.

Deductible DSO costs

These are the costs to distributors that will be recognised by the ERO. In the context of price regulation these costs are reflected in the regulated component of the electricity price.

At the same time, amnesty applicants should be entitled **to a refund of the advance payment** for their share of the connection costs, which may, under the terms of the contracts, be forfeited in certain similar cases.

The introduction of the amnesty would also bring **benefits to the DSO**, as it avoids the administrative costs of applying more restrictive measures (cancellation of reservations) or the consequent costs of protracted litigation against investors. Stakeholders who apply for connection to the newly released capacity in the network will again pay their share of the connection costs to the DSO.

The amnesty could be introduced via a new transitional provision of the Energy Act, which would:

- allow connection applicants to file for amnesty within a predetermined time-limited period,
- give the DSO an obligation to cancel these reservations without recovering the costs incurred for network reinforcement.

The aim of the measure **is to first offer stagnant projects the opportunity to leave the connection queue in a timely and targeted manner without threat of sanctions**, before proceeding to the restrictive measures necessary to release reserved capacity.

Introduction of mandatory milestones and deadlines

The third step is to introduce mandatory milestones and deadlines in new and existing connection contracts. However, it should be required that the RES developers are **transparently consulted in advance**. Consultation with developers will help bring the milestones closer to the reality of the RES construction process and, where appropriate, refine their selection.

It will also be important **to tailor the milestones to individual technologies** (PV and WPP) and not simply introduce them across the board in the same way for all sources. Once the milestones have been introduced in contracts, proof of compliance should be as **standardised** as possible so that DSOs do not incur disproportionate costs to check them. Proving compliance with milestones should instead rest on the shoulders of connection applicants.

If the milestones are not met, the DSO would then be obliged to cancel the reservation, on the basis of a newly added provision of the Energy Act. This will help **filter out some unrealistic projects** before the DSO starts investing in building or strengthening the related infrastructure.

As the proposed measure also aims **to interfere with existing connection contracts**, hence legal certainty of investors, and will potentially have a retroactive effect, a discussion with **representatives of the RES investors who will be most affected is crucial**.

However, we believe that changes to the current reservations and connection agreements **are permissible**. We rely on the **established case law of the Constitutional Court**[1] and the interpretation of the permissibility and impermissibility of retroactivity. We consider that choosing the appropriate legislative regulation these changes will **be seen as a false retroactivity**, where legal relations established under the old legislation (old reservations) will be governed by new legislation.

The courts generally allow for false retroactivity, the only exception being cases where such interference would be disproportionate. However, in the case of speculative capacity reservations, it is clear that the **intensity of the public interest of the State and its citizens outweighs** the investor's interest in the continued existence of the status quo (stagnant reservation). We consider the chosen instruments to be **appropriate means** to achieve the necessary objective (to find and eliminate speculative or permanently stagnant capacity reservations in the network).

The topic of **preventive and systemic measures in the connection process** are dealt with in the following chapters on targeted measures to achieve adequate network capacity reservation and prioritisation in connection to the grid.

[1] The ruling of the Constitutional Court of 12 July 1994, Pl. On the issue of undue retroactivity and its admissibility, the ruling of the Constitutional Court of the Republic of Slovenia, Case No. Pl. ÚS 30/23 of 17 January 2024.

Adequate capacity reservations (the “use it or lose it” principle)

When connecting new sources or points of consumption to the network, applicants may overestimate their **capacity reservations on the network, such that their project** does not actually use them. If connection applicants have no incentive to adjust these reservations to the actual installed grid capacity of their RES or electricity consumption, it often results in situations where they do not use all of the allocated capacity.

This is becoming a problem with increasing capacity reservations on the grid, which may have been avoided if there were preventive measures in place. At the same time, we also know of tools that solve the problem even when it already exists. All of these measures follow the principle mentioned in the title of this section: **“use your capacity or lose it”** or as we say it “don’t reserve it at all”.

Possible solutions? Significant but acceptable interference with the rights of the network user

Netherlands

An example of a tool that implements the "use it or lose it" principle is the so-called GOTORK[1] from the **Netherlands**, introduced by the local regulator ACM in April 2024, based on an initial proposal by the grid operators in May 2023[2].

DSOs or TSOs can now reduce unused reserved capacity of individual network users and distribute it among projects waiting to be connected. As this is a significant interference with the rights of the network user concerned, the instrument can only be used **under specified conditions**:

- Only in case of **medium, high or very high voltage network users** (does not apply to low-voltage users, e.g. households).
- Projects located **in congested areas**, retaining but not using significant network capacity (50% of unused capacity or underutilisation of at least 1 MW).
- Restriction is preceded by **mandatory consultation** with the entities in question to determine the exact unused capacity.
- The entity **shall also have the opportunity to demonstrate that it is using the reserved capacity or will use it** in the foreseeable future (within 1 year at the latest).

For some entities providing basic needs of the state (social services, hospitals, education, etc.), the regime is more lenient, with exceptions.

1 Codebesluit niet gebruikte transportrechten (GOTORK), available from: https://www.acm.nl/nl/publicaties/codebesluit-niet-gebruikte-transportrechten-gotork

2 Autoriteit Consument & Markt, available from: https://www.acm.nl/nl/publicaties/voorstel-codewijziging-niet-gebruikte-transportrechten-gotork

Situation in the Czech Republic: Distributors do not have rights or tools

At present, **distributors have no specific instrument for the return and reallocation of unused** reserved capacity, and must rely for the time being on the voluntary reduction of reserved capacity by users.

According to EG.D[1], electricity producers **are using only 50–60% of their reserved capacity**, thus blocking capacity for new connections. According to DSOs, the problem is evident mainly at the LV level. The metering data that would bring clearer understanding of this problem are not publicly available.

The second possibility is the **voluntary transfer of reserved capacity** from already connected equipment by the network user – this is allowed by the Decree on Connection[2]. However, a certain technical proximity of the connection points is required (the equipment is connected from one substation or a nodal station) and the transfer must not give rise to additional costs for network modifications.

> The transfer of reserved power can be imagined as a village where a number of households want to connect rooftop PV to the grid, but this is not possible due to depleted capacity.
>
> However, if local residents who already have a PV on their roof do not use all of their reserved capacity on the grid, they can transfer it to their neighbours or provide it to the municipality for a larger power plant project built in the public interest or as part of an energy community.

Measures taken to prevent this problem have so far involved minor modifications to the Decree on Connection[3], where it is now possible to reserve power in the network only up to the installed capacity (i.e. 1 : 1) of the RES. Previously, it was possible to reserve power up to 1.2 times of the installed capacity.

Similarly, investment subsidies for RES provided by the Modernisation Fund and other sources are trying to address this issue.

Also relevant are the changes in the tariff structure at high and very high voltage levels, which were proposed by the ERO. The adjustments are intended to **encourage electricity consumers to return any unused capacity to the network**.[4] According to the ERO, the tariff changes will release up to 3,000 MW of capacity, e.g. for RES projects.

The reform is based on the principle that the price paid by the consumer corresponds to the costs and benefits it generates in the system. However, the effectiveness of these changes has been reduced by the delay of their implementation from 2024, as originally planned, to 1 January 2027[5].

1 The solar boom in the south of the Czech Republic is hampered by wires. A problem for more than a year, says EG.D, available from: https://www.seznamzpravy.cz/clanek/ekonomika-firmyslunce-sviti-draty-nestaci-problem-se-za-rok-nevyresi-rika-sef-eg-d-237227

2 Decree No. 16/2016 Coll., on conditions of connection to the electricity grid, available from: https://www.zakonyprolidi.cz/cs/2016-16

3 Decree No. 16/2016 Coll., on conditions of connection to the electricity grid, § 3(3), the change applies to non-synchronous generation modules, typically PV plants, CHP and SHPP. Available from: https://www.zakonyprolidi.cz/cs/2016-16

4 Design of a Network Efficiency Concept, available from: https://eru.gov.cz/narvh-koncepce-efektivniho-vyuzivani-siti

5 Decree No. 6/2024 Coll., on electricity market rules, available from: https://www.zakonyprolidi.cz/cs/2024-6

Recommendations on how to implement the measure

We need an analysis of the problem

For the reallocation of reserved power, as a first step, we propose to test the hypothesis mentioned by EG.D and perform **an extensive analysis of this problem at the level of all DSOs** (through metering data) and all voltage levels. If this hypothesis is confirmed, **measures similar to those in the Netherlands could follow**, consisting of reduction of reserved power according to actual use. However, specific conditions should be set after detailed consultation with the energy sector as a whole.

Transfer of unused reserved power

One other option could be the aforementioned **transfer of unused reserved capacity to other entities in the same part of the grid**. In the Czech Republic, typically on LV networks, there is often reserved capacity that doesn't correspond to the real installed capacity. This unused reserved capacity could be transferred to the municipality or energy community, which would use it for their new resources.

The transfer of reserved capacity from multiple local residents with PV could in aggregate provide connections to power plants built in the public interest. It would require transmission sites connected at the same voltage level (at one substation). In order to increase the potential of this option, it would be necessary to simultaneously loosen the rule that the transfer must not give rise to additional costs for network modifications. Any costs would be paid by the party to whom the unused capacity is transferred.

Changes in the tariff structure

To free up additional capacity for RES, we recommend accelerating the planned **changes in the tariff structure** for the HV and VHV to an earlier date, namely early 2026. Similar changes should be carried out at the LV level, ideally at the earliest possible time and with broad social dialogue.

Prioritization in connecting to the network

There are rules for deciding who joins the network and when. **The two main approaches are used around the world:** either projects are evaluated and ranked according to the date of connection request (first come, first served), or according to predefined criteria.

The criteria generally consist of an assessment of how much **benefit** the project brings to society or the network. Priority is then given to those that excel. This may be the case for well-prepared RES projects that are capable of quick connection to the grid and installation – the so-called **"first-ready, first-served principle"**. However, it is also the case for projects with higher social systemic impact (schools, hospitals) or projects of strategic importance. The criteria can also favour **battery storage installations**, which help the network by allowing it to respond to fluctuations in consumption or electricity generation over time (providing power balancing services).

Possible solutions?
Ranking by readiness and strategic importance

USA

The principle of **"first-ready, first-served"** is used, for example, in the USA[1], where new RES projects are only assessed in groups (so-called clusters), not individually. This results in one study for the whole cluster, which ranks projects **according to their level of readiness**. Priority is given to projects that have secured financing or land rights to the land affected by the development, etc.

United Kingdom

Meanwhile, **the UK** has initially favoured battery storage[2], provided that it voluntarily commits to regulation by the grid operator in the event of congestion. The regulator Ofgem, in partnership with the state-owned company NESO, has also prepared a major connections reform[3] which introduces the principle of "first ready, first connected". The process, which has been planned in detail from the end of 2022, **is expected to result in the introduction of a completely new connection process in 2025**.

At its heart is the prioritisation of ready and strategic projects, including reordering the existing queue for grid connection. The process then consists of two "gates" through which existing and new projects must pass to be assessed for their readiness and importance to the network. **Once the criteria are met, they are given a place in the queue and a firm connection date.**

Netherlands

In the **Netherlands**, prioritisation of projects with higher grid and societal benefits is **one of the tools chosen to address the rapidly declining capacity of the grid**. In March 2023, the regulator ACM therefore announced a departure from the principle of "first come, first served" in areas where the grid is congested, and support for projects with a social function and those that address or reduce congestion problems[4].

The changes were introduced in April 2024, following consultation with market participants, by amending the Network Code[5], which set out **three categories of priority projects**:

1) projects that relieve the grid and provide more space for others to connect – e.g. battery systems;
2) projects that provide security – national defence, healthcare;
3) basic needs projects – drinking water, housing, education.

Network operators are required to use these rules from 1 October 2024, but each applicant must prove its own eligibility to qualify for inclusion in a relevant category.

1 https://web.archive.org/web/20250401134227/https://www.ferc.gov/explainer-interconnection-final-rule#

2 Accelerating Energy Storage Connections policy update, available from: https://www.nationalgrideso.com/document/281171/download

3 Connections Reform, available from: https://www.neso.energy/industry-information/connections/connections-reform

4 ACM geeft extra mogelijkheden om bestaande stroomnet efficiënter te gebruiken, available from: https://www.acm.nl/nl/publicaties/acm-geeft-extra-mogelijkheden-om-bestaande-stroomnet-efficienter-te-gebruiken

5 Codebesluit prioriteringsruimte bij transportverzoeken, available from: https://www.acm.nl/nl/publicaties/codebesluit-prioriteringsruimte-bij-transportverzoeken

Situation in the Czech Republic: Connect everyone who asks, vs. running out of capacity

In the Czech Republic, we do not yet use prioritization tools, and new infrastructure is instead built on the principle of **"first come, first served"**. The Energy Act includes the general principle that the DSO is obliged to allow **connection to anyone who requests it**, as long as they meet the conditions for connection, and there is no limit in the capacity of the network or risk to reliable and safe operation. The Connection Ordinance[1] then states that the relevant DSO shall reserve the required capacity for the applicant from the moment of submission of the draft connection contract.

In the Czech Republic, we are already facing connection limitations in many areas, or refusals due to exhausted capacity. This is the case, for example, in South Moravia[2], where there has been a large increase in the installation of solar power plants.

Recommendations on how to implement the measure

We propose two types of solutions: **short-term and long-term (systemic)**.

- Short-term measures may include favouring projects that **provide flexibility to the grid** (typically battery storage), or public benefit projects and **community energy projects** where households, municipalities and local businesses are effectively involved in the energy transition.

- As a long-term systemic measure, we propose introducing priority connection of projects that are **better prepared and are of strategic importance for the decarbonisation of the Czech energy sector**.

Which projects are of strategic importance?

For us, we consider projects of strategic importance to be mainly wind power plants, the construction of which is stagnating in Czechia. The installed capacity of wind power plants was only about 352 MW in 2024.

This is well below the national target of 1.5 GW set for 2030. However, the Czech Republic can certainly identify other strategic resources on the basis of its long-term strategies. In the UK, for example, they have even divided the grid into different areas according to what RES they want or need there, and prioritise those that are most needed in that particular region.

Battery as a grid stabilizer

Energy storage in large stand-alone battery storage systems (BESS) was introduced in the Czech Republic by an amendment to the Energy Act known as Lex RES 3. Thanks to this, we expect an increase in the number of battery storage projects, which can also **serve as a provider of flexibility and power balance services**. We therefore recommend that the ERO and the MIT, in consultation with distribution and transmission operators, consider the possibility of preferential connection specifically for such facilities.

Priority connection of battery storage facilities will enable the expansion of this sector, which is key for the decentralisation and decarbonisation of the Czech energy sector. This will enable greater use of renewables for both electricity supply and grid balancing: power balance services which in the Czech Republic have so far been provided mostly by fossil fuel sources.

1 Decree 16/2016 Coll., on Connection, § 9(2) and § 8(4), available from: https://www.zakonyprolidi.cz/cs/2016-16

2 Available capacities in the distribution system and information on applications, available from: https://www.egd.cz/volne-kapacity-v-distribucni-soustave-informace-o-zadostech

Necessary changes to legislation

- In the part of **Energy Act** which regulates the obligations of distribution[1] and transmission[2] system operators new condition for priority connection of certain sources must be established and then further determined by implementing legislation.

- For this reason, it is also necessary to **extend the ERO's rights** to regulate connection in the relevant decree[3], to make it possible to establish priorities for the connection of specific sources of electricity to the grid.

- The detailed process of setting priorities will be **regulated by the Decree on connection** and, consequently, by the **Rules for the Operation of the Distribution** (resp. Transmission) **System**.

- When setting the conditions for priority connection, it is necessary to set objective and equal criteria which are in line with the principles of European law concerning non-discriminatory access to the network.

Participation of local communities in RES projects

In accordance with Article 15d(2) of the RED III Directive, Member States should encourage direct and indirect **participation of local communities in RES projects**. We therefore recommend that this support should be included in the framework of the planned legal regulation of renewable acceleration areas, with the allocation of a certain lower percentage of grid capacity in a given acceleration zone for energy communities.

If the energy community will not use this capacity in the specified deadline, it would become available for other interested parties. It would therefore be a form of right of first refusal to reserve network capacity. This could also draw on the experience of countries[4] such as Spain and Lithuania, which have introduced similar measures.

Systemic changes in connection prioritization

As part of a systemic solution, we recommend opening a debate on possible **changes to the process of connecting to the network**, to consider whether the 'first come, first served' connection system fits today's reality. The Netherlands and the UK have already begun favouring better prepared projects and projects of strategic importance to the country due to depleted network capacities.

In the Czech Republic, the suitable platform to begin addressing the prioritisation of the connection can be the National Action Plan for Smart Grid (NAP SG). We therefore recommend the creation of a new working group with this agenda, which will create a proposal for necessary legislative changes.

1 Act No. 458/2000 Coll., on the Conditions of Business and the Exercise of State Administration in the Energy Sectors, Section 25(10)(a), Available from: https://www.zakonyprolidi.cz/cs/2000-458

2 Act No. 458/2000 Coll., on the Conditions of Business and the Exercise of State Administration in the Energy Sectors, Section 24(10)(a), Available from: https://www.zakonyprolidi.cz/cs/2000-458

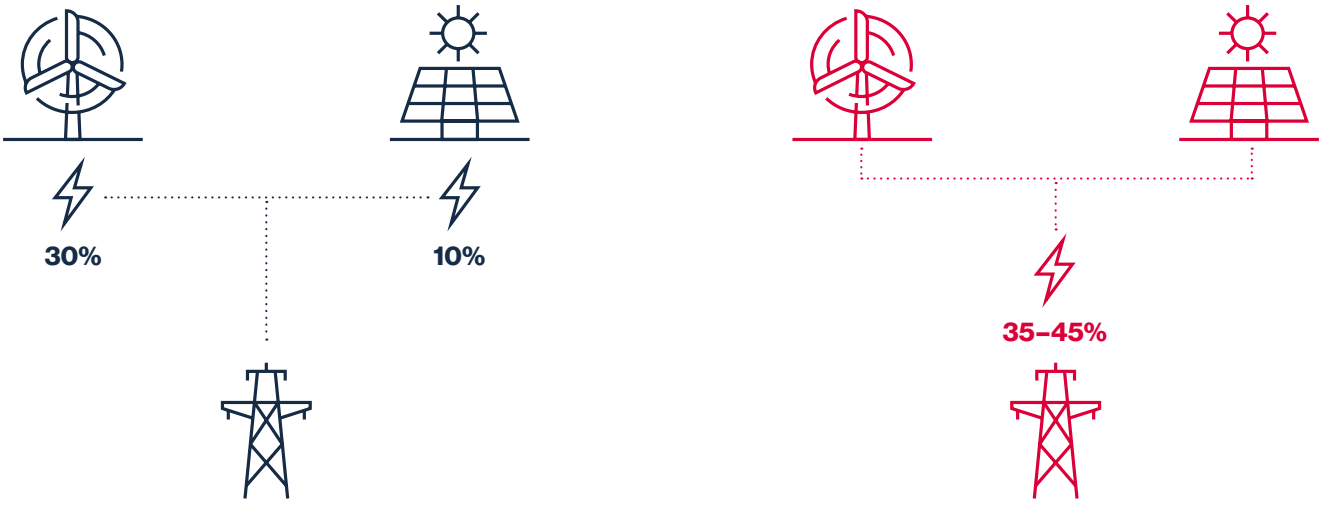
3 Act No. 458/2000 Coll., on the Conditions of Business and the Exercise of State Administration in the Energy Sectors, Section 98a(2)(g), Available from: https://www.zakonyprolidi.cz/cs/2000-458

4 A similar preference for engaging local communities is mentioned, among other things, in the recently issued European Commission Recommendation on speeding up permitting procedures for renewable energy and related infrastructure projects and its accompanying document. Available from: https://eur-lex.europa.eu/legal-content/CS/TXT/?uri=CELEX:32024H1343 and https://energy.ec.europa.eu/document/download/ad850f73-ab84-4ce1-9e66-7430f8f0c7e5_en?filename=SWD_2024_124_1_EN_autre_document_travail_service_part1_v3.pdf

Cable pooling

Cable pooling is a tool that allows **multiple renewable resources to share a single connection** point, thus taking up less capacity on the network.

A prime example of this is **WPP and PV, whose generation is spread over time** and **overlaps only to a limited extent** and, on the other hand, **are complementary across the year**, as shown in the graphic. Instead of each source connecting to the grid separately and taking up more capacity overall, the developer can set up the project to reserve less grid capacity for both power plants. Through cable pooling, it is also possible to connect a power plant together with BESS.



The figure shows that when WPP is connected alone, it uses its full reserved capacity for only 30% of the year, and PV only 10% of the year. However, **if they connect together, they use the reserved capacity 35–45% of the time**. In addition to saving network capacity, cable pooling also makes better use of it.

This will reduce the cost of RES construction, but also make more efficient use of the capacity of the electricity grid. Another advantage is the more efficient use of area (land), as both sources are implemented in a more efficient way in close proximity and thus do not disrupt the landscape in several places. Cable pooling is used mainly in cases of larger RES projects connected to higher voltage levels.

Possible solution?
Joint agreements and the use of batteries

Cable pooling can be used in two basic variants:

- A completely new installation of power generation plants that submit a joint application for connection.
- Connecting a new source to an existing one, e.g. adding a PV plant to WPP or vice versa. In this case, a change is necessary to the existing connection contract.

Netherlands

The Netherlands is a pioneer in cable pooling in the EU, already using connection sharing for PV and WPP. Shared connections are defined directly in the Energy Act.[1] The condition is that the reserved capacity for the project is at least 2 MVA and **a joint application for connection of these plants has been submitted**.

The law then treats these sources as a single generation facility and immovable property. The individual sources may be owned by the same entity or by several different RES developers.

A nice practical example of a locally owned VTE being supplemented by solar panels can be found with the Dutch distributor Alliander.[2] When cable pooling was introduced, 4 to 6 GW were released almost immediately to the grid.

However, the Netherlands goes even further in its efforts. In March 2024, the director of the regulator ACM announced that they will accept the use of cable pooling for battery storage.[3] In the province of Zeeland, there is such a project, where the WPP, PV and battery are connected at a single point.[4]

Poland

Poland introduced cable pooling for two or more renewable sources in October 2023 by an amendment to the Energy Act.[5] Here it is also possible to add a new RES to an existing source, or to build a completely new project with multiple RES connected together. If **different entities** cooperate on a project, they are obliged to conclude a **cooperation agreement** that specifies the terms of their cooperation on the connection and establishes a single responsible person acting on behalf of these entities. This always results in a single connection agreement.

In Poland, shared connection is limited only to networks with a voltage of 1 kV and above (high and very high voltage). Following the introduction of cable pooling, experts have estimated the capacity release for RES in the range of **6–10 GW**.[6] Connecting so-called standalone battery storage in this way is not yet possible, but is envisaged in the future.

1 Elektriciteitswet 1998, Article 1(7), available from: https://wetten.overheid.nl/BWBR0009755/2024-01-01

2 Alliander, Cable pooling, available from: https://www.alliander.com/nl/cable-pooling/

3 Dutch energy regulator to tolerate cable pooling for batteries, available from: https://cms.law/en/nld/publication/dutch-energy-regulator-to-tolerate-cable-pooling-for-batteries

4 Stedin connects 3 customers to 1 connection via cable pooling, available from: https://www.vsk.nl/en/artikelen/stedin-sluit-3-klanten-aan-op-1-aansluiting-via-cable-pooling

5 OJ 2023, item 1762, available from: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20230001762

6 Cable pooling: A potential solution for renewable energy optimisation in Poland, available from: https://www.naturalpower.com/uk/insight/cable-pooling-a-potential-solution-for-renewable-energy-optimization-in-poland

Australia, France, Spain and USA

Cable pooling has also been in use in France from 2023,[1] where they estimate a new capacity release for RES of 6–9 GW without any infrastructure investment. Other countries that have introduced some form of cable pooling include the USA[2], Australia[3] and Spain[4].

Situation in the Czech Republic: Theoretically possible, practically in the pilot phase

According to a consultation with representatives of RES developers, **DSOs already allow one connection request for a combined PV and WPP project**, although this option is not obvious from the legislation at first glance. It is also not offered openly to the developers by the DSOs, and there are no clearly adapted processes for this. Combining power plants and stand-alone battery storage will become possible with the entry into force of specific provisions in Lex RES 3.

The connection of new RES to existing power plants is generally possible, according to the current legislation.[5] However, this is only in cases where the application is submitted, and the connection contract is concluded **by the same producer whose plant is already connected to the grid**. In practice, this is utilized by the developers in particular in the case of phasing of construction of RES, where the producer connects another source to the existing plant. According to available information, attempts to combine WPP and PV are rare in practice, and DSOs consider such applications as new connection requests.

Completely missing in the Czech Republic are clear conditions for situations where cable pooling would be used by **multiple entities**, or where each of the "pooled" sources are owned by a different entity. For this option, already in use in Poland and the Netherlands, there is no legislation, and the rules of system operators are not ready for this.

1 Cable pooling on the final straight, available from: https://www.nortonrosefulbright.com/en-zw/knowledge/publications/2e0bc694/cablepooling-on-the-final-straight

2 Troutman Pepper Summary of FERC Order No. 2023 on Generator Interconnection Reform, available from: https://www.troutman.com/insights/troutman-pepper-summary-of-ferc-order-no-2023-on-generator-interconnection-reform.html

3 IESS implementation strawperson, September 2022, available from: https://aemo.com.au/-/media/files/initiatives/submissions/2021/iess/integrating-energy-storage-systems---implementation-strawperson---final.pdf?la=en

4 Memorandum on Spanish Royal Decree 1183/2020, available from: https://www.ramonycajalabogados.com/en/node/2457

5 See Section 50(3) of the Energy Act and Section 5(4) of the Connection Ordinance

Recommendations on how to implement the measure

We believe that the current wording of the Energy Act (for example, in the definition of point of connection or transmission point) does not preclude the use of cable pooling in cases where the sources sharing connection are **planned to be built by the same entity**.

However, it does not allow for cable pooling for resources constructed by **multiple entities** (entering into a multi-party connection agreement). For the development of cable pooling in the Czech Republic and the fulfilment of its potential, **two changes are needed**:

- The first is **market education and the launch of a discussion about the possibility of cable pooling** by DSOs, including the adaptation of the relevant internal processes. The official introduction of cable pooling can then be followed by awareness-raising activities, in cooperation with RES associations and other interest organisations that can disseminate the news to their members.

- The second is the **introduction of cable pooling for projects where several entities can work together**. The change would further encourage more efficient use of existing capacity by the combination of multi-investor projects.

- With the future emergence of stand-alone batteries, cable pooling could facilitate their development and deployment if connected to existing sources. There are again two ways to enable this cooperation:

- The first option is to set up a completely new joint entity, e.g. a new legal entity (the so-called Special Purpose Vehicle – SPV).

- The second option is to adapt the current legislation and make it clear how to proceed in these cases.

Special Purpose Vehicle (SPV)

This is a legal entity to be jointly owned and managed by the partners concerned. This entity may subsequently enter into a connection contract with the distributor, which will thus have certainty regarding who is obliged to fulfil the obligations and guarantees of the contract. This solution does not require any change in legislation.

Adapting legislation for cable pooling

This requires modification of the decree on connection under the responsibility of the ERO. It would be necessary to define cable pooling and establish its process as opposed to the current connection process.

The issue of multi-investor cooperation could be addressed similarly to the Polish approach through **the mandatory conclusion of a predefined cooperation agreement for a given project**. Contract connection agreements would be concluded with both entities, but under clear conditions in relation to the DSO.

The power of the ERO in the Energy Act[1] to regulate connection issues is sufficiently broad in the Decree and **does not require amendment of the Energy Act**. A follow-up would be needed providing more detailed conditions for the use of this method of connection, to be laid out in the operating rules of the distribution or transmission system.

As this is essentially a legislative and technical solution to make better use of existing network capacity, **it does not bring any additional costs**. This shows the simplicity and effectiveness of this solution.

[1] Act No. 458/2000 Coll., § 98a(2)(g), available from: https://www.zakonyprolidi.cz/cs/2000-458

Flexible connection contracts

A flexible connection contract allows network operators to respond to congestion in locations with limited capacity. Customers who sign up for this type of contract are not guaranteed uninterrupted access to the network; there may be times when production or consumption will be limited.

There are two types of flexible contracts:

- **Dynamic**, where the time of curtailment is not predetermined,
- **Fixed**, where pre-agreed "curtailment" times are respected by the DSO.

In return for this flexibility, customers receive financial benefits such as discounts on distribution charges or compensation for electricity not delivered to the grid. Flexible connection contracts can thus **maximise the use of existing network capacity**.

According to the ACER report, flexible connection contracts are used by about a third of EU member states.

Possible solutions?
A good plan and a reduction in network tariffs

Netherlands

The Netherlands is one of the countries struggling most with electricity grid capacity exhaustion. This is one of the reasons why the Dutch government issued the so-called National Grid Congestion Action Programme[1] in December 2022, which should address grid congestion and capacity issues, especially at higher voltage levels.

Flexible grid connection agreements are among the measures put in place. They can be **fixed** or **dynamic**, where the DSOs tell power plants the previous day that their generation will be curtailed due to congestion. When the contract is concluded, the generator and the network operator also **agree on** compensation **for curtailment**.[2]

Compensation consists from:

- MWh not delivered,
- lost support for the RES (eg. feed-in tariff compensation),
- lost profits for guarantees of origin of green electricity.

The first flexible contracts with large-scale producers were concluded in the Netherlands in November 2023.[3]

Denmark

Denmark, on the other hand, has chosen the option of offering reduced network tariffs[4] to larger consumers who accept the possibility of temporary interruptions in case of insufficient network capacity. However, these should be small interruptions so that the distributor does not have to maintain such high reliability of supply, thereby reducing or delaying grid investment. Denmark has therefore opted for a solution through changes in the tariff structure, and estimates a reduction in network charges of up to 50%.

1 Landelijk Actieprogramma Netcongestie, available from: https://open.overheid.nl/documenten/ronl-4a4a6f1bcb4f30278f4205aeb085c3208f62e8a6/pdf

2 What is a Capacity Limiting Contract (CBC)? Available from: https://withthegrid.com/what-is-a-capacity-limiting-contract-cbc/#vergoedingen

3 Netherlands combats grid overcapacity with flexible contracts for PV owners, available from: https://www.pv-magazine.com/2023/11/21/netherlands-combats-grid-overcapacity-with-flexible-contracts-for-pv-owners/

4 STATUS OF ENERGINET'S TARIFF DESIGN 2023, available from: https://energinet.dk/media/g3jihqjh/23_07494-8-eng-publication-status-of-energinets-tariff-design-2023-1.pdf

Situation in the Czech Republic: Restrictions without compensation

The Czech Republic has introduced flexible connection contracts, or rather the connection of electricity generation plants with the possibility of limiting the use of reserved capacity, **by amending the Energy Act (Lex RES 2)**. The exact form of the flexible contracts is defined in the Decree on Connection, which came into force in October 2024. **Curtailment is not compensated**, as is common in other countries, and there is no positive incentive to enter into flexible contracts.

However, the rule is that network operators must **primarily allow connections to the extent of the submitted application** (i.e. "full"), and only if the technical conditions do not allow them to do so can they offer other alternatives to applicants (e.g. connection with the possibility of limiting the reserved power). The aforementioned Decree also stipulates that **generating plants with this contract must have the facilities for so-called dispatch control**.

What is a dispatch control system?

Dispatch control of the electricity system refers to real-time control of the power system to ensure safe and reliable operation of the system, and ensure that the system performs its function, i.e. supplying electricity to customers at the required time, quantity and quality.

To maintain the physical balance between production and consumption, operators may intervene if necessary to prevent physical overloading of the grid. For example, system operators can request a change in the power output of the power plant remotely.

For this reason, power plants of a certain installed capacity are obliged to install equipment for dispatch control.

The obligation to install dispatching control is now also imposed on **all power generation plants with an installed capacity of over 100 kWp**. These generators thus have the advantage of being able to connect to the grid flexibly if they so choose.

At the same time, the Decree on dispatching control of the electricity system stipulates that if there is no agreement between the applicant for connection and the DSO or TSO in the connection contract, the generation plant may be limited **to only 5%** of its expected annual electricity production.[1] However, they may set a higher limit in the contract by mutual agreement.

Czech DSOs introduced connections with non-guaranteed reserved capacity on a voluntary basis **from 3 June 2024**, before the Decree came into force. For the time being, it can be used to connect generation plants at high voltage level (see ČEZ Distribuce, EG.D, PREdistribuce). According to DSOs data, as of September 2024, RES projects with a total capacity of **740 MW** have used this type of connection. According to their estimates, this tool **can be used to increase the connectable capacity** in the distribution system up to units of GW.[2]

1 Decree No. 79/2010 Coll., on dispatching control of the electricity system, § 14, paragraph 3, available from: https://www.zakonyprolidi.cz/cs/2010-79?text=o%20dispe%C4%8Dersk%C3%A9m%20%C5%99%C3%ADzen%C3%AD#f7907129

2 Monitoring of the connection of electricity generation plants to the distribution system in the Czech Republic 2021-2023, available from: https://eru.gov.cz/monitoring-pripojovani-vyroben-elektriny-do-distribucni-soustavy-v-ceske-republice-2021-2023

Recommendations on how to implement the measure

Since the measure already partly exists in the Czech Republic, we recommend that **the Energy Act be modified so that connection applicants are positively motivated** to conclude flexible connection contracts.

We recommend adding a **maximum limit to the restrictions** that electricity generators must "tolerate" without compensation. **For example, 5% of the total annual generation volume** could be considered, which is also the limit that DSOs proposed in the NAP SG[1] platform, used RES+ Call 3/2024, and is also used in the above-mentioned Dispatching Decree.

The legislative option is **to modify the provisions of the Energy Act** to address this type of connection, namely, § 24(12), § 25(13), § 26, § 98a (2)(g) and possibly also Section 26(6).

At the same time, we propose introducing **a second option of flexible connection**, which network operators may offer to producers if they want to set a limit above 5% of annual production volume. The curtailment would be accompanied by **financial compensation** at an amount set out in the contract with the connection applicant.

A similar solution is currently being proposed in Belgium, with a cap on the maximum amount of limited electricity above which compensation is granted, set at 5%, as we propose to introduce in the Czech Republic.

In the future, **a reduction of the distribution tariff** could also serve as a suitable incentive, as part of the introduction of a new tariff structure in the Czech Republic. This is also supported by the ERO's concept of the new tariff structure,[2] which mentions favouring such connections within the framework of distribution tariffs or connection fees.

The debate on alternative contracts should then be extended **to the low-voltage level**, where there is increasingly a depletion of network capacity to connect smaller sources. In particular, we should consider the possibility of abandoning the requirement to install dispatchable control equipment and replacing it **with intelligent metering equipment** that would automatically limit the maximum electricity consumption. The ERO, in consultation with local stakeholders, could also open this discussion based on the requirements of the European Commission and its EU Action plan for grids[3]. The latter stipulates that the regulator should develop a framework for such contracts and assess the potential for their use.

1 Updated NAP SG (2019-2030), Status of RES Connection, available from: https://mpo.gov.cz/assets/cz/energetika/strategicke-a-koncepcnidokumenty/narodni-akcni-plan-pro-chytre-site/2023/6/4_Stav_pripojovani_OZE_vetsich_od_100-kW.pdf

2 Concept for linking new market design in the electricity sector with regulated prices, pp. 20 and 22, available from: https://eru.gov.cz/koncepce-propojeni-noveho-designu-trhu-v-elektroenergetice-s-regulovanymi-cenami

3 Grids, the missing link – An EU Action Plan for Grids, available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2023%3A757%3AFIN & qid=1701167355682

Dynamic network tariffs

Dynamic network tariffs inform users about network capacity at the time of consumption, providing an economic incentive to adjust consumption, for example, by heating water, switching on heat pumps or charging electric vehicles during off-peak hours. These tariffs take better account of how their user's behaviour affects the grid, because they respond to the current state of the grid. However, they are less predictable and require the use of smart meters that record consumption in near real time.

These are so-called **time-of-use tariffs**, which vary according to the time of consumption. They are distinguished into:

- **static**, which fix the price for a longer period (e.g. day, week, year) well in advance, e.g. in the tariff system;
- **dynamic**, where consumers receive information on the price closer to the time real time, e.g. a few days or only a day in advance.

Possible solutions?
Changes every 15 minutes and smart homes

According to an ACER analysis[1], time-of-use tariffs are **used in 21 out of 28 EU countries**. However, in most cases these are a variant of static tariffs, where the peak load on the network is estimated over a long period of time. Only three EU Member States use truly dynamic tariffs: France, Norway and Sweden.

France

In France, medium-voltage users can take advantage of a dynamic tariff, whereby the periods with the most expensive electricity are known the day before based on estimates from TSOs.

Switzerland

Dynamic network tariffs are being tested in **Switzerland**. The local DSO Group E offers the Vario[2] product, where the tariff price varies every 15 minutes according to the expected network load. Prices are calculated and published by 6 p.m. each day for each 15-minute interval of the following day.

Prices are available on the website and through an online interface (WEB-API), which allows the data to be automatically used in the consumption management system of the customers.

Group E offers this option to all consumers with consumption up to 100 MWh per year, especially smart households that can manage their consumption or electricity generation in real time. The deployment of this product is part of the NeDeLa[3] **research project**, which is investigating dynamic network tariffs as a tool for decentralised management network load.

1 Report on Electricity Transmission and Distribution Tariff Methodologies in Europe, available from: https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_electricity_network_tariff_report.pdf

2 VARIO – Der dynamische Tarif als Option, available from: https://www.groupe-e.ch/de/energie/elektrizitaet/privatkunden/vario

3 NeDeLa – Grid tariffs for decentralised load control, available from: https://www.aramis.admin.ch/Texte/?ProjectID=52365

Situation in the Czech Republic: Obsolete Static time-of-use tariffs and RLC

So far, only **static tariffs** are used in the Czech Republic, which take into account network load calculated long in advance. Users can choose a two-tariff **split into a high and a low tariff**.

The lower tariff applies at times of expected lower load, which is advantageous for heating, heating water, and charging electric vehicles. The length of the low tariff varies according to the distribution tariff (8–20 hours per day) and the conditions for its use are set annually by the **ERO** in a price decision.[1] A **remote load control** (RLC) is required to use the two-tariff, which switches the metering and can block appliances with higher consumption during the high tariff period.

Dynamic distribution tariffs are mentioned and **supported in the ERO's concept for a new tariff structure, especially at the LV level**. The ERO also notes that this topic is related to the roll-out (installation) of smart metering and its functionalities, which allow customers to adjust their consumption to the current situation in the network.

According to the authority, in the future, the option of using dynamic tariffs should be added to the current static (two-tariff) time-of-use tariffs tariffs. **This idea is also supported by the NECP**, which states that the price for customers should be in line with the costs and benefits it causes to the network. Dynamic tariffs are then mentioned by NAP SG.

Recommendations on how to implement the measure

We support the ERO's efforts to introduce dynamic network tariffs under the forthcoming new tariff structure at all voltage levels. Revision of the tariff structure and introduction of flexible tariffs will be implemented in Decree No 408/2015 Coll., on the rules of the electricity market, **in combination with the modification of the price decisions of the ERO**, which sets the prices for the related service in the electricity sector.

The wholesale change of the tariff structure at the level of low voltage networks will take place from 2028, according to current plans. From 2026, pilot projects for the new tariff structure on the network are to be tested LV (using smart metering).

We recommend including testing of the **dynamic distribution tariffs** in the **pilot projects, to provide input for their widespread introduction in 2028**. Customers could choose whether to use dynamic or fixed tariffs or adjust their behaviour to the state of the network based on other financial incentives, such as providing flexibility through an independent aggregator.

[1] Energy Regulatory Bulletin 8/2023, available from: https://eru.gov.cz/energeticky-regulacni-vestnik-82023

Transparency for connecting new sources

Transparency of network capacity is **key for developers of new RES projects; they need to know about the connectivity options in the area when making investment decisions**. Interactive maps are a helpful tool, but they require sufficient detail (granularity) down to the level of individual properties, and must be updated regularly.

It is also advisable to keep an anonymised list of connection applicants, so that it is clear how long the waiting time is. An estimate of the **time and cost of connection** is also valuable information, which will facilitate and speed up the construction of renewable energy sources.

Possible solutions?
Detailed interactive maps

Belgium

In **Belgium**, the local TSO Elia[1] openly communicates network capacities. The map shows the remaining capacity at the level of individual electricity substations and voltage levels. Investors can filter the map data according to the available capacity for the type of resource (e.g. PV, WPP or battery storage). The site also provides summary data on remaining capacity.

The **Flemish TSO Fluvius** offers even more detailed data. In 2024, it launched an interactive map[2] for its territory providing data on:

- **Capacity** to connect new generating plants,
- **distance** from the substation,
- **time needed to connect** to the grid,
- **cost of connection**.

Fluvius says it developed the tool specifically for the business sector to support its energy transformation and transition to RES.[3] This is also why, in preparing the map, it first **collected feedback from sector representatives** to ensure that the **system was user-friendly**.

Portugal and the UK

A good example of transparency can also be found in **Portugal**, where the distributor E-REDES provides an online map[4] showing capacity at the level of medium and high voltage substations. Users can click a specific location on the map **to see data about the capacity already used and remaining** (including the volume of connection requests) and the capacity forecast for the next year. User-friendly maps of electricity system capacity can also be found in the UK.[5]

1 Onthaalcapaciteit van het net, available from: https://www.elia.be/nl/klanten/aansluiting/onthaalcapaciteit-van-het-net

2 Capaciteitswijzer, available from: https://opendata.fluvius.be/pages/map_perceel/

3 Fluvius publishes electrical capacity guide for businesses, available from: https://pers.fluvius.be/fluvius-publishes-electrical-capacity-guide-for-businesses

4 Available Hosting Capacity in the National Distribution Grid, available from: https://e-redes.opendatasoft.com/pages/capacidade_rececao_rnd/

5 Available from: https://network-maps.ssen.co.uk/

Situation in the Czech Republic: EG.D is the pioneer, but data is missing for all distributors at higher voltage levels

With the adoption of the Lex RES 2 amendment, **new obligations for all DSOs have been added regarding transparency of connection** to the electricity grid.[1] These are:

- To **publish and update on their websites once a month the data** on the number of accepted and rejected applications for connection to the distribution network.
- **To make an interactive map available** containing information about the capacity in their distribution territory for all voltage levels.

The current situation in the country is relatively good in this respect. **EG.D was a pioneer** in providing information on network capacity in our territory, ahead of others with its connectivity map[2] at the low voltage network level. In 2024, it added the option to see what capacity can be connected at a specific address, keeping the data up to date.

Regarding capacity disclosure at the level of HV and VVN networks, and providing information on the number of accepted and rejected connection requests, the EG.D map is no longer very detailed[3], and provides only static maps.

ČEZ Distribuce[4] displays a variant of the map on its website for the low voltage network and a variant for higher voltage levels. **The maps distinguish three categories of areas, according to whether or not the connection of a new generation plant will require modifications to the distribution network.** At the same time, at the LV level only, clicking on a specific area provides information on the number of accepted and rejected applications. The map is updated monthly.

The connectivity maps from PREdistribuce[5] are comparable to those from ČEZ Distribuce, although slightly more detailed. The map provides indicative information on network capacity, as well as the number and method of connection requests.

1 Act 458/2000 Coll., § 25, paragraph 11, letter m), available from: https://www.zakonyprolidi.cz/cs/2000-458/zneni-20240701

2 Connectivity map, available from: https://pripojitelnost.egd.cz/

3 Available capacities in the distribution system and information on applications, available from: https://www.egd.cz/volne-kapacity-vvn-vn-informace-o-zadostech

4 Distribution capacity for connecting generating plants, available from: https://www.cezdistribuce.cz/cs/pro-vyrobce/volna-distribucni-kapacita-pro-pripojovani-vyroben

5 Map of available distribution capacity for connecting generating plants, available from: https://www.predistribuce.cz/cs/potrebuji-zaridit/vyrobci/mapa-pripojitelnosti-vyroben/?fullweb=1

Recommendations on how to implement the measure

The Czech Republic has made **good progress in transparency of network capacity in recent times and should continue this trend, also in the light of developments in European law**. The recent revision of the European electricity market – specifically Article 31 of the Directive 2019/944[1] – states that distributors should transparently provide information on the available capacity for new connections in high spatial detail, including capacity already covered by connection requests.

This is an opportunity for Czech DSOs to **improve their maps**, especially at higher voltage levels, to include more detailed information on remaining capacity, e.g. at the level of individual electricity stations.

We also recommend the introduction of **anonymised information on applications submitted in the area** and the current queue for connection, estimates of the time for connection of specific projects, and quantification of **the price for connection** of the intended resource. According to the above directive, DSOs should also add information on the possibility **of flexible connection** (in the Czech context: connection with non-guaranteed reserved power) in congested areas.

Further improving DSO transparency on capacity could take legal form, but it would be far better if DSOs were to make the changes themselves as part of service **improvements for their customers**. We can see from EG.D's approach that this is possible and beneficial.

However, the legislative anchoring of some obligations still cannot be avoided due to the transposition of the Directive. We propose adding these obligations to the current § 25(11) of the Energy Act[2], where some of the related obligations can already be found. Following the example of the Belgian distributor, we also recommend obtaining **feedback from users before implementing these changes**.

[1] https://eur-lex.europa.eu/legal-content/CS/TXT/?uri=CELEX:02019L0944-20240716

[2] Act 458/2000 Coll., available from: https://www.zakonyprolidi.cz/cs/2000-458

More efficient connection of RES – Clustering method

A cluster approach to RES connection allows faster connection of new power plants, by **replacing the traditional principle of "first come, first served"**.

Instead of individual assessment, **applications are grouped together (clusters)** and are assessed in a single connectivity study. This **reduces the administrative burden, saves time and costs, and speeds up the connection process**.

Within the clusters, the principle of **"first-ready, first-served"** is then applied, based on the **readiness of the project and its contribution to the electricity system**, not the order of application. Neither clustering, nor the sophisticated approach to prioritisation discussed in the previous measure, are used in the Czech Republic.

Possible solutions? Only in the US so far

The clustering method has only one pioneer so far – the USA. Federal Energy Regulatory Commission (FERC) issued a decision reforming the rules for connecting new generation facilities to the existing transmission system.[1] The changes, which include clustering, are intended to **accelerate the connection of new resources to the grid, particularly renewables and battery storage**. By the spring of 2024, system operators should have submitted a proposal for the introduction of the new rules into their practice. The changes are now being phased in.

The connection process is based **on application windows of** no more than 180 days – so there are two rounds in a year.

During this period, **developers may submit applications that are then grouped into one cluster**. After the time window closes, **a single connectivity study** for the entire cluster is prepared **within 150 days**.

Projects are then **ranked and prioritised according to readiness and network benefits**, which determines the order of connection. The **cost of the study is shared equally** between the applicants, with the share depending on the size of the cluster and the specific project. The same principle is used to **allocate costs among the applicants** for network reinforcement, **taking into account the impact** of each project on the transmission system.

Situation in the Czech Republic: Neither clusters nor prioritization

As mentioned in the first chapter, there is not yet any prioritization in connecting new RES to the electricity grid in the Czech Republic. **The first-come, first-served rule still determines the order of connection.**

According to Section 9(2) of the Connection Ordinance[2], it is the relevant network operator that reserves the required capacity for the applicant or power from the moment of submission of the draft connection contract, pursuant to Section 8(4) of the same Decree.

Recommendations on how to implement the measure

We propose **opening a debate on the necessary connections reform**. The introduction of the clustering method could then certainly be one of the measures that would make the whole process **cheaper and more efficient**. A principle to prioritise projects that help to **reduce the load on the distribution network, provide flexibility, or are better prepared and quicker to implement** should guide the new connections regulation.

Again, we recommend that MIT **creates a new working group** on reform of connection in the Czech Republic **within the NAP SG**.

The **method of clustering** applications would then have to be reflected in the Energy Act, the Connection Ordinance, and consequently in the operation rules of the distribution or transmission system. It would also be appropriate to extend the power of the ERO to regulate connection in the aforementioned Decree[3], to include the right to define a clustering method and its process. Suitable inspiration for the creation of clustering conditions is provided by **regulation from the USA**.

1 Explainer on the Interconnection Final Rule, available from: https://web.archive.org/web/20250401134227/https://www.ferc.gov/explainer-interconnection-final-rule#

2 Decree No. 16/2016 Coll., available from: https://www.zakonyprolidi.cz/cs/2016-16

3 Act No. 458/2000 Coll., § 98a (2) (g) https://www.zakonyprolidi.cz/cs/2000-458

Acknowledgements

We would like to thank all the experts and stakeholders who generously shared their time, insights, and experience during the preparation of this publication. While the views expressed in this report are solely those of the authors, the input provided through consultations significantly enriched our understanding of the topic. Additionally, we would like to specifically thank Zsuzsanna Pató from Regulatory Assistance Project (RAP) as her policy toolbox served as a great inspiration while drafting this publication.

Jiří Bím, Solar Association

Pavel Černý, EG.D

Alexandr Černý, Energy Regulatory Office

Radim Černý, ČEZ Distribuce, a.s.

Radek Hanuš, PREdistribuce, a.s.

Štěpán Hofman, Ministry of Industry and Trade

Martin Kadlec, CANCOM Czech Republic, s.r.o.

Milan Krátký, EG.D

Hana Konrádová, PREdistribuce, a.s.

Miroslav Kozák, EG.D

Jan Krčmář, Solar Association

Martina Krčová, Energy Regulatory Office

Lukáš Křivanec, PREdistribuce, a.s.

Veronika Kunová, Solar Association

Jan Kůla, ČEZ Distribuce, a.s.

Martin Maloš, CANCOM Czech Republic, s.r.o.

Zdeněk Máca, EG.D

Jiří Nezhyba, Frank Bold Advokáti

Karel Polanecký, Hnutí DUHA – Friends of the Earth Czech Republic

Ladislav Ráliš, ČEZ Distribuce, a.s.

Petr Řeháček, SAF – Association of Aggregators and Flexibility Providers

Jan Šrytr, RAUCHENBERG s.r.o.

Petr Vavrečka, PV Consulting s.r.o.

OPEN SOCIETY
FOUNDATIONS

frank bold

Supported in part by a grant from the Foundation
Open Society Institute in cooperation with the OSIFE
of the Open Society Foundations.

Financially supported by the Foundation Open Society Institute
in collaboration with OSIFE, Open Society Foundations.

Authors: Jan Bakule, Eliška Beranová
Editor: Anna Michalčáková
Typesetting: Vojtěch Lunga
Proofreading: Jack Stephens