ENVIROS TOMORROW'S WORLD

ENVIROS, s.r.o. REPORT - FEBRUARY 2022

MINISTRY OF THE ENVIRONMENT

RES+ Photovoltaic Power Plants above 1MWp - Methodological and Evaluation Report

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QUALITY CONTROL FORM

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1 DESCRIPTION OF CONTENT OF DOCUMENT

This document is an evaluation methodological report of the public aid scheme under the RES+ Photovoltaic Power Plants over 1 MWp programme, which is part of the Modernisation Fund programme. As the average annual budget of the programme exceeds the threshold set in Article 1(2)(a) of the GBER Regulation, the programme has been notified under this Regulation and the requirement for an ex-post evaluation within the meaning of Article 1(2)(a) applies.

The evaluation plan for the scheme in question was described in the European Commission document "State aid SA.100301 (2021/EV) – Czechia – Evaluation Plan for the aid scheme SA.63671" dated 20 December 2021. This report is based on that plan and on the first data on the implementation of the programme (from the MODF - RES+ Call No. 2/2021).

The document contains descriptive statistics on developments in renewable energy, greenhouse gas emissions and national targets in these areas. It also contains a detailed description of the evaluation questions, indicators and methodologies. The document serves as a methodological basis for further stages of the evaluation of the scheme, including the final evaluation report. At the same time, it serves as a basis for the evaluation and set-up of other calls within the programme or, if applicable, for setting up another similar programme.

2 OBJECTIVES OF THE AID SCHEME AND DEVELOPMENT OF KEY PARAMETERS

2.1 Objectives of the aid scheme

The scheme provides investment subsidies for newly installed photovoltaic (PV) power plants with a **capacity above 1 MWp** and for electricity storage technologies. The proposed evaluation and procedures throughout the document deal exclusively with the effects of this scheme and its specific challenges.

The newly installed PV capacity supported by this scheme should make a significant contribution to achieving the NECP targets, both in terms of reducing greenhouse gas emissions and as regards the share of renewable sources in electricity generation, and should also help to replace coal-fired generation. In the longer term, the scheme should help to achieve climate neutrality by 2050. The scheme should result in new installed renewable capacity of 2,959 MW, 684.5 MWh of new electricity storage capacity and an additional cumulative generation of 17.5 TWh of electricity from renewable sources by 2030, reducing emissions by 6.5 million t of CO_2 The expected 3 TWh electricity generated annually by PV will correspond to a reduction of 1.1 million tonnes of CO_2 emissions. By reducing the need for coal generation, the scheme should also contribute to a better quality environment.

The programme also supports energy storage technologies as part of the photovoltaic power plant project. Support for electricity storage also aims to help the electrical grid cope with fluctuations in energy generation and consumption and prepare it for a higher penetration of energy generation from renewable sources in the future.

According to the Czech National Energy and Climate Plan (NECP), the Czech Republic plans to achieve a 22% share of renewable energy sources in gross final consumption by 2030, i.e. an increase of 9% compared to the national target of 13.0% for 2020. In accordance with Article 4(2) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, the Czech Republic undertakes to achieve a share of 14.62% by 2022, 16.87% by 2025, and an RES share in gross final consumption of 18.85% by 2027.

The expected trend in installed capacity in the field of electricity generation is shown in the following table.

Tabulka 1: Expected installed capacity (electrical) according to NECP

Installed capacity (MWe)	2020	2025	2026	2027	2028	2029	2030
Biomass	414	435	435	436	436	436	454
Hydroelectric power plants	1,106	1,117	1,119	1,121	1,123	1,125	1,127
Biodegradable portion of MSW	55	133	133	133	154	154	154
Biogas stations	355	337	322	314	307	299	287
Geothermal energy	10	10	10	10	10	10	10
Wind power plants	370	625	685	745	820	895	970
Photovoltaic systems	2,082	2,628	2,822	3,051	3,319	3,625	3,975
Total	**4,392**	**5,285**	**5,526**	**5,810**	**6,169**	**6,544**	**6,977**

Source: National Energy and Climate Plan of the Czech Republic (NECP)

These values are based on the NECP, which was developed in 2019 and finally approved in January 2020.

A more recent study (model) of the Resource Adequacy Assessment of the Electrical Grid of the Czech Republic until 2040, published in 2022 by CEPS, the transmission system operator, estimates the installed capacity of photovoltaic power plants in 2030 at 8,133 MWp under the conservative scenario and 11,406 MWp under the progressive scenario.

The Czech Republic plans to update its strategic documents on energy and climate in the near future. They will respond to the increase in European targets for 2030 and the commitments and legislation stemming from the Fit for 55 package or other relevant initiatives. The commitment to update national documents is also contained in the Government's Programme Statement of January 2022, as follows:

We will present the new Climate Protection Policy of the Czech Republic, which will take into account the EU's ambitious new targets for 2030 and set out guidelines for achieving the goal of climate neutrality by 2050 at the latest. The policy will be prepared in close coordination with the update of the State Energy Policy so that both documents will be discussed by the Government in 2023.

The anticipated acceleration in the development of RES throughout the EU is also based on the new *RePowerEU* package of measures, which was presented by the European Commission in May 2022. The package aims to replace the EU's natural gas imports from the Russian Federation and includes initiatives to promote the development of renewable energy sources, the development of energy savings, the development of the hydrogen economy, and more. Last but not least, new targets for the development of RES by 2030 (and the corresponding Directive) are also expected to be agreed at the European level in the framework of the negotiations on the parts of the Fit for 55 package.

Member States also have until 30 June 2023 to submit updated National Energy and Climate Plans to the European Commission. It can reasonably be expected that the new national strategy documents will also include increased targets for RES.

2.2 Development of electricity generation from individual sources

The table below shows the development of electricity generation in the Czech Republic. There is a downward trend in the combustion of coal (solid fossil fuel). There is only a slight increase in the amount of electricity generated from biomass and biogas. The volume of hydropower, wind and solar energy generated is dependent on changing natural conditions, and any evaluation of their development needs to take into account installed capacity, which better depicts the development of these sources of electricity. The installed capacity of photovoltaic and wind power plants is stagnating, which in itself indicates the need for incentives.

Tabulka 2: Table: Gross electricity generation according to the EUROSTAT methodology, Czech Republic, in TWh

TWh/year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Solid fossil fuels	46.69	43.98	41.11	40.73	41.14	41.97	41.44	41.20	37.34	31.01	34.18
Natural gas	1.40	1.48	2.03	1.81	2.26	3.71	3.68	3.75	5.79	6.85	7.29
Water energy	2.66	2.86	3.64	2.96	3.07	3.20	3.04	2.68	3.17	3.44	3.62
Wind energy	0.40	0.42	0.48	0.48	0.57	0.50	0.59	0.61	0.70	0.70	0.60

TWh/year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Solar photovoltaic energy	2.18	2.15	2.03	2.12	2.26	2.13	2.20	2.36	2.34	2.34	2.32
Solid biomass	1.68	1.82	1.68	1.99	2.09	2.07	2.21	2.12	2.40	2.50	2.66
Biogas	0.93	1.47	2.29	2.58	2.61	2.59	2.64	2.61	2.53	2.60	2.59
Nuclear fuel	28.28	30.32	30.75	30.33	26.84	24.10	28.34	29.92	30.25	30.04	30.73
Other	3.17	2.85	2.83	3.07	2.95	2.94	2.81	2.66	2.42	1.98	0.95
Total	**87.39**	**87.34**	**86.84**	**86.06**	**83.81**	**83.21**	**86.95**	**87.91**	**86.93**	**81.45**	**84.95**

Source: Energy Balance of the Czech Republic, MIT

2.3 Development of primary non-renewable energy

Electricity from large-scale photovoltaic power plants figures in the energy balance in the transformation sector. To assess the impact of PV on non-renewable energy consumption, it is therefore crucial to monitor the consumption of non-renewable energy for electricity generation. The energy balance in the Eurostat methodology includes electricity generated by individual input energy carriers. As for the consumption of individual energy carriers for electricity generation, this is given for mono-generation. In the case of combined heat and power, the input consumption is given only for electricity and heat combined. In the Eurostat energy balance, each data is identified by three keys: the nrg_bal code (expressing the purpose for which the energy is used), the siec code (expressing the energy carrier) and the year. The items needed for the calculation are given in the following two tables.

Tabulka 3: Energy consumption codes for electricity and heat generation

nrg_bal code	Description of nrg_bal code	siec code	Description of siec code	Abbreviation
TI_EHG_MAPE_E	Transformation input - electricity and heat generation - main activity producer electricity only - energy use	**RA000**	Renewables and biofuels	S1
TI_EHG_MAPE_E	Transformation input - electricity and heat generation - main activity producer electricity only - energy use	**TOTAL**	Total	S2
TI_EHG_MAPCHP_E	Transformation input - electricity and heat generation - main activity producer combined heat and power - energy use	**RA000**	Renewables and biofuels	S3
TI_EHG_MAPCHP_E	Transformation input - electricity and heat generation - main activity producer combined heat and power - energy use	**TOTAL**	Total	S4
TI_EHG_APE_E	Transformation input - electricity and heat generation - autoproducer electricity only - energy use	**RA000**	Renewables and biofuels	S5
TI_EHG_APE_E	Transformation input - electricity and heat generation - autoproducer electricity only - energy use	**TOTAL**	Total	S6
TI_EHG_APCHP_E	Transformation input - electricity and heat generation - autoproducer combined heat and power - energy use	**RA000**	Renewables and biofuels	S7

nrg_bal code	Description of nrg_bal code	siec code	Description of siec code	Abbreviation
TI_EHG_APCHP_E	Transformation input - electricity and heat generation - autoproducer combined heat and power - energy use	**TOTAL**	Total	S8

Tabulka 4: Electricity and heat generation codes

nrg_bal code	Description of nrg_bal code	siec code	Description of siec code	Abbreviation
GEP_MAPE	Gross electricity generation - main activity producer electricity only	RA000	Renewables and biofuels	V1
GEP_MAPE	Gross electricity generation - main activity producer electricity only	**TOTAL**	Total	V2
GEP_MAPCHP	Gross electricity generation - main activity producer combined heat and power	**RA000**	Renewables and biofuels	V3
GEP_MAPCHP	Gross electricity generation - main activity producer combined heat and power	**TOTAL**	Total	V4
GEP_APE	Gross electricity generation - autoproducer electricity only	**RA000**	Renewables and biofuels	V5
GEP_APE	Gross electricity generation - autoproducer electricity only	**TOTAL**	Total	V6
GEP_APCHP	Gross electricity generation - autoproducer combined heat and power	**RA000**	Renewables and biofuels	V7
GEP_APCHP	Gross electricity generation - autoproducer combined heat and power	**TOTAL**	Total	V8
GHP_MAPCHP	Gross heat production - main activity producer combined heat and power	**RA000**	Renewables and biofuels	V9
GHP_MAPCHP	Gross heat production - main activity producer combined heat and power	**TOTAL**	Total	V10
GHP_APCHP	Gross heat production - autoproducer combined heat and power	**RA000**	Renewables and biofuels	V11
GHP_APCHP	Gross heat production - autoproducer combined heat and power	**TOTAL**	Total	V12

To facilitate writing the formulas, abbreviations are used for the individual items.

Electricity generation from non-renewable sources is obtained by subtracting the electricity generation from RES from the total electricity generation, i.e. $EE = V2 + V4 + V6 + V8 - V1 - V3 - V5 - V7$.

Heat generation from non-renewable energy sources in CHP will still be needed for further calculations. This is calculated according to the formula $TE_{KVET} = V10 + V12 - V9 - V11$.

It is somewhat more difficult to determine the consumption of non-renewable energy for electricity generation. The consumption of non-renewable energy from electricity mono-generation is known directly from the balance. For combined heat and power, the fuel consumption is split between electricity and heat using a simplified procedure. We will assume that the specific fuel consumption for heat generation is approx. 1.1 GJ/GJ. From the heat generation, we calculate the fuel consumption for heat generation and subtract it from the total fuel consumption for electricity and heat generation in CHP to obtain the required fuel consumption for electricity generation in CHP.

Therefore, the following relationship will apply to the consumption of non-renewable energy for electricity generation

$P = S2 + S4 + S6 + S8 - S1 - S3 - S5 - S5 - S7 - 1{,}1 * TE_{KVET}.$

Dividing the electricity generation from non-renewable sources by the consumption of these sources gives the approximate efficiency of electricity generation from non-renewable energy sources $\eta = \frac{EE}{P}$.

By dividing the PV power generation increments by this efficiency, we can estimate the savings in primary non-renewable energy.

By performing the above calculations, we obtain the values shown in the following table.

Tabulka 5: Indicators related to electricity generation from non-renewable sources

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
electricity generation from non-renewable sources [PJ]	285.6	286.0	282.8	275.8	273.0	263.2	261.5	274.2	278.8	*272.5*	*251.1*	*262.9*
consumption of non-renewable resources for electricity generation [PJ]	806.6	804.0	792.6	764.3	754.6	714.9	694.8	728.3	745.0	717.1	653.7	680.1
efficiency of electricity generation from non-renewable sources [%]	35.4%	35.6%	35.7%	36.1%	36.2%	36.8%	37.6%	37.6%	37.4%	38.0%	38.4%	38.7%

Source: own calculations, data from the Energy Balance of the Czech Republic

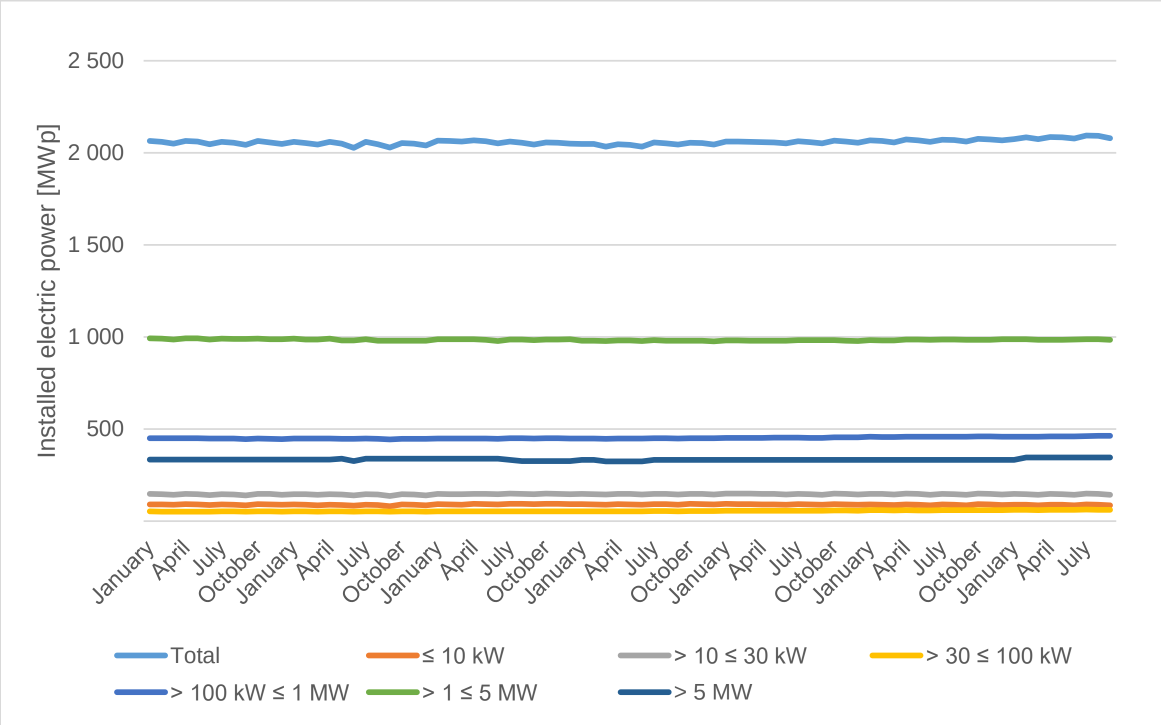
The increase in the efficiency of electricity generation from non-renewable sources in recent years is mainly due to the operation of the steam-gas power plant in Počerady.

2.4 Development of installed capacity of PV power plants in the Czech Republic

There was almost no development in the installed capacity of photovoltaic power plants in the Czech Republic between 2016 and 2022 (data available only until September 2022). This can be attributed to the cessation of operating support for new PV plants. Over the years, solely the installed capacity of the power plants already in operation has changed, although this has only been in the order of MWp units at most. The statistics do not include sources with a capacity of up to 10 kWp connected after 2015, as the legislation no longer requires them to be licensed by the ERA. However, these are sources with a total capacity in the lower hundreds of MWp at the most.

Sources with a capacity above 1 MWp have seen almost zero development since 2016, after which the installed capacity of PV sources is reported by month. Their installed capacity increased in this period by 0.4%, i.e. by approximately 5 MWp.

Obrázek 1: Development of the installed capacity of PV plants in the Czech Republic between January 2016 and September 2022.

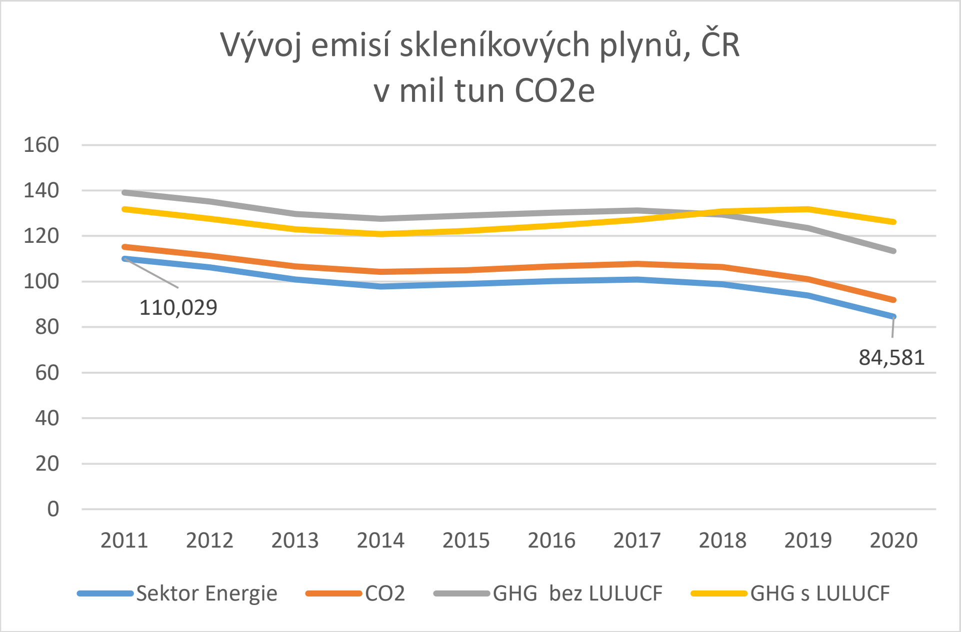


Source: Quarterly reports on the operation of the electricity system of the Czech Republic, ERA

2.5 Development of greenhouse gas emissions

The developments in the energy sector described above can then be identified in the development of greenhouse gas emissions, as shown in the following graph. The overall trend in emissions of all greenhouse gases is strongly influenced by emissions from the LULUCF sector (land use, land-use change and forestry), where emissions have increased substantially in recent years. On the other hand, there has been a gradual decline in the Energy category, mainly due to the gradual shift away from coal combustion. The last year of data, 2020, was substantially affected by the pandemic and the reduction in economic activity. Preliminary electricity generation data for 2022 shows that coal-fired generation will increase again in that year due to high wholesale electricity prices and increased use of installed capacity from existing coal-fired power plants.

Obrázek 2: Development of greenhouse gas emissions in the Czech Republic



Source: CHMI: National Greenhouse Gas Inventory of the Czech Republic

No new nuclear source is likely to be in operation in the Czech Republic before 2035 and therefore the development of renewable sources that will allow the replacement of existing coal sources will be essential for reducing CO_2 emissions in the energy sector in the next 13 years.

3 EVALUATION PLAN AND EVALUATION QUESTIONS

The evaluation plan includes a description of the main elements of the scheme, i.e. the objectives of the aid scheme, the evaluation questions, the outcome indicators, the expected methodology to be used for the evaluation, the data collection requirements, the proposed timetable for the evaluation including the date for submission of the final evaluation report, the approach to be followed in selecting an independent evaluator, and the means of ensuring the evaluation is publicised.

The evaluation will provide information on whether the scheme is achieving its objectives, and also on the number and type of aid beneficiaries. The evaluation will be based in particular on questions relating to the direct and indirect effects of the aid, its wider economic effects and questions relating to the appropriateness and adequacy of the aid.

The evaluation questions were already identified in the original evaluation plan and are as follows:

The following evaluation questions will address the direct effects of the aid on the beneficiaries

- Has the aid led to investment in and implementation of projects to modernise, diversify and decarbonise the energy sector, such as the construction and development of new renewable electricity sources?
- Have the beneficiaries increased the generation of electricity from renewable sources and/or the capacity to store electricity from renewable sources?
- Have the beneficiaries increased investment in renewable energy sources?

The following evaluation questions will address the indirect effects of the aid:

- Has the aid led to a reduction in the consumption of primary non-renewable energy?
- Has the aid led to a reduction in CO_2 emissions?
- How many jobs have been created in the supply industry?

The broader economic effects of the aid will be addressed in the following evaluation question:

- Has there been an adverse impact on electricity prices?
- Has the scheme had an impact on the market position of (large) aid beneficiaries?

The proportionality and appropriateness of the aid shall be assessed on the basis of the following criteria:

- Has this type of public intervention been effective compared to other schemes (e.g. existing and previous schemes in the Czech Republic and schemes in other EU Member States)?
- Was the amount of aid reasonable?
- Could the corresponding decarbonisation measures also be motivated by lower levels of support?

4 DESCRIPTION OF INDICATORS AND METHODOLOGY

With regard to the objectives of the evaluation and the monitoring of state aid schemes, the methodology and indicators described in the following subsections will be used for the purpose of the evaluation reports.

4.1 Impact on the development of RES and storage of electricity from RES and decarbonisation of the energy sector

As part of the primary impact assessment, the evaluation will answer the following questions:

- Has the aid led to investments in projects to modernise, diversify and decarbonise the energy sector, such as the construction and development of new PV plants above 1 MW?
- Have the beneficiaries increased the generation of electricity from renewable sources and/or the capacity to store electricity from renewable sources?
- Have the beneficiaries increased investment in renewable energy sources?

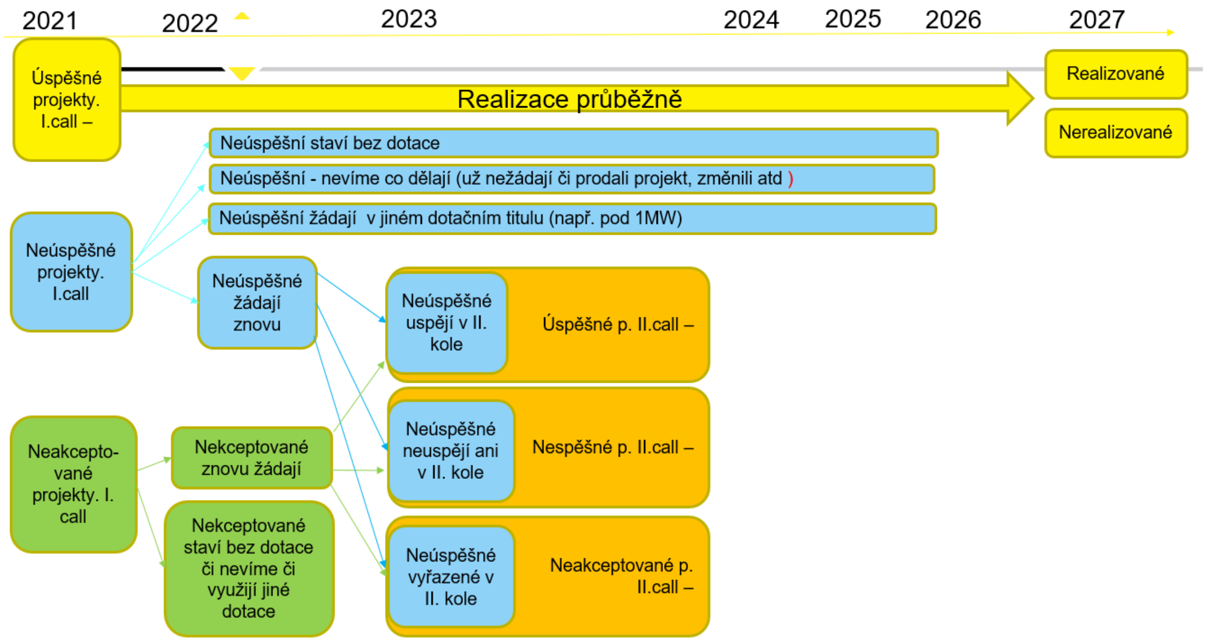
The basic indicators to be monitored will be as follows:

- Installed capacity of PV plants supported under the scheme (and total installed capacity of PV plants above 1 MW)
- Electricity storage capacity supported under the scheme and generation from supported sources
- Total project expenditure, total eligible project expenditure, amount of project subsidy

The scheme and its set-up is specific in that it is a non-refundable subsidy for the construction of photovoltaic power plants. PV plants generate electricity at the lowest operating cost and the amount they generate is more dependent on seasonal generation curves and current weather conditions than on operator intervention. For example, in the case of energy saving subsidies, it is appropriate to verify whether public aid for individual projects (and overall) has led to real savings. In the case of the aid scheme for the construction of photovoltaic power plants, this verification does not seem necessary; the operator is automatically motivated to keep the plant in operation for its lifetime in order to achieve a return on its own investment, including appreciation.

The evaluation should therefore focus on a comparison with the counterfactual situation, i.e. the situation that would have developed if the aid had not been granted, in order to measure the impact of the aid. As described in the original Evaluation Plan, this approach involves a number of methodological challenges. It is also now necessary to mention the changes occurring in the entire energy sector as a result of the energy (and geopolitical crisis) since February 2022.

Point 36 of the evaluation plan proposes the creation of a control group comprising applicants/projects that have not been successful but are reapplying and are likely to be successful. It is difficult to determine the success rate in the next call, as one of the decisive criteria is cost-effectiveness. The possible group gradually breaks down into further sub-groups (see graph below) and, in addition, the parameters and scope of the individual projects may change in subsequent rounds.



Another methodological challenge that complicates the search for homogeneous groups for statistical verification is the fact that some companies submit multiple projects, or some of the applicant companies (with their own ID number) are so-called special purpose vehicles (SPV) of another parent company. These companies were probably set up for the sole purpose of building a single power plant and most have no history, either of power generation or economic indicators. For any possible statistical evaluation, it would be more appropriate to disaggregate the company-level data by parent group (or by beneficial owners). This data is collected as part of the applications under the scheme's calls. Preliminary analysis of the first call in the scheme (No. 2/2021) shows that when considered at the parent company level, the group will shrink to about half.

The original considerations on the evaluation were based on the assumption that hardly any PV plants are built outside the framework of public aid. However, this started to change in 2021 with the increase in electricity prices. In 2022, according to available information on projects in Germany, for example, new PV plants are being built without public aid. According to preliminary ERA data, three PV plants above 1 MWp were built outside this scheme in the Czech Republic in 2021 and two PV plants above 1 MW and four just below 1 MW were added in 2022. It may be assumed that construction will continue without public aid. In this case, a statistical comparison of the trend of the newly installed capacity of PV plants (cumulatively) built without public aid and the trend of plants built with public aid would serve for ex post evaluation in the following evaluation phases. For the purposes of the evaluation, the ERA would compile overviews of new PV power plants connected and, as part of the evaluation process, that list would be divided into projects supported and those not supported from public funds.

In order to compare comparable sources within the framework of the methodology, we propose that a cluster analysis of all applications submitted be performed according to the following characteristics:

- accumulation capacity
- installed capacity of brownfield PV
- installed capacity of other onshore PV plants
- installed capacity of rooftop PV
- whether it is a preferred region.

The cluster analysis should result in four or at most five groups of projects, given the small number of statistical samples. A difference-in-differences analysis would then be carried out in each of these groups.

Example of difference-in-differences calculation

In the given group there were applications according to the following table.

Tabulka 6: Model sample of applications for subsidies in the group

Application for subsidy	Number of projects	Installed power [MW]	Power per project [MW]
successful	30	**65**	2.17
unsuccessful - project implemented	9	**15**	1.67
unsuccessful - project not implemented	61	**125**	2.05
Total	100	**205**	**2.05**

For unsuccessful applications, we determine the percentages of projects implemented and those not implemented.

Tabulka 7: Model calculation of implemented and non-implemented projects with unsuccessful applications

Proportions of unsuccessful applications	Number of projects	Installed power [MW]
unsuccessful - project implemented	12.86%	**10.71%**
unsuccessful - project not implemented	87.14%	**89.29%**

In the following step, this method enables an estimation of how many projects from the set of supported projects would be implemented even in the absence of a subsidy. That is, in the same proportions from Table 7, we divide the projects from the successful applications into those that would not have been implemented without the subsidy and those that would have been implemented without the subsidy.

Tabulka 8: Model calculation of projects that would have been implemented without the subsidy

Successful applications in the absence of subsidy	Number of projects	Installed power [MW]
the project would be implemented	4	**6.96**
the project would not be implemented	26	**58.04**

The **contribution of the scheme** (i.e. the difference in differences) **is** 65 - 6.96 = **58.04 MWp**.

The prerequisites for the successful application of this procedure are

- linking ERA licence data with application data
- in the individual groups that will result from the cluster analysis; there must not be a large variance in installed capacity per project from a methodological point of view.

The amount of booked capacity at regional distributors has reached 18,000 MW according to media reports[1], which is more than can be funded by existing grant programs in the next few years, and it is difficult to estimate if and what proportion of these applications will be implemented outside the framework of public aid in the next few years.

However, if the subsequent individual evaluation phases show that the construction of large-scale PV plants without state aid will not be implemented in sufficient quantities for the chosen evaluation methodology, another methodology will have to be chosen. The document Energy State Aid: A Toolbox on Counterfactual Impact Evaluation lists other possible approaches. The document states specifically: if the original assumptions are not confirmed or key data are not available, the literature mentions other so-called second-best methods. In the case of aid for renewable energy sources, the share of renewable energy generation achieved through state aid intervention can be compared to the total amount of renewable energy generation. This approach provides a first indication of the importance of state aid in the development of RES. A financial analysis can also be carried out by comparing the financial return with and without state aid. Other second-best methods that have been used are descriptive statistics, qualitative analysis and renewable energy supply analysis. Qualitative and descriptive methods can serve as a third-best approach. Alternatively, a purely qualitative approach may take the form of a qualitative questionnaire for state aid beneficiaries to determine whether and what effect the aid has had.

4.2 Impact on reduction of primary non-renewable energy consumption, reduction of CO_2 emissions

In the context of assessing the indirect environmental impacts of the aid, the evaluation will answer the following questions:

- Has the aid led to a reduction in the consumption of primary non-renewable energy?
- Has the aid led to a reduction in CO_2 emissions?

In the case of non-renewable energy consumption, the evaluation will follow the evolution of the efficiency value of electricity generation from non-renewable sources described in the chapter 2.3. For CO_2 emissions, the value of CO_2 emissions from the Energy sector, also outlined in the descriptive section of this report, will be monitored. While tracking these values does answer the question of how these indicators have evolved at the national level, it no longer tells us exactly how the generation based on the power plant output and storage capacity supported by the programme has contributed to this. That would require complex energy modelling with a large degree of uncertainty. For the purposes of the evaluation, it will be sufficient to assume that new renewable sources are eliminating fossil sources from the energy mix (by order of magnitude). And two methods can be used to estimate the effect of emission reductions. Either the corresponding emission factors based on Decree No. 264/2020 Coll., on the energy performance of buildings, are used, or data from the Eurostat energy balance can be used for a more accurate calculation. The consumption of non-renewable energy sources for electricity generation was calculated in section 2.3. Since the exact structure of the energy carriers consumed is known from the energy balance, it is possible to calculate the resulting emission factor for electricity generated from non-renewable sources for each year from their consumption and the corresponding emission factors.

[1] 6.12.2022 Ekonomický deník: https://ekonomickydenik.cz/cesko-stoji-na-prahu-solarniho-boomu-zajem-je-o-pripojeni-az-18-000-megawattu-noveho-vykonu/

This assumption will be confirmed for the purposes of the individual evaluation phases by comparing it with the available energy models. Specifically, every year ČEPS, a. s. publishes the Resource Adequacy Assessment of the Electrical Grid of the Czech Republic (abbreviated as MAF). From these studies, it is possible to deduce what changes in generation from fossil sources may result from the development of RES. The advantage of this, compared to the strategy documents, is that the regular modelling is based on very recent values (i.e. it will include generation from projects supported under the scheme) and should be sufficient for retrospective assessment purposes.

4.3 Adequacy and appropriateness of aid

In assessing the adequacy and appropriateness of the aid, the evaluation will answer the following questions:

- Was this type of public intervention effective compared to other schemes (e.g. existing and previous schemes in the Czech Republic and schemes in other EU Member States)?
- Was the amount of aid reasonable?
- Could the corresponding decarbonisation measures also be motivated by lower levels of support?

The adequacy and appropriateness of the aid will be assessed by comparison with other schemes in the Czech Republic and abroad and by using an economic model as described in the following chapters.

4.3.1 Comparison with similar schemes abroad

Romania has started to use similar aid from the RES+ programme, i.e. through an investment subsidy scheme. A call for support for photovoltaic power plants with a capacity above 0.2 MWp has been launched under the Romanian Renewal Plan. The support is tendered in a similar manner to the Czech Republic according to the amount of the specific subsidy required; the maximum amount of aid is set at 425 000 EUR/MW for projects above 1MW, and at a maximum of 750 000 EUR/MW for projects of 0.2-1MW. As of 31 October, 721 projects had applied for a total of €1.1 billion. The applications had not been evaluated by the end of 2022. The SEF CR or the Committee will consider contacting the Romanian side for data and experience related to this call in the next phases of the evaluation.

At the same time, in the next phases of the evaluation, an analysis of the secondary data will be carried out in order to identify data on possible other comparable foreign schemes.

According to the project (Auctions for Renewable Energy Support)[2], 15 EU Member States use auctions to support PV plants. Experience with aid for renewable sources through auctions (and the contract for difference principle) is also covered in a recent study by the European Commission[3] and the evaluation of auction systems is also covered in the Energy State Aid Toolbox cited above. These documents are useful as a source of experience if such support were to be set up in the Czech Republic. However, as they are based on a different support principle, they are not suitable for the evaluation of the Czech investment support scheme applied under the RES+ programme.

[2] http://aures2project.eu/

[3] A report… on the performance of support for electricity from renewable sources granted by means of tendering procedures in the Union. https://energy.ec.europa.eu/system/files/2022-11/COM_2022_638_1_EN_ACT_part1_v2.pdf

4.3.2 Comparison with other schemes in the Czech Republic

Since 2013, there has been no new support scheme for photovoltaic power plants in the Czech Republic that would target the construction of PV sources above 1 MWp. The original scheme(SA.40171 (2015/NN) 2006 RES support scheme in the Czech Republic) was approved under fundamentally different economic and technological conditions and the comparison is no longer relevant. The parameters of the other National Recovery Plan programme are also difficult to compare (the state's interest in supporting installations with a share of own/local consumption is monitored); however, the amount of investment costs or subsidy is also compared here. The Green Savings Programme for households supports installations up to 10kWp and public aid is clearly higher here.

The RES+ programme for photovoltaic plants below 1 MWp seems to be the most relevant among comparable programmes. Further evaluations will analyse the data of projects approaching the 1MWp break-even point in calls above and below 1MWp and assess whether there will be any undesirable impact of preparing projects to be below this break-even point, which may result in cost inefficiencies and under-utilisation of local potential for the development of PV plants. The results of this evaluation will be used to set up the next calls or the next programme.

4.3.3 Appropriateness of the amount of aid - economic model

As part of the preparation and notification of the evaluated RES+ scheme, the Czech Republic carried out counterfactual economic modelling that answered the question of what the financing gap is for PV plants (and electricity storage technology) compared to alternative, more affordable, technology. The ex-post evaluation of the programme will apply this approach using historical data, and will test the original theses on the adequacy of the proposed aid (and also taking into account the actual aid granted, below the maximum limit). On this basis, the model will be adapted and updated for the design of any further public aid schemes or individual calls.

4.3.4 Update of the unit cost study

For the needs of the next evaluation phases and the setting of further calls under the programme, the SEF CR will update the data mapping the development of unit investment costs for photovoltaic power plants as needed. The first such study was created for the launch of the Modernisation Fund and the first calls for PV plants under the title "Expert Study - Unit Costs of Photovoltaic Systems above 1 MW[4].

4.4 Adverse effects on the price of electricity

4.4.1 Evaluation question and evaluation options

As part of the assessment of the impact on the price of electricity, the evaluation will answer the following question:

- Has there been an adverse impact on electricity prices?

The impact of RES development on electricity prices can be analysed from several perspectives. First and foremost, there is an impact on wholesale prices on the electricity market. Furthermore, RES development has a clear impact on the need to strengthen the grid and the cost of grid operation. These costs can then be covered by an increase in regulated electricity prices.

[4] Expert Study - Unit Costs of Photovoltaic Systems above 1 MW https://www.sfzp.cz/dokumenty/detail/?id=2515

4.4.2 Impact on wholesale prices

The impact on wholesale prices will not be the primary focus of the evaluation. This issue has been addressed by a number of foreign studies whose conclusions are partly applicable to the Czech Republic. In general, the development of RES, especially photovoltaic and wind sources, leads to a reduction in the wholesale price of electricity due to the merit-order effect. For example, a recent study by the International Monetary Fund[5] reports that renewable energy is associated with an average of 0.6% reduction in wholesale power prices in Europe for every 1 percentage point increase in the share of renewable sources. At the same time, according to this study, there is a non-linear effect - this means that the higher the share of renewable energy sources, the greater the impact on electricity prices. Another study by the European Commission think-tank INSIGHT_E[6] models scenarios for 2030 and 2050 that show the impact of scenarios with a high proportion of RES on reducing wholesale electricity prices by an average of 1.6 €/MWh for 2030 and 4.2 €/MWh for 2050. However, a 2017 study by researchers at Charles University focusing specifically on the Czech Republic[7] concluded empirically that generation from solar power plants in the Czech Republic did not lead to lower wholesale prices. The researchers conclude that they do not deny the general influence of the merit order effect, but that the result is also influenced by other factors, such as the strong net exports of electricity from the Czech Republic in the years studied.

4.4.3 Evaluation of network development costs

The primary focus of the evaluation of the scheme's impact on the price of electricity will be on the increase in the cost of operating the network. An estimate of the impact on network operation costs will be provided by the Energy Regulator for the purposes of Supplementary Report 2.

4.5 Impact on employment

4.5.1 Evaluation question and evaluation options

As part of the assessment of the impact on employment, the evaluation will answer the following question:

- How many jobs have been created in the supply industry?

The impact on employment will be assessed in the first phases of the scheme using a simplified method involving the use of job creation multipliers associated with the installation and operation of PV plants. In the final stages of the scheme, where more ex post data will be available, the impact on employment will be assessed through an ad hoc study using multiple methods, considering the use of macroeconomic modelling, questionnaires, etc.

[5] IMF: Chasing the Sun and Catching the Wind: Energy Transition and Electricity Prices in Europe Prepared by Serhan Cevik and Keitaro Ninomiya. 2022. https://www.imf.org/en/Publications/WP/Issues/2022/11/04/Chasing-the-Sun-and-Catching-the-Wind-Energy-Transition-and-Electricity-Prices-in-Europe-525079

[6] Quantifying the "merit-order" effect in European electricity markets, INSIGHT_E, 2015, https://www.ifri.org/sites/default/files/atoms/files/insight_e_european_electricity_market.pdf

[7] Lunackova P., Prusa J., Janda K. (2017). "The Merit Order Effect of Czech Photovoltaic Plants" IES Working Paper 1/2017. IES FSS. Charles University.

4.5.2 Employment multiplier

This approach is described in many foreign scientific or professional studies. For example, Dvořák et al.[8] provide different ways of dividing employment into short-term, associated with RES construction, and long-term, associated with RES operation. The study also describes the possibility of assessing employment related to the production of components. Many components are imported from outside the EU and therefore their impact on employment is not examined. The impact of end-of-life disposal and recycling will also not be investigated. In terms of long-term employment associated with the operation of the source, PV is amongst the RES with the lowest number of long-term jobs per unit of installed capacity. Some studies use the FTE (full time employee) coefficient per financial unit of investment or per unit of energy produced.

The following table shows the **FTE/MWp equivalent** coefficients reported in foreign studies. A coefficient of 8.1, for example, means that the installation of 1 MWp of photovoltaic plant represents the annualized full-time equivalent of 8.1 workers. This is a year-round figure, and in practice the work is of course of an impact nature, i.e. most of the work is on the physical installation of the plant, which takes place over a shorter period of time and with more staff.

Tabulka 9: Employment multiplier for photovoltaic power plants - overview of selected studies

Study	Description	Installation FTE/MWp	Operation and maintenance FTE/MWp
Employment Projections for Four Clean Energy Technologies[9]	For 2020, a decrease to 2.06 is expected for 2025	2.87	-
Solar PV job market study for the European Union[10]	Also includes indirect FTEs (regulators, consultants, storage, research)	4.2 (Western Europe) 8.1 (Eastern Europe)	0.1 (Western Europe) 0.12 (Eastern Europe)
Employment factors for wind and solar energy technologies: A literature review[11]	Analysis of 14 data sources carried out in 2013	minimum 6.4 median 11.2 maximum 33	minimum 0.1 median 0.3 maximum 1.65
Energiewende im Kontext von Atom- und Kohleausstieg –	For 2018, in 2040 a decrease to 3.5. For operation and maintenance, 0.2 in	4.65	0.2

[8] Dvořák, P., Martinát, S., Van der Horst, D., Frantál, B., & Turečková, K. (2017). Renewable energy investment and job creation; a cross-sectoral assessment for the Czech Republic with reference to EU benchmarks. Renewable and Sustainable Energy Reviews, 69, 360-368.

[9] State-Level Employment Projections for Four Clean Energy Technologies in 2025 and 2030 Sarah Truitt, James Elsworth, Juliana Williams, David Keyser, Allison Moe, Julia Sullivan, and Kevin Wu National Renewable Energy Laboratory, https://www.nrel.gov/docs/fy22osti/81486.pdf

[10] Solar pv job market study for the European Union, Buyens, Lowiek; Lauwers, Bart; Louwaege, Harold-Jan, https://repository.vlerick.com/bitstream/handle/20.500.12127/7030/Buyens_ICP_SolarpvjobmarketstudyfortheEuropeanUnion.pdf?sequence=1&isAllowed=y

[11] Cameron L, van der Zwaan B: Employment factors for wind and solar energy technologies: A literature review, 2015, https://www.sciencedirect.com/science/article/abs/pii/S1364032115000118,

Perspektiven im Strommarkt bis 2040[12]	2018 and dropping to 0.12 in 2040		

Source: own research

The aforementioned study (Cameron, 2015) also mentions limitations in the use of the given multipliers, e.g. that the studies do not provide sufficient detail on the differences resulting from the size of the projects and also from the lack of clarity as to whether and to what extent indirect jobs are included.

In general, large projects covered by the evaluation of the scheme generate fewer jobs per MW of installed capacity than smaller projects. Studies also show that the number of jobs per unit of installed capacity will gradually decrease as the process becomes more efficient.

If the employment multiplier approach described above is used, the chosen coefficient should be based on the most recent studies and ideally take into account the size of the plants.

4.6 Has the scheme had an impact on the market position of (large) aid beneficiaries?

4.6.1 Evaluation question and evaluation options

In the context of the assessment of the impact on competition, the evaluation will answer the following question:

- Has the scheme had an impact on the market position of (large) aid beneficiaries?

For the purposes of the next stages of the evaluation of the scheme, the ERA will provide the Evaluation Committee with data on the share of the largest RES electricity producers in the total share of RES electricity generation (or installed capacity). In the event of an increase in dominance, the Evaluation Committee will issue recommendations for a change in the setting of the aid parameter, which should lead to a realignment in favour of more structurally functional markets.

4.7 Other indirect effects

4.7.1 Evaluation of economic performance

Point 37 of the evaluation plan mentions the possibility of evaluating the economic performance of the beneficiaries. However, revealing the impact that obtaining or not obtaining aid has on economic actors is not meaningful in the context of the diversity of the economic entities and funding schemes involved, and the results cannot be indicative. The following reasons can be given:

- Photovoltaic power plants with a capacity of more than 1 MWp are very often financed by bank loans or other external sources; the funding is drawn for the given project. In these cases, SPVs (Special Purpose Vehicles) are set up for the purpose of accounting separation, so the companies have no history or other subject of business. It is therefore not possible to analyse the trend in terms of before and after.

[12] Energiewende im Kontext von Atom- und Kohleausstieg – Perspektiven im Strommarkt bis 2040, 2020,https://www.solarwirtschaft.de/wp-content/uploads/2020/08/EUPD_Energiewende_Studie_Update_2020_webversion.pdf

- If the applicant is a company with a history and other business activities, the PV project is often also financed by a bank loan. These loans are generally set up so that the loan repayments replicate the benefits of the project and the company's cash flow is not affected. Depending on the specific project, the loan repayment period can be up to 15 years, but is normally approximately 10 years. Throughout this period, the benefits of the project are offset by the cost of repaying the debt. Generally speaking, there will be a reduction in energy costs and an increase in debt service costs in the income statement, as well as an increase in external resources and tangible fixed assets in the balance sheet. In the reality of corporate finance, it will be almost impossible to determine whether the public aid has led to a change in performance in the medium term when the loan is drawn down.

5 TIMETABLE, DATA COLLECTION AND PUBLICITY

5.1 Data collection

The evaluation will be based on information obtained from various sources. One set of data on performance indicators for both successful and rejected applicants comes from applications and follow-up reports collected, managed and processed by the SEF CR.

Information on the development of greenhouse gas emissions in the electricity sector will be provided by the Ministry of the Environment from data from the European greenhouse gas Emissions Trading Scheme (ETS).

The Ministry of Industry and Trade and the Energy Regulatory Authority will provide data on the mix of electricity generation, generation and consumption from renewable sources, newly installed renewable capacity, energy storage capacity, market shares, market concentration and the impact on electricity prices.

A questionnaire survey of applicants will serve as a supplementary source of data.

All data on indicators for supported and unsupported projects will be available for the annual evaluation or for the evaluation of individual calls of the scheme.

As the scheme administrator, the SEF CR will have access to all the data needed to carry out the evaluation and to calculate and assess the outcome indicators.

5.2 Data collection by interviewing applicants in the scheme

5.2.1 Data from successful applicants

The implementation and progress of the project are monitored by sending interim annual monitoring reports submitted by the beneficiaries to the SEF CR system. At the end of the project implementation, the beneficiary documents the implementation through a final evaluation of the project.

For the purposes of the next evaluation phases, the SEF CR will provide aggregated or anonymised data concerning the parameters of the implemented projects, as well as deviations in changes in the estimated installed capacities of panels and battery capacities, changes in the amount of investment costs and the number and parameters of beneficiaries who will not implement the approved projects.

5.3 Publication of the evaluation

The results of the evaluation of the aid scheme will be published on the SEF CR website. They will also be presented at meetings of the Modernisation Fund Platform, which is made up of representatives of stakeholders from public authorities, professional associations and other interested parties.

Documents submitted by applicants are public, but information on commercial or operational conditions may be designated as confidential and will not be disclosed.

5.4 Evaluation steering committee

An independent evaluation steering committee has been established for the evaluation, consisting of representatives of the following institutions: The Energy Regulatory Authority (ERA), the Office for the Protection of Competition (OPC), the Czech Technical University in Prague and the Chamber of Renewable Energy Sources.

The committee coordinates evaluation activities related to individual evaluation reports, and methodologically leads evaluation activities. The committee may use the services of other bodies to carry out selected parts of the evaluation work.

5.5 Schedule

In the Evaluation Plan of 20 December 2021, the Czech Republic committed to the following timeline:

- 28 February 2023: final evaluation report for the period 2021-2022 (guidance document) - The report will build on the evaluation plan already submitted and the first evidence available on the implementation of the scheme, and will include descriptive statistics (where available) and, where appropriate, an updated description of the data and methodologies that will be used for the evaluation. This guidance document will serve as the basis for the evaluation plan for any follow-up scheme. The scheme should be suspended if the final evaluation report is not submitted on time and in sufficient quality.
- 31 December 2026: Supplementary Report 1 - the evaluation report will include an assessment of the effectiveness and efficiency of the scheme. It will apply to projects completed by 31 December 2024.
- 31 March 2030: Supplementary Report 2 - the evaluation reports will include an assessment of the effectiveness and efficiency of the scheme, which will cover projects completed by 31 December 2028.
- 31 December 2035: Supplementary Report 3 will be the final and complete evaluation report, with a comprehensive assessment of the scheme.

Furthermore, the Czech Republic will inform the Commission annually on progress with the implementation of the scheme and on the collection of data. The evaluation steering committee will set a detailed schedule for the preparation and approval of each report to enable it to be prepared and approved in time, but at the same time to ensure that it is not drawn up unnecessarily in advance and contains the most up-to-date data relevant for the ex post evaluation, while responding to the schedule of the individual calls.

6 EVALUATION OF THE SCHEME IN 2021-2022

6.1 Overview of announced calls

As part of the scheme under evaluation, two calls were announced between 2021 and 2022:

- ModF - RES+ No. 2/2021, with the application closing date of 29 October 2021. The Minister's decision was passed on 15 March 2022 and with a call allocation of CZK 3.5 billion.
- ModF - RES+ No. 2/2022 with the application closing date of 31 October 2022 with an allocation of CZK 5.5 billion. The aid in this call had not been decided on by the end of 2022.

6.2 RES+ No. 2/2021

The evaluation is based on the database supplied by the SEF CR, which contained the parameters of all 151 aid applications broken down as follows:

- Ranking
- Application registration number
- Name of applicant
- ID No.
- Project name
- Region
- 10c entity
- Subsidy (CZK)
- Total project expenditure (CZK)
- Total eligible expenditure (CZK)
- % of TEE
- Amount of subsidy requested per unit of installed capacity (CZK)
- Total power (kW)
- Ground power (kW)
- Roof power (kW)
- Brownfield power (kW)
- Storage capacity (kWh)
- Total points, Points - economic efficiency
- Points - storage
- Points - roof
- Points - brownfield
- Points - region
- District
- Implementation location
- Acceptability criteria
- Recommendation.

It should be noted that, according to the SEF CR, the data concerning the 38 unaccepted projects are less reliable, as the projects have not undergone a complete evaluation and it is possible that they contain some errors or inaccuracies. Therefore, in the following evaluation, these data have been used only in some cases and their interpretation should take into account the risk described above.

6.2.1 Contribution of the call to achievement of the overall objectives of the scheme

According to the notification, the aim of the scheme is to build 2,959 MW of new installed PV plant capacity and 684.5 MWh of new storage capacity.

The first call of the scheme provisionally supported projects with a total capacity of 532.565 MWp and a storage capacity of 40.667 MWh with a total subsidy of approx. 3.215 billion CZK, while the total allocation of the scheme is planned at EUR 1.1 billion (CZK 26 billion). With a simplified calculation of the application of the same parameters of the first call to the total planned aid amount of CZK 26 billion, the whole programme would, according to the results of the first call, support a total of 4,307 MWp of installed capacity and 329 MWh of storage capacity. The storage volume is therefore approximately half the amount that would correspond to the linear construction of these capacities. Therefore, the setting of future calls should focus on how the aid is set up and favour a system with storage, so as to increase the rate at which the storage is installed.

6.2.2 Distribution of projects in the first call

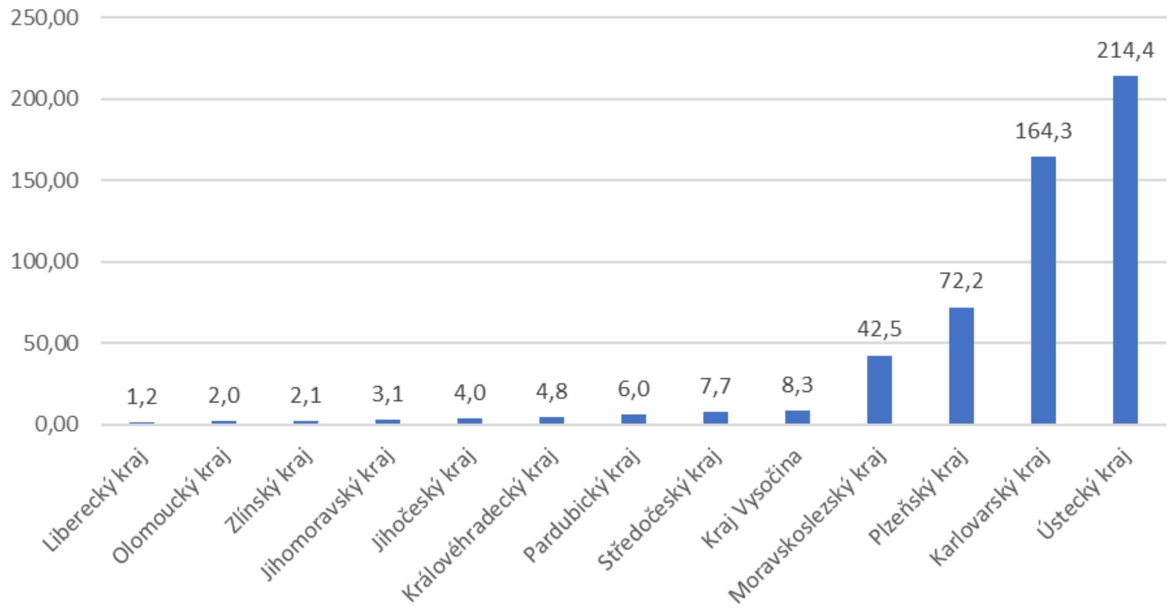
Tabulka 10: Aggregate values of applicant projects

All (151 projects)	Unit	All (151 projects)	Accepted (113 projects)	Recommended (57 projects)
Buildings	kW	117,243	89,132	32,048
Ground other	kW	383,016	234,112	123,703
Brownfields	kW	548,790	412,965	376,814
Total capacity	kW	1,049,049	736,208	532,565
Storage capacity	kWh	64,692	51,863	40,667

Source: SEF CR

Within the framework of the supported projects, 70.8% of the installed capacity of the projects is on brownfield sites and 6% on buildings. No specific target for the proportion of rooftop and brownfield projects was set in the notification or notification plan.

Obrázek 3: Capacity of supported projects in individual regions, in MWh



Source: SEF CR

The three regions with a point advantage as regions affected by the decline in coal mining represent a total of 421.2 MW of supported installed capacity, which makes up 79% of the total supported capacity in the whole of the Czech Republic. The notification of the scheme did not set a specific target for support for the region.

Within the framework of the 57 supported projects, ČEZ, a.s. received the largest number of projects and public aid. Of the CZK 3.2 billion, ČEZ a. s. will receive 32.3% of the aid for a total of 17 projects; the next largest beneficiary will be ORLEN Unipetrol a. s. with one project, which will receive 17.7% of the total aid; another group, SUAS GROUP a. s. with 4 projects, will receive 14.3% of the total aid and the fourth largest beneficiary will be the Global Energy Investments a. s. group with 6.2% of the aid. In total, these four groups will receive 70.6% of the approved public aid. The proportion of aid received by the four largest companies or groups can be considered high. This is a problem that is also faced in other countries in the context of support for RES through auctions. The literature lists some measures that can be considered when designing further challenges or schemes[13].

6.2.3 Testing alternative scenarios

Several alternative scenarios and an alternative evaluation key were developed to evaluate the set-up of conditions and benefits in the first call. An interpretation of the results, including the limitations of this approach, is included in the description of each scenario.

A: Scenario including all 151 projects

This scenario tests whether the administrative phase-out resulted in increased program inefficiencies. The modelling result did not show this. On the one hand, including all the projects would increase the supported installed capacity by 3.7%; on the other hand, 14.4% less storage capacity would be supported. In general, it can be recommended that the SEF CR should consider the balance between

[13] EBRD and EnCS (2018), Competitive Selection and Support for Renewable Energy; IRENA 2019 Renewable energy auctions - status and trends beyond price; 2nd CEER Report on Tendering Procedures for RES in Europe

maintaining the effectiveness of the competition and maximising the number of supported projects showing a similar level of effectiveness when setting up future calls.

B: Scenario with no regional preference.

This scenario tests a group of 113 accepted projects to see how the project ranking would have turned out without the 10 points assigned to the coal regions, and whether projects from these regions required significantly higher public aid. The limitation of this test is the assumption that, owing to the setup of the programme, projects from these regions could be assumed to have applied for inclusion in the programme. Another limitation is the small sample of projects outside the supported regions. The result of the modelling shows that in this scenario the amount of installed capacity was almost identical and the amount of storage was 16% higher.

C: Scenario that does not prioritise companies using Article 10c

This scenario includes 113 accepted projects and abandons the prioritisation of support for electricity generator projects pursuant to Article 10c of Directive 2003/87/EC of the European Parliament and of the Council ("10c entities"). The alternative scenario came out the same as the reference scenario; there was no change in the projects supported. One reason for this is the relatively low number of 10c entity projects. Thus, the prioritisation of 10c entities did not lead to inefficiencies in the system.

The following table shows how the parameters of the supported projects would differ in each scenario for the same public aid as in the reference scenario, i.e. CZK 3.24 billion.

Tabulka 11: Results of modelled scenarios

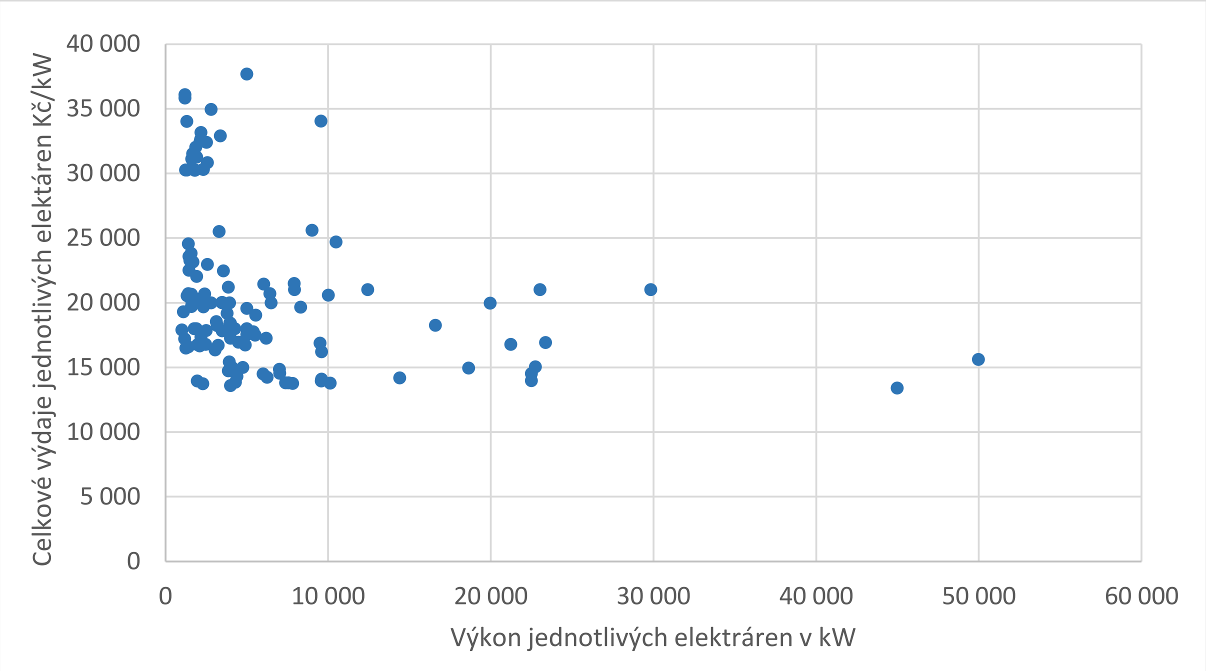
	Number of supported projects	Requested amount of subsidy per unit of installed capacity (CZK/kWp)	Total power (kW)	Ground power (kW)	Roof power (kW)	Brownfield power (kW)	Storage capacity (kWh)
Realistically supported	**57**	**6,036.5**	**532,565.2**	**123,703.2**	**32,048.0**	**376,814.0**	**40,667.1**
Scenario A: inclusion of all 151 projects	48	5,809	552,114	46,424	47,983	457,708	34,400
A: Percentage compared to the real scenario	-	96.2%	103.7%	37.5%	149.7%	121.5%	84.6%
Scenario B: no regional preference	84	6,082	531,463	91,615	86,556	353,292	47,313
B: Percentage compared to the real scenario	-	100.8%	99.8%	74.1%	270.1%	93.8%	116.3%
Scenario C: without 10c priority (113 projects)	57	6,037	532,565	123,703	32,048	376,814	40,667

	Number of supported projects	Requested amount of subsidy per unit of installed capacity (CZK/kWp)	Total power (kW)	Ground power (kW)	Roof power (kW)	Brownfield power (kW)	Storage capacity (kWh)
C: Percentage compared to the real scenario	-	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

6.2.4 Economies of scale

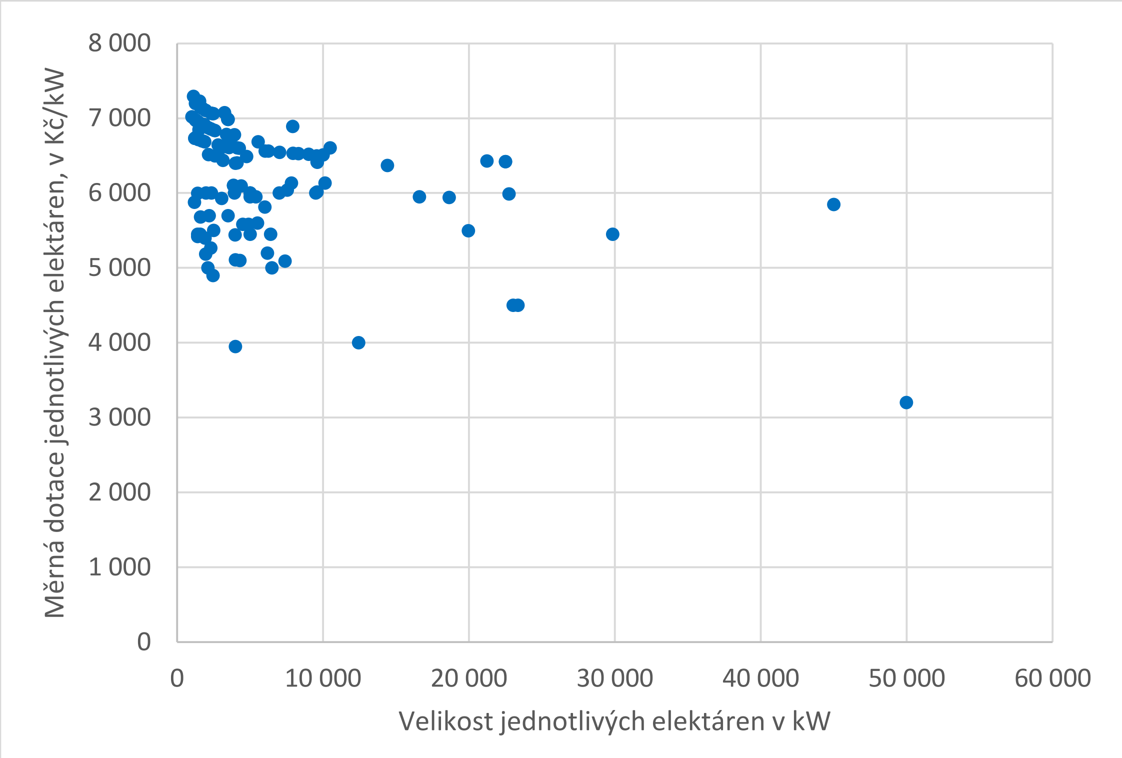
The data from the first call examined the relationship between installed capacity and the decrease in specific costs (as reported in the applications) per unit of installed capacity. If the decrease in costs from scale were sufficiently evident and high, a possible additional sub-division/grading of calls could theoretically be considered. The following chart shows the values of each project. The set of all 132 projects excluding projects containing storage was selected. The variance of expected costs is large, especially for smaller projects, up to several times higher than that of the cheapest projects. It is unlikely that the real costs would differ in this way, nor does the literature suggest that they would. A more likely explanation is that the applicants underestimated the expected expenditure in their applications. While this does not affect the award of the grant, for evaluation purposes the value of the expected expenditure becomes less reliable and it will be more appropriate to use realistic values in the ex post evaluation.

Obrázek 4: Specific costs per unit of installed capacity depending on the installed capacity of the PV plant



The same approach was taken in the evaluation above, examining the relationship between the size of the plant and the size of the specific subsidy. It is important to note here that the size of the subsidy requested (as with auction systems) is not directly proportional to the cost and that cannot be used to determine the real cost. The relationship between the size of the projects and the requested subsidy was found to be insignificant in the data analysis.

Obrázek 5: Amount of subsidy requested depending on the installed capacity of the power plant



6.2.5 Setup of the other calls of the scheme

The second call of the scheme, RES+ 2/2022, had almost identical parameters to the first call. The results and data from this call will be available in the first half of 2023. After the publication of the results of the second call of the scheme, the SEF CR, in cooperation with the Evaluation Committee and any other social partners, will analyse the call with regard to possible changes in the setting of parameters, especially the weighting of the individual evaluation criteria, i.e. points for repository, region, brownfields and rooftop installations.

The scheme does not have specific quantified targets for the representation of each of the preferred parameters (brownfields, roofs, batteries, vulnerable regions), so it will be necessary to assess whether the distribution of projects is in line with the state's intentions and whether the supported criteria significantly impair the effectiveness of the scheme (increased unit costs of support).

The above analysis of the first call shows the need to respond flexibly to the priority shown to the three coal regions in order to avoid situations where projects from these regions receive the vast majority of support. If this criterion is changed, targets and limits on the amount of suitable PV development in these regions should be set to avoid geographically uneven RES development, which could potentially be problematic from a technical perspective. In the event that the projects continue to be concentrated on a few companies or groups, it may be appropriate to consider possible measures based on foreign experience of auction systems. In the event of continued inadequate success of storage projects, the setting and weighting of this criterion will also need to be considered.

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