CEER
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REPORT

Impact of high market prices on renewables

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Renewable Energy Sources Workstream
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Abstract

This document (C83-RES-83-05) presents a paper on high market prices.

With this briefing, the Renewable Energy Systems Workstream (RES WS) within the Electricity Working Group (EWG) aims to assess the impact of the recent high market prices on RES installations and, if changes were made, to examine the nature of those changes.

Target audience

CEER members and observers, European Commission, energy suppliers, traders, electricity customers, consumer representative groups, Member States, academics and other interested parties.

Keywords

High market prices; renewables; renewable energy.

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Background

At the end of 2021, electricity market prices started to rise significantly above previous thresholds. Support systems for renewables are based on the premises that the market cannot provide sufficient revenues for those installations and therefore additional money, whether through any form of premium, investment grants or other forms of support is needed.

The intention of this paper is to gather information on how the high market prices changed the situation for existing and new installations until the end of 2022.

Objectives and contents of the document

This paper aims to provide insight into how high market prices affected supported RES in Europe. It seeks to determine whether there was the option for supported RES to leave any given support system, outline the structure of those support systems, and assess whether supported installations that left the support system during the high market price phase had the option to rejoin the system later on. The paper also seeks to determine whether rules for renewable energy communities were already in place in 2022 and whether high market prices led to the support systems being adapted or changed.

Summary of the conclusions

Based on the answers provided, a very broad spectrum of effects from the high market prices can be observed. There was no uniform approach regarding the option to leave and/or rejoin support systems. A majority responded that the high market prices led to a quicker deployment of RES installations. Roughly half of the Member Countries (MCs) reported a measurable impact of inflation and cost increase on the development of new RES installations, while the other half stated that there was no or little effect due to inflation and cost increases. Furthermore, around half of the MCs indicated that existing support systems were adapted due to inflation and cost increase. Adaptions range from not decreasing existing support levels to raising support levels for new installations.

There is no single “to-do” for MCs to adapt their support systems. Clear rules as to whether RES installations can or cannot leave the support system, and whether they can or cannot rejoin after leaving are helpful. MCs should plan for contingencies such as higher-than-usual market prices, possibly through the implementation of (variations of) Contracts for Difference (CfDs). As such, negative prices should also be observed more closely.

1 Introduction

At the end of 2021, electricity market prices started to rise significantly above previous thresholds. Support systems for renewables are based on the premise that the market alone can't provide sufficient revenues for these installations, making additional financial support – whether through premiums, investment grants or other forms – necessary.

This paper aims to gather information on how these high market prices affected both existing and new installations up to the end of 2022. For that purpose, various premium and CfD support systems were listed.

This paper aims to provide insight into how high market prices affected supported RES in Europe. It seeks to determine whether there was the option for supported RES to leave any given support system, outline the structure of those support systems and assess whether supported installations that left the support system during the high market price phase had the option to rejoin the system later on. The paper also tries to determine whether rules for renewable energy communities were already in place in 2022 and whether high market prices led to the support systems being adapted or changed.

2 Situation prior to the rising market prices

The following chapter describes the situation of support systems before the increase of market prices around Europe.

2.1 Option to leave the support system in place

MCs were asked if supported installations had the option to leave the support system in 2022. Seventeen out of a total of 23 MCs indicated that it was possible to leave the support scheme. Although the answer may have been yes or no, it was not always possible to give a clear answer or what consequences producers faced if they left the support system. Thus, individual MCs often clarified and explained their answers. Poland stated that it was not possible to give a clear answer because producers can leave some support schemes and cannot leave others. Denmark was the only MC to state that producers can exit and enter the system on a monthly basis. Hungary stated that the rules for exiting RES support schemes have been changed and it is no longer possible to leave the support scheme except for biomass and biogas. Portugal stated that it was not possible to leave the scheme during the support period, but that support was terminated by those producers who had reached the end of the support period. Luxembourg responded that producers did not have the option but left anyway. On the other hand, they don't have possibility to recontract.

If MCs responded that it is not possible to leave the scheme, it is usually due to a contracted fixed support period or mandatory delivery during the support period.

MC	Option to leave the support system in 2022	Comment
AT	Yes	
BE	No	There was no option to leave the support schemes for RES on federal and regional level. However, measures have been taken, including a change in the legal framework, for the support provided to existing offshore wind farms.
CY	Yes	
CZ	Yes	
DE	Yes	Operators can choose on a monthly basis whether they want to be supported or not.
ES	Yes	
FI	No	No, the support schemes for RES-E generation in Finland follow a fixed term of 12 years. Mid-term exit is not allowed.
GB	No	RO – No option to 'withdraw' from the scheme, but they can decommission and no longer benefit from the scheme. No additional powers were introduced in response to high energy prices for them

MC	Option to leave the support system in 2022	Comment
		to change between schemes. You cannot leave the scheme to join another one. FiT – They can decommission their installation, or they can opt out of FiT export payments. As above, no additional powers were introduced in response to high energy prices for them to change between schemes. CFD – CfDs are designed as private law contracts and can only be withdrawn from under certain circumstances and with repercussions.
GR	Yes	
HR	Yes	
HU	Yes	Rules of leaving the RES support system were changed several times in 2022. As of 29 June 2022, no exit is possible except for biomass and biogas (but they can return to the schemes). Additionally, a feed-in tariff contract can only be terminated by concluding a green premium contract, again with the exception of biomass and biogas.
IE	Yes	Yes. Under the Terms and Conditions, a project can apply to leave RES at any time.
IT	Yes	
LT	Yes	
LU	No, but producers left anyways.	It is a fixed-term RES support contract for 15 years, but there is no disposition preventing or explicitly addressing early termination. Therefore, during periods of high market prices, nothing prevents a beneficiary of RES support to end a contact (a win for everybody) but there is no possibility to re-enter the contract afterwards.
MD	No	
MK	Yes	
NL	Yes	
PL		The answer to this question is complex and cannot be simply reduced to yes or no. Theoretically, it is possible to leave and later re-enter the support system (according to the legal status as of 2022). For support systems based on certificates of origin and FiT/FiP, leaving and returning are allowed within a maximum 15-year support period (or 17 years in some cases) without any penalties. However, for auction-based systems, the matter is more complicated, as an auction offer is a legal obligation to sell a specific

MC	Option to leave the support system in 2022	Comment
		amount of electricity for 15 years of the support period. In the case of offshore wind installations, the support period will be 25 years. If a producer wins an auction but does not start producing and feeding electricity into the grid, a decision will be issued prohibiting them from participating in the support system for 3 years, and the deposit paid during the auction will be forfeited. If the producer wins the auction and starts generating and feeding electricity into the grid but later discontinues this activity, fines are imposed for the unfulfilled obligation, with 3-year intervals in controlling producers. However, returning to the production and sale of electricity is still possible, as there is no prohibition on further activity.
PT	Yes	As a general rule, RES producers benefiting from a support system have the option to leave the support system before the end of its duration without the possibility of re-entering the support scheme.
RO	Yes	
SE	Yes	
SK	Yes	Yes, there are no legal burdens for RES producers to leave.

Table 1 – Option to leave the support system

2.1.1 Implications of leaving the system

MCs were asked if supported installations had the option to rejoin the support system after leaving. This question arose because many renewable installations exited the support system when market prices rose significantly above given support levels. Out of the 22 MCs that responded, seven had an option to rejoin the support system in place, while 12 did not.

MC	Option to rejoin support system after leaving
AT	Yes
BE	Not applicable
CY	No
CZ	No
DE	Yes
ES	Yes (for CHP)
GB	No
GR	No

MC	Option to rejoin support system after leaving
HR	No
HU	Yes
IE	No
IT	No
LT	No
LU	No
MD	No
MK	No
NL	No
PT	No
RO	Yes
SE	Yes
SK	Yes

Table 1 – Option to rejoin the support system after leaving

Furthermore, MCs were asked if penalties were in place for producers leaving the support system. Ireland responded that *"participants have to put up a bond, which will be lost if the project exits the RESS programme before it achieves commercial operation. Once commercial operation is achieved projects can exit without penalty."* In Hungary, producers must pay a windfall profit tax if they were entitled to a feed-in tariff or green premium contract but started operations between 2022 and 2024 without concluding the contract or if they terminated their contract within that time span.

2.2 Effect of Premium or CfD systems

Table 2 shows the MCs that had Premium/CfD-supported RES installations in 2022. In the Czech Republic, for example, an amendment to Act 165/2012 on Supported Sources introduced new electricity support schemes for renewable sources as of 1 January 2022, now exclusively in the form of an hourly green bonus (H-FIP) with a mandatory CfD. In Spain, renewable projects were granted support via CfD-based auctions held in 2022, although these projects have not yet been commissioned.

MC	Premium/CfD-supported RES installations in 2022
AT	No
BE	Yes, for offshore wind only

MC	Premium/CfD-supported RES installations in 2022
CY	No
CZ	Yes
DE	Yes
ES	Yes
FI	Yes
GB	Yes
GR	
HR	Yes
HU	Yes
IE	Yes
IT	Yes
LT	No
LU	No
MD	Yes
MK	No
NL	Yes
PL	Yes
PT	Yes
RO	No
SE	No
SK	No

Table 2 – Premium/CfD supports 2022 in place

2.3 Description of different Premium or CfD systems

2.3.1 Premium or CfD system – wind onshore

Table 3 provides an overview of the Premium/CfD systems which were in place for onshore wind installations in CEER MCs.

The data show that six MCs reported sliding premiums with an upper ceiling as the applicable support scheme mechanism for onshore wind installations for 2022. Finland further commented on the particularity of the applied support mechanism as following: *"The premium, established through a pay-as-bid auction procedure, is reduced by €1/MWh for every €1/MWh that the 3-month average wholesale electricity price in the Finnish price area exceeds the threshold of €30/MWh."* Other MCs that have onshore wind installations with a sliding premium support mechanism are Germany, Croatia, Italy, Luxemburg and the Netherlands.

The Czech Republic, Greece, Hungary and Poland support onshore wind installations with a two-sided Feed in Premium/CfD system. In Hungary, this system has not yet been implemented in practice, whereas in the Czech Republic, it applies for onshore wind plants that were put into operation after 1 January 2022.

Fixed premium schemes seem to be the least common option. Only three MCs – Great Britain, Ireland, and North Macedonia – have fixed premium schemes in place when it comes to onshore wind installations. In the case of Great Britain, the fixed premium is based on a strike price determined though an auction procedure and is paid only when the value of a proxy for the wholesale cost of electricity is below the level of the strike price. In the case of Ireland, most of the supported wind onshore installations are under the Renewable Energy Feed In Tariff (REFIT), a fixed premium (one-way CfD) support mechanism. Ireland has also recently introduced a support scheme mechanism called the Renewable Electricity Support Scheme (RESS), a two-way CfD support mechanism. It must be noted, however, that the ~1GW of onshore wind installations under RESS are not yet commercially operational.

Spain documented that the RES support scheme, which also applies in wind onshore installations, is not solely FiT, nor FiP, nor Capacity payments nor Quota nor CFD. On the contrary, there is a capacity payment in €/MW and the remuneration takes place on a monthly basis. Additionally, for some technologies, there is a supplementary remuneration in €/kWh, which is in addition to income from the wholesale electricity market and may be linked to the provision of ancillary services. The support scheme is recalculated every 3 years.

The other nine MCs reported that the above question on premium/CfDs for onshore wind installations is not applicable in their case.

MC	two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
AT				✓
BE				✓
CY				✓
CZ	✓			
DE		✓		
ES				✓
FI		✓		

MC	two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
GB			✓	
GR	✓			
HR		✓		
HU	✓			
IE			✓	
IT		✓		
LT				✓
LU		✓		
MD				✓
MK			✓	
NL		✓		
PL	✓			
PT				✓
RO				✓
SE				✓
SK		✓		✓

Table 3 – Premium/CfD - wind onshore

2.3.2 Premium or CfD system – wind offshore

As displayed in Table 4, most of the MCs that responded to the questionnaire reported no regulatory framework with Premium/CfDs for offshore wind installations. Only eight out of 22 MCs documented that their regulatory framework provides support for electricity generated from wind offshore installations via Premium/CfDs. Of course, it must be taken into consideration that the support of offshore wind installations is limited to countries with a coastline.

Based on the responses, Germany, Finland, Italy and the Netherlands have sliding premiums with an upper ceiling as a support scheme for offshore wind installations. Notably, Finland further specifies that at that time (i.e. in 2022), there were no offshore installations in the support scheme, although the scheme was open for offshore wind power. The low interest for offshore wind installations was justified by Finland based on an abundance of eligible locations for onshore wind on its territory.

In response to high energy prices, Belgium changed the legal framework for existing wind farms from a one-sided CfD to a two-sided CfD, effective from 1 June 2023. The two-sided CfD requires excess revenues above LCOE + €20/MWh to be paid to the Belgian Government.

Great Britain is the only country to report implementing a fixed premium on offshore wind, clarifying that the fixed premium is based on the strike price which is determined via tendering procedures and is paid only when the value of a proxy for the wholesale cost of electricity falls below the level of the strike price.

Additionally, according to information provided by Ireland, there is one offshore windfarm that is currently unsupported.

Lastly, Poland stated that the regulatory framework allows for a two-sided premium/CfD in the case of offshore wind installations. Nonetheless, the capacity of active offshore wind farms is currently zero, as all were still at planning or construction stages.

Overall, there seems to be a variety of Premium/CfDs types used by MCs to support offshore wind installations.

MC	Two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
AT				✓
BE	✓			
CY				✓
CZ				✓
DE		✓		
ES				✓
FI		✓		
GB			✓	
GR				✓
HR				✓
HU				✓
IE	✓			
IT		✓		
LT				✓
LU				✓
MD				✓

MK				✓
NL		✓		
PL	✓			
PT				✓
RO				✓
SE				✓
SK				✓

Table 4 – Premium/CfD - wind offshore

2.3.3 Premium or CfD system – solar PV

Table 5 reports the Premium/CfD mechanisms for solar PV installations. In Finland, for example, solar PV installations have benefited from investment grants. In Great Britain, there is a fixed premium based on strike price determined via competitive auction, paid only when the value of a proxy for the wholesale cost of electricity is below the level of the strike price. In Ireland, there is both a fixed premium and a two-way CfD. The so-called REFIT is a fixed premium one-way CfD support mechanism. It was open to new projects in three rounds from 2006 to 2015. In addition, there is also a new RESS program, which had three rounds in 2020, 2022 and 2023. In this case RESS are two-way CfDs. The majority of the ~2.8 GW solar PV in these programmes is not commercially operable yet. In Italy, a fixed premium and sliding premium (upper ceiling) is in place for older installations and a two-sided premium/CfD for new ones.

MC	Two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
AT				✓
BE				✓
CY				✓
CZ				✓
DE		✓		
ES				✓
FI		✓		
GB			✓	
GR	✓			
HR		✓		
HU	✓			

IE			✓	
IT	✓	✓	✓	
LT				✓
LU		✓		
MD				✓
MK			✓	
NL		✓		
PL	✓			
PT				✓
RO				✓
SE				✓
SK		✓		

Table 5 – Premium/CfD - solar

2.3.4 Premium or CfD system – hydro

As shown in Table 6, the Czech Republic, Hungary, Italy[1] (new installations) and Poland support hydro installations with a two-sided Feed in Premium/CfD system. In the Czech Republic this system is implemented for hydro units that were put into operation after 01 January 2022.

Germany, Croatia, Luxemburg, the Netherlands and Slovakia reported a sliding premium with upper ceiling as the applied support mechanism for hydro projects in 2022. It should be remarked that as far as Luxemburg is concerned, while hydro installations are eligible for sliding premium support, the existing units are either in a FiT scheme or unsupported after exceeding their support period.

Great Britain and Ireland mentioned a fixed premium support scheme for hydro installations. In the case of Great Britain, the fixed premium is based on a strike price determined via auction procedure and is paid only when the value of a proxy for the wholesale cost of electricity is below the level of the strike price. In the case of Ireland, the Renewable Energy Feed In Tariff (REFIT) is reported as a fixed premium (one-way CfD) support mechanism, which was open to new projects in three rounds from 2006 to 2015. Moreover, according to Ireland's input, there are eight small, supported projects under 1MW, with total capacity of 1,24 MW. Hydro projects were eligible for the Renewable Electricity Support Scheme (RESS), but no such unit applied.

[1] Older installations were supported with a sliding premium (upper ceiling)

Spain documented that the RES support scheme is not solely FiT, nor FiP, nor Capacity payments nor Quota nor CfD. On the contrary, the projects seem to be supported by a combination of support schemes. Specifically, there is a capacity payment in €/MW and the remuneration takes place monthly. Additionally, for some technologies, there is supplementary remuneration in €/kWh, which is additional to income from the wholesale electricity market and may be linked to the provision of ancillary services. The support scheme is recalculated every three years.

As for MCs which reported no premium/CfDs for hydro units, North Macedonia and Greece reported that a FiT scheme is implemented for these electricity production projects. Finland clarified that hydro projects are not included in FiT schemes, invoking political reasons to justify this situation. Particularly because of a reported high growth of installed hydropower capacity, questions are raised about further constructing such projects with or without state aid, also taking into account the potential adverse environmental effects.

MC	Two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
AT				✓
BE				✓
CY				✓
CZ	✓			
DE		✓		
ES				✓
FI				✓
GB			✓	
GR				✓
HR		✓		
HU	✓			
IE			✓	
IT	✓	✓		
LT				✓
LU		✓		
MD				✓
MK				✓
NL		✓		
PL	✓			
PT				✓
RO				✓
SE				✓
SK		✓		

Table 6 – Premium/CfD - hydro

2.3.5 Premium or CfD system – biomass

MCs were asked what support systems exist for biomass energy production. Based on the question it was possible to choose from the following answers: two-sided premium/CfD, Sliding premium (upper ceiling) or Fixed premium.

Ten out of 21 MCs did not answer or answered that it is not applicable. Only three MCs responded that they have two-sided CfDs for biomass plants. Poland stated that both positive and negative balances can occur. The Czech Republic clarified that the support scheme is dependent on the date of commissioning of the plant. Two-sided CfDs could be applied only for electricity production in modernised plants. New biomass plants commissioned after 1 January 2022 can only apply for support through heat production in the form of FiP green bonuses in the annual regime. On the other hand, plants commissioned before 2022 can choose between the FiT form of support and the one-way FiP depending on the date of commissioning.

Seven MCs indicated that they use Sliding premiums (upper ceiling) to support electricity production in biomass plants. Finland further specified that for eligible biogas and wood installations, operating aid is paid according to the wholesale electricity price on the market and for eligible installations using forest chips, operating aid is paid depending on the peat tax and the price of EU emission allowances.

Great Britain and Ireland indicated that they use a fixed premium to support biomass electricity generation. Great Britain further specified that the amount of the fixed premium is based on the strike price offered in the auction if the proxy value for the wholesale cost of electricity is below the strike price. Ireland stated that biomass is supported through a fixed premium as a one-way CfD scheme. Five projects with a total capacity of 130 MW were supported.

MC	Two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
AT				✓
BE				✓
CY				✓
CZ	✓			
DE		✓		
ES				✓
FI		✓		
GB			✓	
GR				✓
HR		✓		
HU	✓		✓	
IE			✓	
IT	✓	✓		
LT				✓
LU		✓		

MC	Two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
MD				✓
MK				✓
NL		✓		
PL	✓			
PT				✓
RO				✓
SE		✓		
SK		✓		

Table 7 – Premium/CfD - biomass

2.3.6 Premium or CfD system – biogas

As in the previous chapters for other types of energy, MCs were asked the same question for biogas electricity production as for biogas support schemes. Again, the following answers could be selected: Reversible premium/CfD, Sliding premium (upper ceiling) or Fixed premium.

As with the question on biomass ten out of 21 MC did not answer or answered that it is not applicable. This includes various MCs like North Macedonia that stated that only Feed-in tariffs for biogas installations were in place at the time.

Four MCs responded that they use two-sided CfDs for biomass plants support. The Czech Republic clarified that the support scheme is dependent on the date of commissioning of the plant. Two-sided CfDs could be applied only for electricity production in modernised biogas plants or for new landfill and sludge gas plants. Biogas plants put into operation prior to 2022, could choose the form of support through FiT or FiP (one-way CfD) depending on the date of commissioning of the plant. Poland stated that as for biomass both positive and negative balances can occur.

Spain indicated that, as for all other technologies, a capacity payment, which is paid monthly, or an operating aid on top of the market price of electricity can be provided for biogas electricity production.

Six MCs indicated that they use Sliding premium (upper ceiling) to support electricity production in biogas plants.

Finland stated that for eligible installations that use biogas, operating aid is paid depending on the wholesale electricity market price.

Great Britain specified that the amount of the fixed premium is based on the strike price offered in the auction if the proxy value for the wholesale cost of electricity is below the strike price. Luxembourg stated there are no actual cases in Luxembourg, but there could be some in the future. Ireland indicated that biogas is only supported as a fixed premium, one-way CfD scheme. There are 25 supported projects in Ireland, totalling 33.4 MW. Biogas projects are eligible to participate in RESS, but none have done so.

MC	Two-sided premium/CfD	Sliding premium (upper ceiling)	Fixed premium	N/A
AT				✓
BE				✓
CY				✓
CZ	✓			
DE		✓		
ES				✓
FI		✓		
GB			✓	
GR				✓
HR		✓		
HU	✓			
IE			✓	
IT	✓	✓		
LT				✓
LU		✓		
MD				✓
MK				✓
NL		✓		
PL	✓			
PT				✓
RO				✓
SE				✓
SK		✓		

Table 8 – Premium/CfD - biogas

2.3.7 One-way premium / CfD

Table 9 shows if there is some sort of ceiling in the CfD contracts to the revenues kept by the producers. In some cases, producers are allowed to keep all payouts from the FiT schemes. Some CfD producers or generators pay back the difference in which wholesale electricity prices are above the strike prices.

MC	ceiling
AT	
BE	
CY	
CZ	
DE	No
ES	
FI	No
GB	Yes
GR	
HR	No
HU	
IE	No
IT	Yes
LT	Yes
LU	No
MD	
MK	
NL	Yes
PL	No
PT	
RO	
SE	
SK	

Table 9 – Ceiling for one-way premium/CfD contracts

2.3.8 Two-way CfDs

Table 10 shows if there is some sort of ceiling planned to the revenues paid back to the state by producers. Only for the Belgian offshore wind farms, a two-way CfD is applied. For the existing windfarms, the two-way CfD requires excess revenues above LCOE + €20/MWh to be paid to the Belgian Government. In Spain, renewable projects were granted support via CfD-based auctions held in 2022 but have not been commissioned yet.

In other countries, there are no two-way CfDs. Revenues are not planned to be paid back to the state by producers. In Great Britain, the current CfD model is not a two-way model, i.e. with a revenue cap and an equivalent floor. Revenue paid to generators via CfDs is capped at the value of a project's strike price. The strike price is a £/MWh value determined via a competitive auction.

MC	ceiling
AT	No
BE	No
CY	No
CZ	Yes
DE	No
ES	
FI	No
GB	
GR	No
HR	Yes
HU	No
IE	No
IT	Yes
LT	
LU	
MD	
MK	
NL	
PL	
PT	
RO	
SE	
SK	

Table 10 – Two-way CfD ceiling for revenue pay back

2.4 Renewable Energy Communities in 2022

Table 12 shows which MCs had rules for Renewable Energy Communities (RECs) in place in 2022. Out of the 21 MCs that responded, 15 had rules for RECs in place and six did not.

MC	Rules for RECs in place in 2022
AT	Yes
BE	Yes
CY	No
CZ	No
ES	No
FI	Yes
GB	No
GR	Yes
HR	Yes
HU	Yes
IE	Yes
IT	Yes
LT	Yes
LU	Yes
MK	Yes
NL	Yes
PL	No
PT	Yes
RO	Yes
SE	Yes
SK	Yes

Table 11 – Rules for RECs in place

Out of the 6 MCs that didn't have rules in place in 2022, the Czech Republic and Poland specified that rules were put in place in 2023. Belgium specified that rules for RECs were in place only for the Flemish region. In Spain, the Power Act includes communities as an additional market player, yet the approval of lower-level regulation is in process.

As for how the hight market prices affected RECs and REC members, two MCs (Austria and Greece) responded that REC development was hindered because electricity was sold to the market instead of being shared within REC. Two MCs (Italy and the Netherlands) responded that RECs mitigated the effects of the high market prices for members and ten MCs specified in the comments that no RECs were in place and therefore no effects could be observed. For the Flemish region, Belgium responded that the impact varied from one REC to the other, depending on the way each of them operate.

Since in most MCs RECs were only introduced shortly before or even after the end of 2021, it is not clear how they were affected by the high market prices. Nevertheless, RECs can be an option for producers and consumers to mitigate price fluctuations.

3 Situations and/or changes due to the high market prices

3.1 Effects of high market prices

MCs were asked about the effect of high market prices on the installation of RES. Of the 20 MCs that responded, the majority (13) considered it led to quicker deployment. This compares to three that thought higher prices lessened deployment (Ireland, Netherlands and Moldova) and a further three which noticed no effect (Cyprus, Finland and Great Britain) – see Table 12.

Reasons provided for quicker deployment include increased profitability for RES developers (Spain and Greece), economic viability without the need for support (Hungary) and an incentive to conclude projects as soon as possible (Portugal). Some MCs also noted a particular positive effect on domestic/prosumer RES, with an increase in the number of rooftop solar installations (the Czech Republic, North Macedonia, Portugal, Romania).

In contrast, the explanation for a lower level of deployment centres on the concurrent increase in CAPEX costs and inflation, combined with a concern that increased wholesale electricity prices might be temporary. The temporary nature of high prices was also cited as a reason for MCs which reported no effect on deployment, alongside the type of support used (e.g. two-way CfDs) being unaffected by increased prices.

MC	Effect of high market prices for RES installations
AT	Quicker deployment
BE	Further investigation necessary
CY	No effect
CZ	Quicker deployment
DE	Quicker deployment
ES	Quicker deployment
FI	No effect

GB	No effect
GR	Quicker deployment
HR	Quicker deployment
HU	Quicker deployment
IE	Less deployment
IT	Quicker deployment
LT	Quicker deployment
LU	Quicker deployment
MD	Less deployment
MK	Quicker deployment
NL	Less deployment
PL	
PT	Quicker deployment
RO	Quicker deployment
SE	
SK	Quicker deployment

Table 12 – Effect of high market prices for RES installations

3.2 Introduction of new legislation

MCs were asked whether new (temporary) legislation was introduced by 2022 in response to high wholesale market electricity prices. Of the 20 MCs which responded, 16 confirmed that it was.

The legislation introduced covered a wide range of approaches. For example, Great Britain passed laws capping energy prices for domestic customers and mandating a discount for commercial customers. Spain and Portugal established a cap on gas prices for electricity generation and Belgium, the Netherlands and Hungary put in place a windfall profit tax on generators. Ireland latterly introduced laws capping market revenues for generators. Finland noted that although they did not have legislation that would affect market prices, they did have new temporary measures to compensate consumers.

3.2.1 Cap on market revenues

This chapter gives an overview of the presence of caps on market revenues for RES installations and some of the arrangements implemented by MCs.

As depicted in Figure 1, out of all the MCs that answered the questionnaire, the majority implemented some kind of cap on market revenues. If there is a cap for one technology in an MC, there will usually be caps for all technologies available in the same MC. These caps are mostly located within the range of €120/MWh to €180/MWh. There were some exceptions for Biomass and Biogas installations. For these technologies the caps for market revenues are significantly higher and lie within €240-285/MWh.

Another exception is a few old onshore wind installations in Greece. They are affected by the market revenue caps set at €85/MWh in DA and ID markets. The total wind RES capacity that was affected by the caps is 196 MW.

Portugal mentioned that RES producers under the FiT support scheme are not affected by the Iberian mechanism since the price is independent from the wholesale price level. RES producers that participate in the market are affected by the Iberian mechanism since the mechanism has an impact on price formation. However, there is no “cap” on market revenues since the producers will receive all of them. The Iberian mechanism acts on the price that is formed on the wholesale market. In Spain, supported plants were not affected by the Iberian mechanism as their remunerations were adjusted considering the real wholesale prices. On the contrary, RES producers that were not supported were affected by the Iberian mechanism because of its impact on price formation.

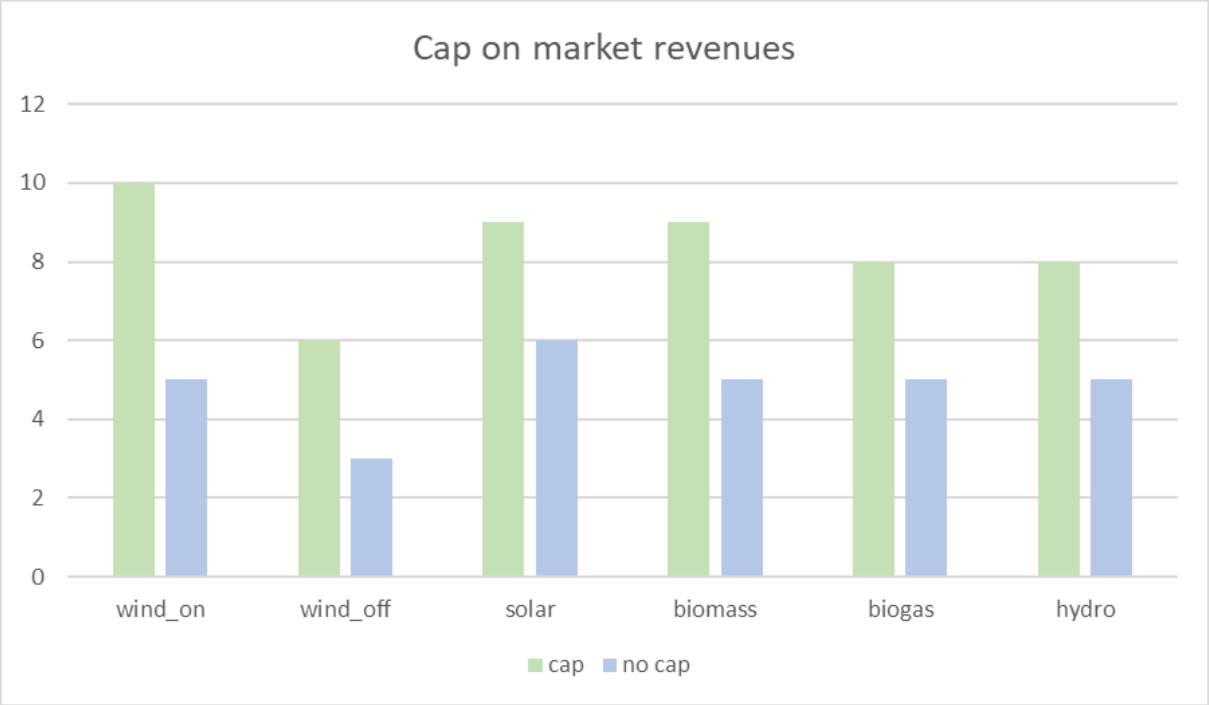

Figure 1 – Cap on market revenues

3.3 Producers that left the support scheme

MCs were asked how much installed capacity left the support systems in 2022. Based on the MCs that provided data, the majority of RES installations that left the support systems were solar PV generators with an overall capacity of 7.464 MW followed by onshore wind installations with 3.452 MW (see Table 13). In the case of Austria, for example, most of the supported onshore wind capacity (1.716 MW out of 2.495 MW at the end of 2020) had already left the support system by 2022. This might also be true for other MC.

MC	onshore wind	offshore wind	solar PV	hydro	biomass	biogas
AT[2]	61		838	105	94	75
ES	1,488			34	22[3]	
FI	3[4]					
GB	900	93.7	6,203	28.4		311.91
HR	234		7	1	7	25
HU	0.6		368	2.48	203.84	17.99
IT	2			158		8
LT	405		0.065	1	41	15
MK			4.225	6.367		4.999
NL[5]						
PT[6]	6		31	9	158	21
RO				45		
SE	349		11	41	0,3	
Sum in MW	**3,454**	**94**	**7,464**	**431**	**526**	**479**

Table 13 – RES producers leaving the support system in 2022

[2] The major share already left in 2021 with 1.716 MW (out of 2.495 at the end of 2020).

[3] Includes solid, liquid and gas

[4] The first power plant left the Finnish feed-in tariff scheme in 2023. The reason for the exit was that the 12 year long fixed period for support came to an end.

[5] Due to the one-sided CfD, no-one left the support scheme because of high market prices.

[6] MVa

3.4 Problems related to CfDs

Table 14 shows whether there were CfD-specific problems. In Hungary, it was necessary to cancel the Premium contracts and to sell electricity to the market as market prices were higher than the supported prices. Therefore, the rules to leave the support system have been tightened in 2022.

Ireland saw an increased numbers of projects leaving the Renewable Electricity Support Scheme. In response, the application process was simplified for future auction rounds.

In Poland, the increase in electricity prices on the market resulted, in 2022 and 2023, in the unprofitability of support systems in many cases – greater income could have been achieved by selling electricity outside the support system. On the other hand, participation in the support system generally guarantees predictability of revenues over the next 15 years. In Belgium, the one-sided CfD in place until 1 June 2023 for the existing offshore wind farms resulted in windfall profits during the period of high market prices. The legal framework for excess revenues at the Belgian level were applied for the period of August 2022 to May 2023.

MC	CfD-specific problems
AT	No
BE	No
CY	
CZ	No
DE	
ES	No
FI	No
GB	No
GR	No
HR	No
HU	Yes
IE	Yes
IT	No
LT	No
LU	No
MD	No
MK	
NL	
PL	Yes
PT	
RO	

MC	CfD-specific problems
SE	
SK	

Table 14 – CfD-specific problems

3.5 Impact of inflation and cost increase

Table 15 illustrates whether the development of new installations in MCs in 2023 was affected by inflation and cost increase. There seems to be mixed reports from MCs when it comes to the impact of inflation and cost increase on the deployment of new RES installations. Eight MCs replied that there is little or no impact of inflation or cost increase. Among the MCs that responded, Spain and Hungary clarified that the main barrier for new installations is grid access and/or connection issues. Finland specified that its “no impact” answer refers only to wind installations.

Nine MCs replied that there is a measurable impact of inflation or cost increase on the development of new RES installations. Among them, Ireland mentioned the low level of interest in the RES tender procedure that took place in 2023 as a measurable impact. The Netherlands referred to a delay in realisation of new RES projects due to CAPEX increase. Romania replied that there was increased interest and realisation of new RES projects in the years 2022 and 2023, but mainly by prosumers. The rest of the MCs that noticed a measurable effect commented on the increased cost without further analysis on the exact impact on the development of new RES projects.

MC	Measurable impact of inflation/ cost increase	No/Little effect	No data/Unknown
AT		✓	
BE			✓
CY		✓	
CZ	✓		
DE	✓		
ES		✓	
FI		✓	
GB	✓		
GR	✓		
HR			✓
HU		✓	

MC	Measurable impact of inflation/ cost increase	No/Little effect	No data/Unknown
IE	✓		
IT	✓		
LT			✓
LU			✓
MD		✓	
MK	-	-	-
NL	✓		
PL	✓		
PT		✓	
RO	✓		
SE			✓
SK		✓	

Table 15 – Impact of inflation and cost increase

3.6 Additional help for projects that already secured support

Table 16 provides an overview of whether new RES projects that had already secured financial support were given additional support by MCs. The vast majority of MCs stated that no additional help was provided. Only four MCs – the Czech Republic, Greece, Hungary and Slovakia – gave a positive answer on follow-up support. However, different approaches are observed. Some countries chose measures of additional financial support. For example, for fuel-based renewables, the Czech Republic provided a year-on-year adjustment of the amount of operating support in order to reflect fuel costs. Slovakia provided biomass and biogas producers with higher financial support, thereby allowing for a higher price of electricity (€232/MWh). Greece reduced construction costs for producers, specifically by introducing a connection cost sharing methodology, hence decreasing network connection costs by 50%. On the other hand, Hungary provided implicit support by prolonging the deadline of starting the commercial operation.

MC	Additional help to supported projects
AT	×
BE	×
CY	×
CZ	✓

DE	×
ES	×
FI	×
GB	×
GR	✓
HR	×
HU	✓
IE	×
IT	×
LT	×
LU	×
MD	-
MK	×
NL	×
PL	×
PT	-
RO	×
SE	×
SK	✓

Table 16 – Additional help to supported projects

3.7 Adaption of existing support systems due to inflation and cost increase

Table 17 depicts if support schemes were adapted due to cost increase in general and inflation in particular. Noticeably, the given answers are mixed with almost half of the MCs giving a positive answer and slightly more than half of the MCs giving a negative answer. Eight MCs reported changes to their support schemes. Austria reported a raise in the auction price cap for wind installations from €82.2 to €92.8/MWh, while Slovakia reported a raise in the selling price of electricity. The Czech Republic, Great Britain, Ireland, the Netherlands and Poland introduced new parameters in the calculation of cost for RES installations, taking into consideration inflation and rising costs. In Italy the reference tariffs for the competitive bidding procedures have been updated on the basis of the national consumer price index. Luxemburg indicated that the prices in its FiT mechanism for 2023 were set at the same level as those in 2022, although FiT prices typically tend to decrease over the years.

MC	Adaptation of support schemes to inflation/cost increase
AT	✓
BE	×
CY	×
CZ	✓
DE	×
ES	×
FI	×
GB	✓
GR	×
HR	×
HU	×
IE	✓
IT	✓
LT	×
LU	✓
MD	✓
MK	×
NL	✓
PL	✓
PT	-
RO	×
SE	×
SK	✓

Table 17 – Adaption of support schemes to inflation/cost increase

4 Conclusions

Based on the responses provided by CEER NRAs, the following messages can be brought forward:

- There was no uniform approach regarding the option to leave and/or rejoin support systems;
    - However, the majority of MCs (17 out of 23) indicated that RES producers had to option to leave the support system;
    - 7 out of 22 MCs indicated that RES producers also had the option to rejoin the support system.
- Fifteen out of 21 MCs had rules for RECs in place, whereas six responded that no RECs were in place;
    - Austria and Greece highlighted that the high market prices had a negative effect on RECs because electricity was sold to the market instead of being shared within RECs, whereas Italy and the Netherlands responded that RECs mitigated the effects of the high market prices for members.
- Thirteen out of 20 MCs responded that the high market prices led to a quicker deployment of RES installations;
- Three out of 20 MCs indicated less deployment due the high market prices based on the concurrent increase on CAPEX costs and inflation, combined with a concern that increased wholesale electricity prices might be temporary;
- Nine MCs replied that there was measurable impact of inflation/cost increase on the development of new RES installations and eight MCs replied that there was no or little effect due to inflation and cost increase;
- Four out of 21 MCs indicated that additional help for projects that already secured support was implemented;
- Ten out of 22 MCs indicated that existing support systems were adapted due to inflation and cost increase;
    - Those adaptions range from not decreasing existing support levels to raising support levels for new installations.

Based on the answers provided, a very broad spectrum of the effects of high market prices could be observed. There is or was no single “to-do” for MCs to adapt given support systems.

- Clear rules for whether RES installations can or cannot leave the support system and whether RES installations can or cannot rejoin the support system after leaving it are helpful;
- MCs should plan for contingencies such as higher-than-usual market prices, possibly through the implementation of (variations of) CfDs;
    - As such, negative prices should also be observed more closely.

Annex 1 – List of abbreviations

Term	Definition
CEER	Council of European Energy Regulators
CfD	Contract for difference
FiT	Feed in Tarif
FiP	Feed in Premium
GGP	Guidelines of Good Practice
MC	Member Country
NRAs	National Regulatory Authorities
RES	Renewable Energy Sources

About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 39 national energy regulatory authorities (NRAs) from across Europe.

CEER is legally established as a not-for-profit association under Belgian law, with a small Secretariat based in Brussels to assist the organisation.

CEER supports its NRA members/observers in their responsibilities, sharing experience and developing regulatory capacity and best practices. It does so by facilitating expert working group meetings, hosting workshops and events, supporting the development and publication of regulatory papers, and through an in-house Training Academy. Through CEER, European NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

In terms of policy, CEER actively promotes an investment friendly, harmonised regulatory environment and the consistent application of existing EU legislation. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable Internal Energy Market in Europe that works in the consumer interest.

Specifically, CEER deals with a range of energy regulatory issues including wholesale and retail markets; consumer issues; distribution networks; smart grids; flexibility; sustainability; and international cooperation.

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