Evaluation Plan of a State Aid Scheme in the Republic of Croatia:

Promoting Electricity Produced from Renewable Energy Sources and High-Efficiency Cogeneration in the Form of a Market Premium for the period 2021–2022 (SA.57089), extended to 2023

1. INTRODUCTION

The evaluation plan is prepared in line with the Commission's Common methodology for state aid evaluation (28 May 2014), which defines the framework conditions for implementation of state-aid evaluations. The state aid Scheme Promoting Electricity Produced from Renewable Energy Sources and High-Efficiency Cogeneration in the Form of a Market Premium for the period 2021–2022, which is listed under the number SA.57089, exceeds the threshold of EUR 150 mil. of annual State aid budget. This will be true even despite the fact that Croatia wants to prolong the Scheme by one year, i.e. to (including) 2023. Thus, this Scheme is subject of external evaluation due to its potential impact on the internal market.

2. THE STATE AID SCHEME

2.1 THE OBJECTIVES OF THE SCHEME

In June 2021 Republic of Croatia has adopted a new low-carbon development strategy until 2030 with a view of 2050. The low-carbon strategy sets the way for a transition towards a sustainable, competitive economy, in which economic growth is achieved with low or no greenhouse gas emissions. Greenhouse gas emission reduction targets by 2030 and 2050 will be implemented within the political framework adopted by the European Union, particularly Green New Deal and climate-neutrality by 2050.

In February 2020 Republic of Croatia has adopted Energy development strategy until 2030 with a view of 2050 that represents a step towards achieving the vision of low-carbon energy and ensures a transition to a new energy policy that should lead to an affordable, secure and high-quality energy supply.

In December 2020 Croatia has also adopted its Integrated National Energy and Climate Plan (NECP) for the period 2021-2030. The NECP sets objectives through five key dimensions of the Energy Union with more than 100 relevant measures. However, **the key objectives outlined in**

the Croatian integrated NECP are the reduction in greenhouse gas emissions for the year 2030, increased share of RES in the gross final energy consumption and increased energy efficiency. Particularly, objectives and trajectories are set for the increased share of renewable energy sources in the gross final consumption of electricity, from 47% in 2020 to 63.8% in 2030.

In accordance with the low-carbon strategy, energy development strategy and NECP the Republic of Croatia implements state aid Scheme in order to mitigate the main barriers to wider use of RES: high production cost, low bankability and uncompetitive status on the energy markets. However, Croatia by the Scheme wants to achieve other complementary goals and objectives, recognised in its strategic documents.

Thus, the key objectives of the Scheme are:

- Reduction of greenhouse gas emissions and sustainable development
- Increased use of RES in electricity production;
- Diversification of energy sources;
- Reduction of the dependence on imported fossil fuels;
- Positive macroeconomic effects of investing in the RES sector (new jobs, positive impact on GDP);
- Balanced economic development of local communities, proactive management of agricultural and forest land use and transition to a bioeconomy.

The aid from the Scheme should address the energy market failure to internationalise *the so called* external cost of energy and to overcome market barriers to RES by creating incentive framework that would lead to increased share of RES in total energy production. Despite clear environmental and climate advantages compared to established and technologically more mature production technologies from conventional sources, it is necessary to create a level playing field for RES technologies. As these technologies are more costly than conventional technologies and thus less competitive, they cannot achieve economic viability, they are not attractive for investment under current market conditions and state of technology. Therefore, it is necessary to ensure a certain level of incentives to make RES producers feasible and increase their competitiveness. Without that, very few RES projects would be realised and overall targets in terms of RES shares jeopardised.

At the same time, when determining incentive measures price mechanisms should be implemented through price signals and other market signals that shall guide the development of RES projects in the desired direction, making the projects financially attractive to investors from

one side, but also financially viable for the Republic of Croatia from the other. In other words, without the incentive system in question, it would not be possible to increase the share of RES compared to the level that would be achieved without aid. The introduction of the system of incentives in the form of a market premium should improve efficient functioning of the electricity market and correct market failures regarding the increase in electricity produced from RES.

One of the key objectives of the Scheme is to contribute to the fulfilment of the strategic objectives listed in Croatian low-carbon strategy, NECP and energy development strategy (hereinafter: Strategies). These documents set the direction of development of the energy sector in Croatia towards reducing dependence on energy imports, ensuring the long-term sustainability of the energy sector, achieving positive macroeconomic effects of investing in the energy sector, and harmonising with the EU's long-term development agenda (EU SET-Plan 2050). Among others, Strategies outline Croatia's contribution to mitigating climate change. The energy transition cannot be achieved in isolation, but it is necessary to continue working on the goals of global reduction of CO2 and other greenhouse gas emissions and support the EU's commitment to the single climate and energy policy. Certainly, complementary goal is to promote energy efficiency in compliance with Directive (EU) 2018/2002 of the European Parliament on energy efficiency

Based on previous studies and evaluations of the former support system for RES (FIT - *Feed-in Tariffs)*[1], the overall effects on the GDP and new jobs (direct, indirect and induced) of investments in RES plants range from HRK 350,000 and 1.9 new jobs per HRK 1 million of total investments (wind power plants) to HRK 670,000 and 3.7 new jobs per HRK 1 million of total investments in biogas power plants. These indicators are very important for Croatia, but are not fixed because they depend on investment costs of individual technologies, as well as on the country's economic structure. For technologies with declining specific costs, primarily solar and wind power plants, there should be an additional effects compared to historical data since each million of investments shall enable a higher amount of goods and services, thus also inducing greater effects.

The economic viability of using RES also includes benefits for the entire community, primarily through the reduction of greenhouse gas emissions and environment protection, creation of new jobs and business activities in less developed local communities.

To achieve objectives Croatia has opted to carry out a tender procedure for different RES technologies (technology specific tenders), all for the purpose of obtaining cost-effective financial

[1] Accessible at https://www.hops.hr/page-file/CwqtWjjSgKIf9Qfz07pFB5/ostale-publikacije/Analiza_OIE_Final.pdf (in Croatian)

aid for specific technologies, and avoiding single technology domination at the same time. The reasons for technology specific tenders are primarily in the need for diversification of energy sources, spatial diversification of production units, promotion of innovative technologies, use of unused RES resources and optimal grid development and stability.

In rural areas, proactive management of agricultural and forest land use can significantly contribute to the goals of RES use and GHG emission reduction, as well as to making a transition to bioeconomy and achieving the desired multiplication effect and socio-economic measures. The local self-government has a key role with regard to mobilising biomass potentials, creating opportunities for farmers to become stakeholders in the biomass supply chain and get actively involved in the supply chain, whether through the participation of utility companies or by participating in establishing collection and logistics centres for biomass, i.e. through cooperative biogas plants.

The bioeconomy means the production of renewable biological resources and the conversion of those resources, together with their waste streams, into value-added products such as food, feed, biological products and bioenergy. The circular economy and bioeconomy provide a new context for the use of biomass, where the demand for biomass as a raw material is expanded from current values into new, innovative supply chains and bio-based products. Agriculture, forestry and fisheries, including the industries based on those sectors, and landscape maintenance (transport, energy and other infrastructures, waterways, urban green areas), together with waste management, represent the raw material basis for renewable biological resources of the bioeconomy or biomass. The priority in using biomass should be given to products with higher added value or through cascade use, and it should also be harmonised with the national economic capacity as well as with strategic development goals.

This Scheme promotes good practice in biomass production for the needs of the bioeconomy, energy production from biomass and use of by-products generated in such plants, while it minimises the space for biomass production and supply chains and plants that are not achieving sustainable use of natural resources.

The RES plants shall have even greater effects in their operational phase, whereas those effects are greatest in the case of biomass and biogas power plants since the raw material used for their operation is delivered by domestic producers, which increases multiplication effects in the operational phase as compared with technologies that do not require the raw material.

Finally, it is important to note the multi-purpose importance of small hydro power plants as projects that can positively contribute to different sectors of the society (e.g. flood protection, raising the level of ground water, irrigation, reduction of greenhouse gas emissions, etc.).

2.2 BENEFICIARIES

Any undertakings (small, medium, large) as well as natural persons, local self-government units and state administration bodies that have acquired the status of eligible RES electricity producer or, in the case of simple plants (constructed on other buildings like integrated solar plants), have signed a power grid connection agreement with the distribution system operator may become beneficiaries under this Scheme. All beneficiaries, regardless of its size or type, must meet the tendering conditions for the award of a market premium.

2.3 THE STATE AID INSTRUMENT

Electricity generation from RES production plants larger than 500 kW will be supported through a market premium paid to producers on the basis of an agreement with the electricity market operator (herein: HROTE). The market premium is an operational aid, a monetary amount paid by HROTE to the eligible electricity producer for the net electricity supplied by the production plant into the electric power grid.

The right to conclude a market premium agreement is awarded based on the decision on the selection of the most economically advantageous offers in the tender procedure conducted by HROTE. Having concluded the agreement, the eligible electricity producer shall then sell the electricity on the electricity market in accordance with the regulations governing the electricity market. Therefore, the RES producers under this scheme are responsible for energy balancing.

The market premium system promotes building exclusively new production plants and production units that use RES, up to the quota to be incentivised is reached. The quota to be intensified is determined by the regulation (herein: The Quota Regulation).

Pursuant to the Regulation on the Promotion of RES, eligible producers shall be paid the market premium only for the net electricity delivered at hours when the value of the reference hourly market price is higher than or equals to zero. No aid shall be granted when the market prices are negative.

Based on the offered reference values on a tender HROTE will select the lowest, most competitive offers and make a decision on successful bidders. After that HROTE will conclude a 12-year market premium agreement with a project developer. The agreement will be effectuated from the day when the project developer has acquired the status of eligible electricity producer (after construction is completed), or in the case of a simple plants, from its commercial operation date, as defined in the Permanent Operating License issued by the distribution system operator.

The market premium (TPi) for each production plant or production unit in a given accounting period (a month) and is calculated as:

$$\mathbf{TPi = RV – TCi}$$

where:

TCi – is the reference market electricity price in the accounting period, expressed in HRK/kWh

RV – is the reference value defined by the market premium agreement, based on the tender results, expressed in HRK/kWh.

HROTE shall define the reference electricity market price no later than the 15th day of the current month for the previous month, based on the calculation methodology for reference electricity market prices provided for in the Regulation on the Promotion of RES and publish it on its website. The methodology for the calculation of reference electricity market prices provides a mechanism to ensure that an eligible electricity producer is not entitled to a market premium incentive in periods when the reference market prices are negative.

Market premium on top of the electricity market price represent an aid to RES producers. The average income of RES producers (in this case reference value was taken as proxy of their average income) must not be higher than LCOE (Levelised Cost of Electricity) for those production plants since LCOE represent 100% of the eligible costs. In case of Croatia, the aid intensity is expected to be up to 50% of the eligible costs, depending on RES technology (the lowest being for solar and wind energy, the highest for geothermal). Maximum reference values are calculated according to the methodology defined in the Regulation on the promotion of RES&HEC. Details of the calculation and assumptions are given in the state aid Scheme.

The market premium payments shall be based on the net electricity supplied within the calculation period. The market premium payments shall start once the producer has acquired the status of eligible producer for the production plant for which the market premium agreement has been

concluded. The project developer has four (4) years after conclusion of the agreement to complete construction and obtain a decision on the status of eligible producer (by Croatian Energy Regulatory Agency; herein: the Agency).

The market premium agreement shall be terminated, inter alia, if the producer loses the status of eligible producer for the production plant or production unit for which the market premium purchase agreement has been concluded.

3. THE EVALUATION QUESTIONS

The evaluation report aims at verifying whether the assumptions and conditions underlying the Croatian state aid Scheme have been achieved, as well as verify the proportionality and appropriateness of the aid in the light of its general objectives. The evaluation report aims also at provision of indications on the impact of the Scheme on competition and trade.

The evaluation questions given below are derived from the intended objectives of the Scheme and will focus to quantification on the impacts of the Scheme. The ultimate purpose of the evaluation is to get lessons for future aid schemes.

The evaluation questions can be classified according to the different levels:

A. Direct impact of the aid on beneficiaries:

1. *How many renewable energy projects are contracted with the aid provided under the Scheme and how many are expected to be realised without that aid during the Scheme per each RES technology? Has the aid significant effect on the course of action taken by the aid beneficiaries?*

   During last five (5) years (since 2016), Croatia didn't have a Scheme under which new RES projects had a chance to get support and realise. According to the Croatian regulation FIT system (Feed-in System) expired in 2015. However, due to the technology cost decrease in the meantime, some RES projects entered construction phase even without support. The intention of this question is to verify to what extent the aid granted has effect on investment decisions of the beneficiaries and to compare the "speed" of renewable energy progress without and with the aid granted, for different RES technologies.

2. *Are beneficiaries affected differently by the aid?*

This question intends to verify if the beneficiaries are affected in the same way, considering size, location or sector. For example, same level of support (as percentage of eligible cost) might have different effects on small and large projects. Hence, beneficiaries might have been differently affected, which would lead to different investment decisions. Such effects, if any, should be recognised by the evaluators.

B. Indirect impact of the aid on specific policy objectives:

3. *What is the (expected) effect of the aid on the increase of RES share in Croatia?*

   Increase of RES share is one of the key targets of the Scheme. Thus, it is reasonable to assume that the aid should contribute to the increased share of RES in Croatia. However, if the electricity consumption increase significantly, the RES share might even decrease. If so, this might be a signal that some interventions are required.

4. *Evaluate the expected GHG emissions reduction due to aid provided. What was the cost of GHG reduction per RES technology for the State aid Scheme?*

   GHG emissions reduction is another key target of the Scheme. For this reason the evaluation body will analyse the expected impact of the aid to the emissions reduction. However, the important question is also the specific cost of emissions reduction. Not all RES technologies contribute to the same level per MWh produced and the aid intensity differs. The analysis should answer which RES technologies under specific Croatian circumstances contribute more. This recommendation might be important for policy makers in shaping future RES policies.

C. Indirect impact of the aid on beneficiaries:

5. *What impact the aid have on the competition, i.e. are non-successful tenderers crowed-out? Is there any influence on the market prices and the demotivation of new investments?*

   By logic behind the tender for getting a market premium, unsuccessful tenderers will be crowed-out. However, they have a new chance to participate on the next tender. Through this analysis the evaluators could detect any systematic trend that persistently crowd-out some specific group of tenderers. F.e. RES technology groups are now aggregated (no tenders by RES groups, only tenders for a whole RES technology – solar, wind, biomass, etc.), smaller projects (f.e. solar or biomass)

could suffer because of lack of competitiveness and, as a result, systematically been crowd-out.

6. *How many new projects are registered in the Registry of RES&CHP projects, per REC technology? Does the Program induced new projects in the Croatian renewable energy sector?*

   The launch of market premium tenders send very strong signal to the investors' community. It would be expected that a number of new projects is initiated and registered in the Registry of RES&CHM after they got the licence permit (The Registry is managed by the Ministry of economy and sustainable development). If not so, the evaluators would be asked to detect what risks might be the reason for the calm (risks associated to the Scheme or something else).

7. *Will the aid to RES producers impacted (decreased) imports of electricity to the Croatia?*

   One of the policy objectives of granting aid to renewable producers is decreased net dependence on imports of electricity, especially fossil fuels. The evaluation body will assess the impact of the aid to RES producers on the imports of electricity in order to verify if the objective was met.

8. *Does the aid granted have had effects on economic activity of less developed local communities in Croatia?*

   One of indirect policy objectives of the aid Scheme is to trigger more economic activity in less developed local communities. The evaluation will analyse how much economic activity was initiated by the Scheme in less developed Croatian NUTS 3 regions that are under the national average according to regional economic indicators (employment, GDP, Gross value added, etc.). This analysis will increase understanding of the Scheme impact on the regional economic activity of less developed communities in Croatia.

D. <u>Proportionality and appropriateness</u>

What is the average level of support per each RES technology, based on tender outcomes? Is that support within expected range in relation to credible international sources for Europe, especially for SEE region (like International Renewable Energy Agency –IRENA and other)? Would lower aid impose same results?

This question intends to verify if the aid granted through a Scheme is proportionate to the problem, i.e. the lack of competitiveness of RES technologies.

5. *Was the market premium tender the most appropriate instrument to support RES producers? Would other instrument have been more appropriate for achieving increased use of renewables and GHG emissions savings?*

   This question intends to verify if the aid instrument (floating market premium) is the most appropriate instrument in the context of Croatian renewable energy industry. Other options for support include different variants of market premium (based on cfd – contracts for difference, fixed premium, etc.), investment subsidy, loans, risk funds for high risk initial project development activities (like drilling), etc.

4. THE RESULT INDICATORS

For the purpose of evaluation of the Scheme, output and result indicators will be used. Output indicators are needed to get a basic idea on the functioning of the scheme and shall include more aggregated values and parameters (as a result of the whole Scheme). The result indicators will be used as a key tool for assessment of effectiveness of the aid scheme as achieved values will be further scrutinized using counterfactual methods. It is also possible to use the indicators for interpretation of the impacts of the Scheme.

With regard to the objectives of the Scheme objectives, all indicators used for the purpose of evaluation reports are included in the following table. In case of result indicators, achieved values will be compared with a control group on basis of counterfactual evaluation methods.

Evaluation question	Indicator	Association with the evaluation question	Type
1.	Number of new RES projects with and without aid granted	Classification of new RES projects (production plants) to groups with and without the aid, and their comparison, will enable understanding of the aid effects on the course of action taken by the aid beneficiaries.	Output indicator
2.	Size of the projects, geographical scatter	Classification of projects by size and location would help to assess if those parameters have impact on the beneficiaries and their actions.	Result indicator

3.	RES-E share	Energy balance and estimate of the impact of new RES projects with aid	Output indicator
4.	Croatian GHG emissions in absolute and specific terms (estimated effect for the new supported RES project)	One of the key indicators to show overall effects of the aid.	Output indicator
5.	Status of RES projects that do not receive aid 1 year after the tender closure	Non-successful tenderers will be followed to assess if they are crowded-out (even after multiple attempts to participate on tenders) or succeeded to make progress with their projects without the aid. This indicator will be used as a tool for assessment of the impact of the aid Scheme on competition.	Result indicator
6.	New registered RES projects in the Registry of RES&CHP Projects, managed by Ministry	Insight in the Registry is required in order to assess trends and determine the “speed” of RES development. This indicator is an entry to the more complex analysis of the reasons of the eventual RES development slowdown or even pause. Especially if the aid granted turn out to be proportionate and adequate.	Result indicator
7.	Import of electricity (trend)	This statistical indicator would show if the import of electricity has changed due to the Scheme implementation.	Output indicator
8.	Geographical scatter of successful projects and overlap with NUTS 3 regions and their development status	This indicator will enable assessment of the economic activity in less developed local communities of Croatia in order to estimate the indirect impact of the aid and its contribution to the regional policy development objectives.	Output indicator
9.	Level of support granted via tenders for each RES technology	This is one of the key indicators. Based on the level of support for RES technologies it is possible to assess if the aid has been proportionate.	Result indicator
10.	Level of support granted via tenders for each RES technology	The same indicator will be also used to analyse if the selected instrument was the best option in relation to the objectives. Starting from here, by performing SWOT analyses for the most relevant instruments, comparison will be made between different instruments available.	Output indicator

5. METHODOLOGY

5.1 GENERAL APPROACH

State aid evaluations should be designed to identify the undistorted causal impact of the Scheme. Any impact of the other variables on the outcome should be recognised and avoided. The evaluation should, thus, assess changes that can be attributed to a particular intervention only, in this case support to RES producers through a market premium.

The impact of the aid is the actual difference between the outcome with the aid and the outcome in the absence of the aid (i.e. the "net effect" of the Scheme). While the outcome with the aid is observed for firms who receive the aid, the outcome in the absence of the aid is only measured for firms who do not receive aid. To estimate the effect of the aid on aid beneficiaries counterfactual method will be applied, based on the most comparable control group. Impact evaluation involves an identification of a causal mechanism by a comparison between what actually happened and what would have happened in the absence of the aid (counterfactual analysis)[2].

The evaluation of the Scheme will be based on usage of the envisaged indicators and counterfactual methods using comparison of data on the basic group of assisted RES producers with data on the control group. The development of values of indicators envisaged in the previous chapter, where applicable, will be compared between the group of aid beneficiaries and the control group. Impact evaluation will also use overall development of economic indicators as a benchmark for comparison. The envisaged evaluation methods will enable to discover the causality of aid. These methods will help to evaluate the causal effect of aid on the group of beneficiaries and also try to estimate the indirect effects of aid.

We distinguish between direct and indirect effects of the Scheme. The general methods used for evaluation will differ accordingly:

- For direct impact of the aid, several methods will be applied, depending on the evaluation aspect:
    - Counterfactual methods where a control group will be compared to the group of undertakings receiving the aid. More specifically, the time to investment decision

[2] Luque-Fernandez, Miguel-Angel: A counterfactual approach for impact evaluation, Harvard School of Public Health, July 2014

will be analysed in both groups (treated/aided and control) to detect the impact of the aid.
    - Supply cost method to assess proportionality of the aid Scheme, as discussed later,
    - SWOT analysis in order to assess the appropriateness of the Scheme by comparing good and bad of alternative support options for RES with the existing Scheme (of market premium), only on qualitative level.
- For indirect impacts specific indicators and parameters will be analysed in order to verify that the aid induced action in the desired direction (regarding overall policy objectives like decarbonisation, increase of RES share, regional development, decrease of imports, diversification, use of untapped RES resources, etc.….).

5.2 THE BENEFICIARIES

The beneficiaries of the Scheme include subsidized firms that receive aid in the form of a market premium. The market premium is obtained on a public tender.

5.3 TARGET AND CONTROL GROUPS

The counterfactual evaluation requires target (basic) and control groups to be defined. design is quasi-experimental using a combination of linear regression and

matching comparison (mainly in case of insufficient frequency in data):

- **Treated (basic) group** includes all aid beneficiaries,
- **Control group** includes non-beneficiary firms with similar key features to the group of beneficiaries (same technology, same size).

5.4 SELECTION OF THE GROUPS

As stressed in the literature, identification of a proper control group is key to obtaining unbiased analysis of the aid impact. In selection of the appropriate method important is the fact that wind, solar, hydro and geothermal projects are typically developed by project companies (SPV – Special Purpose Vehicle), established with the only purpose of developing and implementing projects. In

case of biomass and biogas projects, there might be a link to other business activities like wood processing or agriculture or waste management.

Out of many different methods, for the Scheme under consideration (that is to be evaluated, i.e. the market premium for RES producers), quasi-experimental method based on Difference-in-Difference approach (DD method) was selected as appropriate. Randomised methods are seen less appropriate as the set of projects for selection of treated and control groups can be very small (only few projects, especially in case of geothermal, small hydro, biomass and biogas projects). In such a case, randomised selection might lead to biased results due to small set of data.

The crucial assumption behind choice of DD method is that unobserved heterogeneity in participation is present – but that such factors are time invariant[3]. In other words, same-technology projects develop in a very similar external environment – they will all have to pass the very same administrative procedure, they develop in the same-risk environment (country risk, financial risk, technology risk, policy risk, market risk). The differences between the projects are related to financial power of the firm, level of expertise available, RES resource available. However, all these differences are not attributed to the Scheme, but the factors that will persist during the whole time of RES project development. The difference between the firms, as detected before the aid was granted, should be present also after the aid. The difference between firms is assumed to be stable over time so any change of difference between the firms can be attributed to the Scheme only.

5.5 CONTRIBUTION TO THE OBJECTIVES OF A COMMON INTEREST

The important aspect of evaluation is verification of the Scheme in relation to the contribution to the objectives of the common interest. This reflect the need to collect evidence and determine whether policy objectives have been met and whether the resources were used efficiently. Evaluation of contribution to the objectives of the common interest particularly refer to evaluation questions 3, 4, 7 and 8. Increase of RES share, decarbonisation and decrease of fossil fuel imports are well recognised objectives of a common interest. For this to verify, specific indicators will be derived (RES share, specific GHG savings due to the Scheme implementation, the share of imports) taking into account actual trends and tender results. At the time of evaluation the risk

[3] Khandker, Shahidur R., et.al.: Handbook on Impact Evaluation, Quantitative Methods and Practices, The World Bank, 2010.

matrix will be derived in order to recognise potential aid beneficiary failures to complete the projects. Failure to complete might partly compromise the desired effects (policy objectives).

5.6 IMPACT TO THE BENEFICIARIES

Direct and indirect impact to the beneficiaries is to be evaluated by counterfactual impact evaluation method and linear regression. This especially refer to questions 1, 2, 5, and 6.

Counterfactual impact evaluation is a method of comparison which involves comparing the outcomes of interest of those having benefitted from a Scheme (beneficiaries of the market premium) with those of a group similar in all respects to the beneficiary group (the control group), the only difference being that the control group has not been exposed to the Scheme. The comparison group provides information on what would have happened to the aided firms had they not been exposed to the Scheme (the counterfactual case).

5.7 PROPORTIONALITY OF THE SCHEME

The evaluation of the aid proportionality refer to the analysis if the aid is limited to the minimum necessary level. This will require more detailed insight in the project specific data. For an unbiased evaluation, we propose the supply cost curve method.

The Scheme is considered to be proportionate if the effects are induced with the minimum possible intervention. However, in the real world, where uncertainty of input data for specific projects can be high, the evaluation makes more sense on a Scheme level then on a specific project level.

Supply cost curve is a technology-specific curve based on the project costs (i.e. lifetime production cost). The project are ordered according to the LCOE. In order to generate the supply curve a set of input data must be obtained from the aid beneficiaries (CAPEX, OPEX, FLH, WACC). The supply cost is then compared with the revenue curve. The revenue curve is the curve obtained by connecting project specific (per MWh) revenues over lifetime of the project. The Scheme is considered proportionate for a given technology if the area under the supply cost curve (B) is larger than or equal to the area under the revenue curve (A). This signifies that the aid is not higher then 100% of the eligible cost on a Scheme level (i.e. the aid is proportionate).

The methodology is illustrated on the figure bellow.

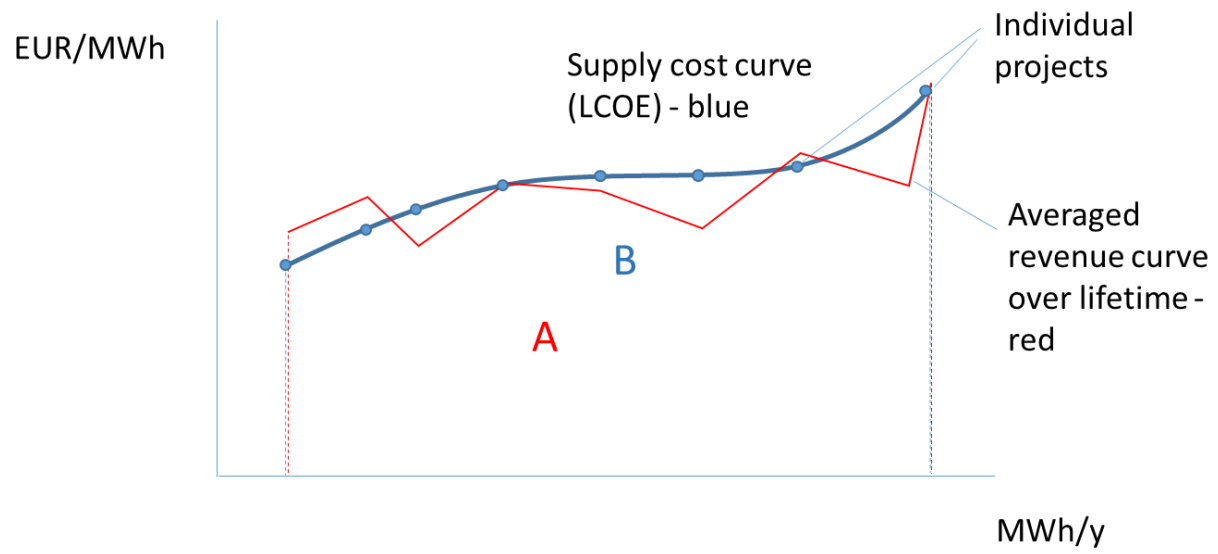

Figure 1 – Illustration of the supply cost curve method.

5.8 REFERENCES

[1] Khandker, Shahidur R., et.al.: *Handbook on Impact Evaluation, Quantitative Methods and Practices*, The World Bank, 2010.

[2] European Commission: *Common methodology for State aid evaluation*, COMMISSION STAFF WORKING DOCUMENT, 28 May 2014.

[3] Vidoni, Daniele: *State aid impact evaluation in the context of the EU State Aid Modernization*, World Bank – SRSS Training; Bucharest, December 10-12, 2018.

[4] Pindyck, Robert S., Rubinfeld, Daniel L.: Microeconomics, Eight Edition, The Pearson series in economics, Pearson Prentice Hall, 2013.

6. DATA COLLECTION

The data will be collected both from the aid beneficiaries of the scheme and from a control group of firms (non-beneficiaries). Data on assisted projects will be collected directly from the aid beneficiaries using survey tools on a yearly basis. First survey will include questions on initial values of indicators before the aid was granted (if applicable). As data will be collected on a yearly basis both from the aid beneficiaries and the control group, it will be also possible to use reflexive

comparison (comparison of initial and final values within the aid beneficiaries and within the control group).

Part of the data will be collected via the already established channels from other institutions and state companies in order to create synergies and increase efficiency of the evaluation process, like: HOPS (Croatian TSO), ODS (Croatian DSO), the Agency and the Ministry of economy and sustainable development. In addition, a new information channels will be open in other to gather data required for the evaluation like with Ministry of construction. Part of the data will come from regular statistical sources (Croatian Bureau of Statistics, EUROSTAT).

HROTE will act as data point for sensitive data (like investment, O&M cost, financing cost, etc.) in order to protect those data as business secret. The evaluator will thus use encrypted data under ID numbers of treated and control groups.

Outcomes will be published in the aggregate form only, because of the sensitive data protection.

Evaluation question	Indicator	Source of data	Frequency	Level	Population
1.	Number of new RES projects with and without aid granted	Data from Registries managed by Ministry, HROTE, the Agency and HOPS/ODS	Annual collection of data	Firm level	Aid beneficiaries and non-beneficiaries
2.	Size of the projects, geographical scatter, aid level provided	Results of tenders for market premium	Annual collection of data	Firm level	Aid beneficiaries
3.	RES-E share	Energy balance and estimate of the impact of new RES projects with aid	Annual	Energy sector	All electricity producers and imports
4.	Croatian GHG emissions in absolute and specific terms (estimated effect for the new supported RES project)	National inventory of GHG emissions, Eurostat data, data	Annual	Electricity sector level	All electricity producers

		analysis and calculations			
5.	Status of RES projects that do not receive aid 1 year after the tender closure	Tender results, audit, in-sight into the relevant Registries	Annual	Firm level	Aid non-beneficiaries
6.	New registered RES projects in the Registry of RES&CHP Projects, managed by Ministry	Data from the Registry	Annual	Firm level	New RES projects
7.	Import of electricity (trend)	Energy balances	Annual	Electricity sector level	All electricity producers and system operators
8.	Geographical scatter of successful projects and overlap with NUTS 3 regions and their development status	Tender results, NACE classification and indicators	Annual	Firm level	Aid beneficiaries
9.	Level of support granted via tenders for each RES technology	Tender results, international data published	Annual	Firm level, aggregate RES technology data	Aid beneficiaries, RES sector
10.	Level of support granted via tenders for each RES technology	Tender results, international data published	Annual	Firm level, aggregate RES technology data	Aid beneficiaries, RES sector

7. TIMELINE

It should be stressed that the Scheme has intended duration until the end of 2023. Such relatively short duration of the Scheme is an unfavourable circumstance for the evaluation. Namely, in the energy industry processes related to construction of new capacity are sometimes rather slow compared to other industries and the expected impacts of the policy require more time to be visible, typically several years. Moreover, by regulation the RES projects have four (4) years to

implement (to complete construction and get the status of eligible producer), please refer to the Scheme. As a result, some of the indicators will have to be drown from the expected (not actually realised) trends and assumptions, based on the market premium tender results.

However, we plan the evaluation process to start as early as after the first tender is completed by collecting initial data on beneficiaries and non-beneficiaries. During 2022 and first quarter of 2023 the collection of data will continue and the evaluation according to this plan will be performed during last quarter 2022 and first quarter 2023.

The final evaluation report is expected before the last market premium tender for RES in Croatia under this Scheme, expected to be open in second quarter of 2023.

	3Q 2021	4Q2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022	1Q 2023	2Q 2023	3Q 2023	4Q 2023
Planned tenders for market premium		x		x		x		x		
Data collection		x	x	x		x	x			
Evaluation										
Evaluation report - results							x			

8. THE BODY CONDUCTING THE EVALUATION

The evaluation will be conducted by the independent body, which will be fully independent from the aid grantor (HROTE). Specific body has not yet been selected for conducting of the evaluation plan. HROTE is a legal entity with public authorities and is obliged to carry out public procurement procedures, especially when it comes from external services such as this one. Therefore, it will be possible to select an evaluation body only after completion of the public procurement procedure.

The public procurement will set personal qualifications and conditions (references) for the body competing for the implementation of the evaluation plan. In the first place, the body must be independent from HROTE, a team of qualified experts with deep understanding of RES technologies from one side, and evaluation methods and techniques from the other. The evaluation team will be composed of experts from any of the relevant institutions (e.g. research institutes, universities, audit firms, individual researchers, Croatian Competition Agency, etc.) that can prove enough quality and capable experts to implement this plan. During selection of the evaluation body previous experience in conducting evaluations will be taken into account, but also experience in drafting laws and state aid programs in the field of energy.

9. PUBLICITY OF EVALUATION

The findings of evaluation will be consulted with relevant stakeholders, mainly business associations and public institutions like the Agency, TSO, DSO and public authorities. The results of evaluation will be published on the official website of HROTE (www.hrote.hr), respecting all conditions of possible business secrets and confidential information (Communication of the Commission on professional secrets in State aid decisions C (2003) 4582 OJ C 297) and the GDPR Regulation. Individual data on beneficiaries and control group collected for the purpose of evaluation will not be published. However, HROTE may use them for further studies and analysis.