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Two-way Contracts for Difference for Renewable Energy Projects in the EU – An Economic and Legal Analysis

Master Thesis

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submitted by

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ABSTRACT

English: This master thesis deals with the introduction of two-way *contracts for difference* (CfDs) in the renewable energy sector, which must be introduced in all EU member states in a few years as part of the current EU electricity market reform. The aim and purpose of the introduction of bilateral CfDs is to avoid or at least limit so-called windfall profits for various low-carbon power generation technologies (including nuclear energy in addition to renewable energy), as occurred in the course of the electricity market crisis in 2022 and 2023.

The analysis of the CfD instrument is interdisciplinary in that the legal analysis is preceded by an energy economic analysis. This shows, among other things, that the intended reform goal of revenue capping can be achieved through CfDs, but that their exact effect depends heavily on the specific design of the instrument. The EU reform leaves the member states a great deal of room for manoeuvre. As a result, a final legal assessment of conformity with EU law and German constitutional and energy law is not yet possible. However, a legally compliant implementation in Germany can certainly be expected if the German legislator closely follows the EU requirements.

…

Deutsch: Diese Masterarbeit beschäftigt sich mit der Einführung zweiseitiger Differenzverträge (engl. *Contracts for Difference*, oder *CfDs*) im Bereich der erneuerbaren Energien, welche im Zuge der aktuellen EU-Strommarktreform in einigen Jahren verpflichtend in allen EU-Mitgliedsstaaten eingeführt werden müssen. Ziel und Zweck der Einführung zweiseitiger CfDs ist die Vermeidung oder zumindest Begrenzung sogenannter Zufallsgewinne für verschiedene treibhausgasarme Stromerzeugungstechnologien (neben erneuerbaren Energien auch Atomenergie), wie sie im Zuge der Strommarktkrise in den Jahren 2022 und 2023 aufgetreten sind.

Die Analyse des Instruments des CfDs erfolgt interdisziplinär, indem der rechtswissenschaftlichen Analyse eine energieökonomische Analyse vorangestellt wird. Diese zeigt unter anderem, dass das angestrebte Reformziel der Erlöskappung durch CfDs erreicht werden kann, deren genaue Wirkung aber stark von der konkreten Ausgestaltung des Instruments abhängt. Dabei lässt die EU-Reform den Mitgliedsstaaten große Gestaltungsspielräume. Diese führen dazu, dass eine abschließende rechtliche Beurteilung hinsichtlich Konformität mit EU-Recht und deutschem Verfassungs- und Energierecht aktuell noch nicht möglich ist. Allerdings ist eine rechtskonforme Implementierung in Deutschland durchaus zu erwarten, wenn sich der deutsche Gesetzgeber nahe an den EU-Vorgaben orientiert.

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Chapter 1

INTRODUCTION AND RESEARCH OVERVIEW

> *"This market system does not work anymore. We have to reform it. We have to adapt it to the new realities of dominant renewables. [...] This is the task that the Commission has taken over now. This is not trivial, this is a huge reform. It will take time; it has to be well thought through. But we must step forward to adapt our electricity market to the modern conditions."*[1]

1.1. Introduction and motivation

Thus spoke the President of the European Commission, Ursula von der Leyen, on 8 June 2022 in front of members of the European Parliament, introducing what was widely understood as a radical U-turn of the EU's executive on the fundamental design of Europe's Internal Electricity Market (IEM). This announcement – and similar ones made in the weeks around it – seemed to set Europe on a course to a radical overhaul of the European power market, which could lead to the replacement of the fundamental principle of marginal pricing in wholesale electricity markets with something else. However, at the time it was completely unclear what that *something else* could be – and what it would mean for the proper functioning of the IEM.

What had triggered this seeming U-turn from the Commission and put the cherished *merit order principle* in doubt was a steep rise in the cost of natural gas in the autumn of 2021 and during much of 2022. Across Europe, this led to electricity prices at levels never seen before – in a way, Europe's electricity market genuinely *exploded*: Wholesale power prices in Germany and France, for instance, started to increase dramatically from September 2021 as the cost of gas and coal soared, and as Europe's wind turbines produced less electricity than usual.[2] By the summer of 2022, things had gotten considerably worse, with "forward prices for daytime electricity for the fourth quarter of the year briefly spik[ing] above €1,200 per megawatt hour in Germany and

[1] Frédéric Simon and Nikolaus J. Kurmayer, 'EU chief announces electricity market overhaul amid 'skyrocketing' prices' *EURACTIV* (Brussels, 10 June 2022) <www.euractiv.com> (last accessed 21 June 2024)

[2] 'Why has the price of electricity in Europe reached record highs?' *The Economist* (London, 15 September 2021) <www.economist.com> (last accessed 21 June 2024)

above a surreal €2,500 in France. The usual price is around €50."[3] The main culprit for these price levels (as illustrated by Figure 1 below) was scarcity on the supply side (i.e. in power generation) across the continent, which coincided with a massive increase in the price of natural gas caused by Russia's full-scale assault on Ukraine. To keep the lights on in Europe, gas-fired power plants needed to run no matter the cost (of gas) – and pass those costs on to electricity consumers.[4]

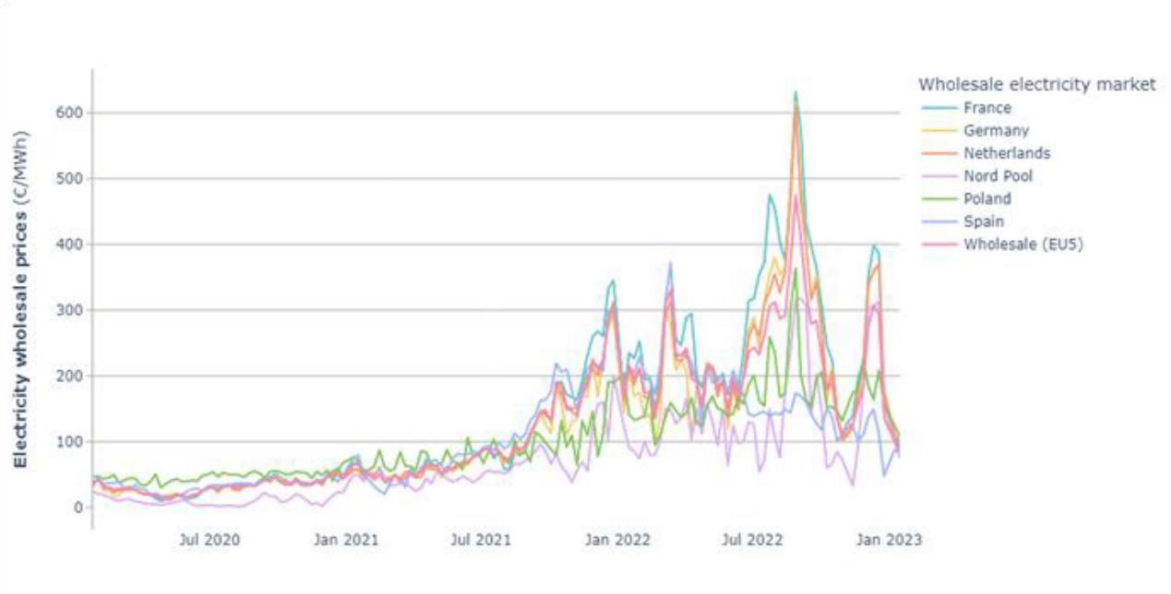

Figure 1: *EU wholesale electricity prices (weekly averages)*[5]

Even though this alone would have been bad enough for consumers, the way the European power market is organised, the most expensive power plant still selling into the market (the *marginal supplier*) determines the wholesale power price for all suppliers on the market. This is what is commonly known as the so-called *merit order principle* based on marginal prices, and it forms the bedrock of liberalised electricity markets all over the world. In normal times, this market design works wonders by letting the *invisible hand* steer the actions of producers and consumers in an efficient way. In times of war, pandemic or other upheaval it might struggle to deliver the de-

[3] 'Europe's energy market was not built for this crisis' *The Economist* (London, 8 September 2022) <www.economist.com> (last accessed 21 June 2024)

[4] ibid

[5] Figure reproduced from European Commission, 'Commission Staff Working Document: Reform of Electricity Market Design' (SWD(2023) 58 final, 14 March 2023), p. 3 (Figure 1).

sired outcome.[6] Thus, in 2022 European consumers were dreading the prospect of an electricity bill that could increase by a staggering €800 billion (or 6% of GDP), according to estimates reported at the time.[7]

Amidst this energy price crisis, which affected both Europe's households and industry, it thus appeared quite plausible that the merit order could be abolished and replaced by something else entirely – a revolution in the making. Two years on, it seems fair to say that the revolution has not happened. Instead, as energy prices have come down again – and as the sense of crisis has thus abated – the European Union has embarked on a calmer course of incremental changes to the design of its electricity market.

In line with demands from EU Member States, the Commission published its proposals for these incremental changes to the European electricity market in March 2023; that is, just a short few months after the Commission President's speech at the Parliament. This research will look at a single, and very important, element of the EU's large reform package: the EU-wide introduction of so-called *two-way contracts for difference* (CfDs) proposed by the Commission. Even though this proposal is a cornerstone of the electricity market reform (EMR), the introduction of two-way CfDs is an evolution, rather than a revolution, of Europe's support system for renewable energy sources (RES) – as it leaves the merit order principle largely intact, while still achieving (potentially, at least) many of the policy aims pursued in conjunction with the lessons learnt from the European energy price crisis of 2021/22.

With the proposed introduction of two-way CfDs across the EU, the Commission aimed to address two perceived market failures that could be observed during the crisis and that put pressure on the EU to act. The first *market failure* were the rapidly rising electricity prices for households and industry (as mentioned above) that led to price subsidies, price caps and calls for a fundamental market design reform. The second *market failure* were the windfall profits (or "excess remuneration" in the Commission's words) arising for power generators using non-fossil technologies, e.g. wind and solar energy, whose generation costs had not changed materially, but who still benefitted from increasing wholesale electricity prices due to the merit order principle.

[6] Cf. ACER, 'ACER's Final Assessment of the EU Wholesale Electricity Market Design' (Brussels, April 2022); *The Economist* (footnote 3).

[7] *The Economist* (footnote 3)

While both outcomes were fully in line with economic theory and the design of the IEM (and not real *market failures* in the strict economic sense, as will be argued later), there was clearly a political need to address these socio-economic issues in a way that did not harm the efficient functioning of the IEM, but restored a *fair* balance between electricity consumers and producers. Two-way CfDs are meant to achieve this aim. They function as illustrated in Figure 2 below:

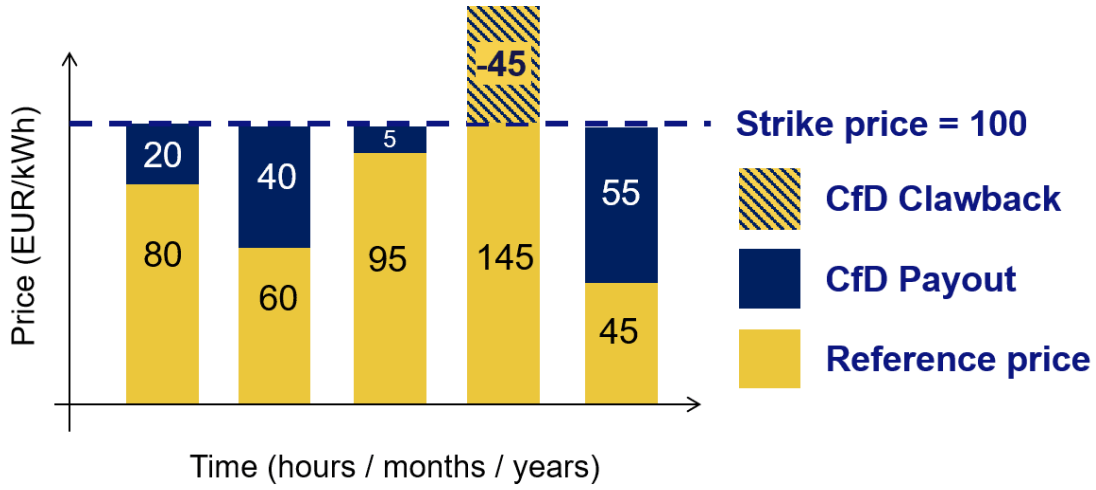

Figure 2: *Illustration of a two-way CfD*[8]

In a two-way CfD the *strike price* determines the total remuneration that a producer receives for the electricity he generates (per unit of output). In principle, the producer's actual revenues are derived from two sources, the electricity market, into which he sells at the going market price and the government (or an entity obligated by government to act as the CfD-counterpart, e.g. an electricity grid operator). When the market *reference price* (used as a proxy for the price actually obtained by the producer) is below the strike price, the government will pay a top-up (the *CfD payout* in Figure 2 above), in order to increase the total remuneration to the level of the strike price. When the *reference price* is above the strike price, the government will receive the difference from the producer (the *CfD clawback* in the figure), in order to reduce the total remuneration to the level of the strike price. Through this mechanism, the total remuneration (per unit of output) is effectively fixed at the level of the strike price, which distinguishes a two-way CfD from a one-sided CfD (market premium), where no such clawback mechanism exists.

[8] Figure reproduced from Florence School of Regulation, 'Contracts-for-Difference', (Florence, 12 April 2023) <https://fsr.eui.eu/> (last accessed 21 June 2024). Note that the price would typically be set in EUR/MWh, not in EUR/kWh as indicated in the figure.

1.2. Research overview

The EU's proposed EMR and the introduction of two-way CfDs in particular both have a strong economic dimension and important legal implications, which should be looked at in an integrated way. This thesis therefore looks at the subject matter through a combination of economic and legal science, i.e. in an interdisciplinary manner.

In more concrete terms, this thesis will at its core address the following overarching research question: **How is the introduction of two-way CfDs for RES in the EU that is planned as part of the EMR to be judged economically and legally?**

In so doing, several distinct research questions on economic and legal aspects of the EU's reform proposal will be investigated. Here, the focus will be mainly on the European level. This will be complemented by taking a closer look at practical considerations for when the EU's reform needs to be implemented in Member States. Therefore, the thesis will zoom in on Germany's support regime for renewable energy (RE) as a case-study providing additional insights. Overall, this will be quite a sweeping review of the EMR that touches on a large range of connected issues. Naturally, the breadth of the analysis will thus come at the expense of granularity; but this is fully intentional and can serve as a basis for further, more detailed research in future.

In addressing the overarching research presented before, the following eight economic and legal research questions will be investigated (cf. Table 1 below and overleaf):

Table 1: Research questions to be investigated

I.	**Economic research questions** (Chapter 3)
1.	Is there a need for the existing public support instrument of market premium (or *one-sided CfD*) to be amended from an economic perspective?
2.	Are two-way CfDs a suitable instrument to balance risks (and rewards) between producers and consumers of renewable electricity from an economic perspective?
3.	How is the introduction of two-way CfDs likely to influence future investment and operating decisions of producers of renewable electricity?
4.	Do two-way CfDs constitute a market intervention that contravenes the principles of the social market economy and the EU's single market *from an economic perspective?*

II. Legal research questions (Chapter 4)
5. Do two-way CfDs constitute a market intervention that contravenes the principles of the social market economy and the EU's single market *from a legal perspective?*
6. Is the EU's EMR proposal consistent with current EU legislation and case law, particularly on the promotion of renewable energy?
7. Would the introduction of two-way CfDs (disproportionately) impair the basic rights of German renewable electricity producers?
8. How would the German Renewable Energy Act need to be amended in order to incorporate the EU's EMR?

The remainder of this thesis is structured as follows. **Chapter 2** starts with the political, economic and legal background necessary for the subsequent economic and legal investigation of the research questions listed in Table 1 above. **Chapter 3** addresses the economic research questions with a separate subchapter dedicated to each of them. **Chapter 4** examines the legal research questions, again with a separate subchapter dedicated to each of them. Both chapters contain a summary and conclusions of the economic and legal analysis carried out, respectively. **Chapter 5** presents overall conclusions from the interdisciplinary research and identifies scope for further research. Finally, **Appendix 1** summarises the positions of the Parliament and the Council for the inter-institutional negotiations (or *trilogues*) with the Commission and **Appendix 2** provides a description of the quantitative model, and its results, used in Chapter 3.

Before moving on to the political, economic and legal background to the Commission's reform proposal for the introduction of two-way CfDs in the next chapter, two final remarks are required in order to help the reader navigate the following chapters. Firstly, the following analyses are primarily based on four sets of documents prepared by the EU institutions in the course of the reform process; these are listed in Table 2 on the following page. Secondly, as the reform process progressed while the research was conducted from November 2023 to April 2024, the concrete shape and content of the EMR constituted an ever-evolving, *moving target*. Therefore, the analysis presented in the following chapters is based on the stage in the reform process reached on 30 April 2024. The epilogue in Subchapter 5.3 provides an update on the status of the reform process reached on the submission date of this thesis.

Table 2: Main documents underlying the analyses

1. European Commission	2. European Parliament	3. Council of the EU
• "**Proposal** for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design"; ***COM(2023) 148 final***; • "Commission Staff Working Document: Reform of Electricity Market Design"; ***SWD(2023) 58 final***; • both published 14 March 2023	• "**Report on the** proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design"; ***file ID: A9-0255/2023***; • published 27 July 2023	• "Proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design **– General approach**"; ***file ID: 14339/23***; • published 19 October 2023
4. Provisional agreement reached between the EU institutions (trilogue outcome)		
• "Proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design **– Analysis of the final compromise text with a view to agreement**"; ***file ID: 16964/23***; • published 19 December 2023		

Chapter 2

TWO-WAY CFDS FOR RENEWABLE ENERGY PROJECTS IN THE EU: POLITICAL, ECONOMIC AND LEGAL BACKGROUND

2.1. Introduction

Following the upheaval seen in Europe's energy market in the second half of 2021 and throughout much of 2022 (as described above), the Council requested the Commission on 15 December 2022 to propose concrete measures to counter the negative impacts of high and volatile energy prices on European firms and consumers.[9] The Commission's response took the form of a draft "Regulation amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design" and an accompanying Commission Staff Working Document (SWD) on the "Reform of Electricity Market Design", both published on 14 March 2023.

Reflecting the complexity of the issue at hand and the multiple challenges facing the European electricity market, the Commission made a multitude of proposals aimed at different aspects of the EU's electricity market. These ranged from the design of short- and long-term markets, flexibility services and measures for consumer protection to market transparency, thus addressing the variety of issues brought to light during the energy crisis of the preceding one and a half years. The following description of the proposal will be restricted to those of its parts that are immediately related to the research questions at hand (as set out in Subchapter 1.2), i.e. mainly the new Chapter IIIa on "Specific investment incentives to achieve the Union's decarbonisation objectives" contained in Article 1, paragraph 9 of the proposed Regulation, and, most importantly, the proposed Article 19b on "direct price support schemes for new investments in generation", which introduces the new instrument of "two-way CfD" contained therein.

Primarily, the Commission proposed two instruments aimed at price stabilisation and a better balance between producers and consumers: so-called Power Purchase Agreements (PPAs) and two-way CfDs. The research presented here will focus on the latter as their introduction will,

[9] Cf. European Council, 'European Council meeting (15 December 2022) – Conclusions' (Brussels, 15 December 2022), para. 19.

likely, prove more consequential and has been debated more hotly in academic, political and business circles.

The remainder of this chapter will be structured as follows: The Commission's detailed proposal as contained in the proposed Regulation and the underlying rationale, as laid out in the Commission's SWD, will be presented in Subchapter 2.2. Given that the political discussion at European level has moved on since the Commission's proposal was presented in March 2023, the following subchapters will briefly look at the positions of the Parliament and the Council (cf. Subchapter 2.3), as well as the provisional agreement reached between EU institutions in the negotiations on 13/14 December 2023 (cf. Subchapters 2.4 and 2.5). This descriptive chapter will thus not only summarize the content of the EU's EMR process, but also provide the necessary background information and definitions needed for the subsequent economic and legal analyses forming the core of this thesis and presented in the following two chapters.

2.2. Commission proposal for a regulation to improve the Union's electricity market design

On 14 March 2023, the Commission published a proposal for a "Regulation amending Regulations (EU) 2019/943 [on the internal market for electricity (recast)] and (EU) 2019/942 [establishing a European Union Agency for the Cooperation of Energy Regulators] as well as Directives (EU) 2018/2001 [on the promotion of the use of energy from renewable sources] and (EU) 2019/944 [on common rules for the internal market for electricity (recast)] to improve the Union's electricity market design"[10] as well as an accompanying Commission Staff Working Document on the "Reform of Electricity Market Design" [11]. Both documents will be presented in the following sections, as they formed the basis for reactions by the Parliament and the Council and the inter-institutional negotiations (*trilogues*) that were finally concluded on 13/14 December 2023.

[10] European Commission, 'Proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design' (COM(2023) 148 final, 14 March 2023)

[11] European Commission, 'Commission Staff Working Document: Reform of Electricity Market Design' (SWD(2023) 58 final, 14 March 2023)

2.2.1. Proposal for a regulation to improve the Union's electricity market design

The actual legislative proposal of the Commission was preceded by an explanatory memorandum serving as a summary of the Commission's SWD (further described in section 2.2.2), which sets out the context of the proposal. Additional aspects brought to bear by the Commission as justifications for its concrete proposals regarding two-way CfDs will be summarised below, before the main elements of the actual proposal will be presented in detail with the necessary focus on electricity prices and windfall profits, which are to be addressed by the new instrument of two-way CfDs in particular.

2.2.1.1. Context and objectives of the proposal

A raft of emergency measures was passed by the EU to address the energy crisis of 2021/22, including instruments to limit prices and thus avoid windfall profits in the gas and electricity markets. While these proved their worth as stopgap measures in the Commission's assessment, it was argued that a more fundamental reform of the electricity market design was needed in order to establish "a buffer between short-term markets and electricity bills paid by consumers, in particular by way of incentivizing longer term contracting"[12] by attempting to decouple retail electricity prices from the impact of fossil fuel-based (mainly natural gas-fired) generation as the marginal producer in the wholesale electricity market.[13]

At the same time, the Commission argued that market participants would require long-term visibility on the electricity market design and (especially) the price-setting mechanism in place for RE projects, in order to "facilitate the [necessary RE] investments needed in the face of recent price volatility, uncoordinated regulatory interventions and grid and regulatory barriers to entry" – and hence "fundamental reform [was] needed" according to the Commission.[14]

Thus, the Commission set out to "optimise the electricity market design by complementing the short-term markets with a greater role for longer-term instruments [...] and facilitating investments in clean technologies. Ultimately, this will mean that less fossil fuel generation is needed

[12] Cf. European Commission (footnote 10), p. 2.

[13] It is worth noting here that the Commission's proposal focused on (end-) consumer prices through revenue recycling rather than addressing the (perceived) shortcomings of the merit order (which was left untouched), as was initially requested from it. This important point will be further investigated in section 3.2.2.

[14] Cf. European Commission (footnote 10), p. 3.

and will lead to lower prices for consumers during future fossil fuel crisis due to the low operational costs of renewable and low carbon energy."[15] By improving and clarifying access to longer-term contracts for developers of RE projects, the Commission's proposal aimed to increase price stability both on the producers' and the consumers' side, while also lowering (perceived) investments risks and thus the cost of capital. At the same time, the Commission's stated aim was also "to avoid windfall profits in periods of high prices,"[16] thus protecting consumers from price volatility, and to enhance the stability and predictability of electricity prices for industry, while also boosting much-needed investments in RE through the increased reliability of revenues.[17]

2.2.1.2. Legal basis, subsidiarity and proportionality

The Commission continued with an explanation of the legal basis of its proposal, which can be found in Article 194 (2) of the Treaty on the Functioning of the European Union (TFEU). In accordance with this article, the Commission shares competence with Member States in the area of energy, including the promotion of RE, which means agreement has to be reached between Member States and the Commission, as well as with the European Parliament. Regarding the principle of subsidiarity, the Commission explained that addressing the energy crisis could not be left to Member States alone for several reasons, including the proper functioning of the common electricity market. Furthermore, the Commission referred to the need for changes to existing EU legislation, which are the prerogative of the Commission. As regards the proportionality[18] of the proposed measures, the Commission stated that they were considered proportionate, before (qualitatively) explaining its reasoning behind this conclusion.[19] Thus, the proposal's impact on several fundamental rights, particularly limits to the freedom to conduct a business and the right to property (as enshrined in Articles 16 and 17 of the Charter of Funda-

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[15] Cf. European Commission (footnote 10), p. 3.

[16] ibid

[17] "The proposed initiative is complementary [with other legislative initiatives of the EU] in that it aims to enable the acceleration in the uptake of renewable energy. The proposal seeks to ensure more stable long-term sources of revenue to unleash further renewable and low carbon energy investments, while improving the functioning of short-term markets, which are key for the integration of renewables in the electricity system." (Cf. European Commission (footnote 10), pp. 6-7.)

[18] Cf. Publications Office of the European Union, 'Principle of proportionality', (Brussels, 14 November 2023) <https://eur-lex.europa.eu> (last accessed 21 June 2024), for a definition the principle of proportionality.

[19] It is worth mentioning that the Commission did not carry out an (ex-ante) impact assessment of its proposal, as would normally be required (cf. European Commission (footnote 10), p. 12). This point will be further addressed in section 3.3.3.

mental Rights of the European Union; the *Charter* for short), was considered "necessary and proportionate to achieve [its] objectives"[20] by the Commission. Given the limited number of changes to existing legislation, the Commission also argued that the choice of an amending act, rather than a wholly new regulation or directive, is the right legislative instrument.

2.2.1.3. Content of the proposed Regulation

The actual proposal for a regulation is contained on pages 19-52 of the Commission's document[21], and will be presented next as far as it concerns the new instrument of two-way CfD. As is commonly the case, the proposed Regulation started with a number of recitals setting out its background and rationale. The initial recitals mostly repeated points already made in the previous sections of the Commission document and/or contained (in more detail) in the accompanying SWD. Thus, only pertinent points relating to two-way CfDs as well as those setting out the specific wording of the legislative proposal will be summarised below, as they form the basis for its further economic and legal analysis.

The proposed recitals 8 and 10 were to provide the main aim of the proposed changes to the electricity market design, namely to reduce "the impact of high and volatile fossil fuel prices" on households' and companies' electricity bills, and to "ensure that benefits from rising renewable power deployment, and the energy transition as a whole, are brought to consumers."[22]

Proposed recitals 24-26 were to provide additional details on adjustments to the price mechanism enshrined in the electricity market design, namely the central element of the so-called merit order, as well as its shortcomings observed during the recent energy crisis. Thus, the Commission justified its proposal by stating that through the functioning of the merit order "a surge in the price of gas and hard coal [has] translate[d] into [...] exceptionally high prices in the day-ahead [electricity] market [...]", which in turn saw "technologies with significantly lower marginal costs [such as many renewables and nuclear] [...] consistently record[ing] high revenues." Yet at the same time, the Commission also acknowledged that in order to reach the EU's ambitious targets for the expansion of renewables and the investments "required to achieve these goals,

[20] Cf. European Commission (footnote 10), p. 14.

[21] That is, European Commission (footnote 10).

[22] Cf. European Commission (footnote 10), p. 21.

the market should ensure that a long-term price signal is established."[23] In combination, proposed recitals 24-26 thus pointed at the circle that the Commission attempted to square with its proposal, namely the avoidance of windfall profits for low-carbon technologies at times of high prices, whilst not disincentivising investments into new electricity generation facilities and the efficient operation of existing facilities.

Proposed recital 30 was to specify that any future direct price support schemes for new investments offered by Member States should take the form of two-way CfDs that include not only a revenue guarantee (as before with feed-in premiums (FIP) etc., which provided a downward limitation or *floor*), but additionally "an upward limitation [or *cap*] of the market revenues of the generation assets concerned"[24] – hence *two-way*, as there would be a *revenue floor* and a *revenue cap*. In this context, *new investments* were not only to comprise new power generation facilities using low-carbon, non-fossil fuels (i.e. renewables and nuclear), but also investments to replace (*re-power*) or to expand existing facilities, or to prolong their lifetime.

In proposed recital 32, the proposal clarified that the requirement to exclusively design direct price support schemes in future as two-way CfDs was to be limited to "low carbon, non-fossil fuel technologies, with low and stable operational costs and to technologies which typically do not provide flexibility to the electricity system, while excluding technologies that are at early stages of their market deployment."[25] Generation technologies with high marginal (i.e. operating) costs and/or the possibility to operate in a flexible manner, as well as those considered *emerging* thus were to be expressly excluded, as were "small-scale installations and demonstration projects" and (possibly) renewable energy communities, depending on their specificities that needed to be considered by Member States.[26] However, at this stage the Commission did not specify further which concrete technologies or capacities it considered as to be excluded from the CfD-requirement, a point that will be further addressed later.

Proposed recital 33 repeated (and thus underlined) that the requirement to introduce two-way CfDs should only apply to new investments (as already set out in proposed recital 30). Thus, the

[23] Cf. European Commission (footnote 10), p. 24.

[24] Cf. European Commission (footnote 10), p. 25.

[25] ibid

[26] As defined in Articles 4 (3) and 22 (7) of Directive (EU) 2018/2001, respectively.

Commission did not foresee the retroactive application of two-way CfDs to existing investments.

Proposed recital 34 specified that additional revenues generated by Member States in periods of high electricity prices through the revenue cap put in place with two-way CfDs would need to be "passed on to all final electricity customers, including households, SMEs and industrial consumers, based on their consumption"[27], while maintaining incentives to reduce or shift demand at times of high market prices, and while ensuring that competition between different suppliers was not distorted.

Proposed recital 35 repeated and further expanded on the aspect of competition by broadening the required design features introduced in the previous recital. Thus, two-way CfDs were to be designed by Member States in such a way that they "do not undermine the efficient, competitive and liquid functioning of the electricity markets, preserving the incentives of producers to react to market signals, including stop generating when electricity prices are below their operational costs, and of final customers to reduce consumption when electricity prices are high." Furthermore, Member States were to ensure that the introduction of two-way CfDs does not "constitute a barrier for the development of commercial contracts such as PPAs."[28] In this context, proposed recital 36 stated that two-way CfDs and PPAs were to be seen as complements rather than substitutes, with both instruments each serving a different and distinct purpose.

Following the recitals, Article 1 (2) of the proposed Regulation added a number of definitions to Regulation (EU) 2019/943, of which new points (76) and (78) were of immediate relevance to two-way CfDs. Point 76 defined what a "two-way contract for difference" is (as opposed to, e.g., a PPA as defined in point (77)). A two-way CfD was to be defined as "a contract signed between a power generating facility operator and a counterpart, usually a public entity, that provides both minimum remuneration protection and a limit to excess remuneration; the contract is designed to preserve incentives for the generating facility to operate and participate efficiently in

[27] Cf. European Commission (footnote 10), p. 26.

[28] ibid

the electricity markets and complies with the principles set out in Article 4 (2) and Article 4 (3), first and third subparagraphs, of Directive (EU) 2018/2001."[29]

Whereas point (78) would have further defined the term "market revenue", as used in point (76) before, as the "realised income an electricity producer receives in exchange for the sale and delivery of electricity in the Union, regardless of the contractual form in which such exchange takes place, and excluding any support granted by Member States," other terms used in the proposed Regulation (such as "power generating facility operator", "minimum remuneration" and "excess remuneration") remained undefined.[30]

As mentioned before, Article 1 (9) of the proposed Regulation subsequently introduced a new chapter IIIa on "Specific investment incentives to achieve the Union's decarbonisation objectives" to Regulation (EU) 2019/943, namely Article 19a on PPAs and Article 19b on two-way CfDs (as well as a further four articles related to flexibility needs, demand side response and storage, and flexibility support schemes, which are excluded from further analysis).

In line with proposed recitals 35 and 36, Article 19a (4) was to stipulate that "in the design of the support schemes for electricity from renewable sources [i.e. two-way CfDs], Member States shall allow the participation of projects which reserve part of the electricity for sale through a PPA or other market-based arrangements […]", in order to facilitate the emergence of a market segment based on PPAs.

As proposed Article 19b is central to the further analysis, it will be reproduced in full below:

> "Article 19b
>
> Direct price support schemes for new investments in generation
>
> 1. Direct price support schemes for new investments for the generation of electricity from the sources listed in paragraph 2 shall take the form of a two-way contract for differences. New investments for the generation of electricity shall include investments in new power-generating facilities, investments aimed at repowering existing power-generating facilities, investments aimed at extending existing power-generating facilities or at prolonging their lifetime.

[29] Cf. European Commission (footnote 10), p. 31.

[30] ibid

2. Paragraph 1 shall apply to new investments in generation of electricity from the following sources:
(a) wind energy;
(b) solar energy;
(c) geothermal energy;
(d) hydropower without reservoir;
(e) nuclear energy;

3. Direct price support schemes in the form of two-way contracts for difference shall:

(a) be designed so that the revenues collected when the market price is above the strike price are distributed to all final electricity customers based on their share of consumption (same cost / refund per MWh consumed);

(b) ensure that the distribution of the revenues to final electricity customers is designed so as not to remove the incentives of consumers to reduce their consumption or shift it to periods when electricity prices are low and not to undermine competition between electricity suppliers."[31]

Building on the recitals mentioned before, proposed Article 19b thus was to flesh out in more specific terms in which cases of investments a two-way CfD should be used as a support instrument, and how. Thus, paragraph 1 mostly repeats the wording of recital 30, whereas paragraph 2 expands on the vague wording of recital 32 by providing a list of technologies that are considered suitable for two-way CfDs (in contrast to other technologies generically mentioned in recital 32 that should not be subject to a two-way CfD scheme in case of public support). Finally, paragraph 3 broadly implements the considerations regarding price signals and competition contained in recitals 34 and 35.

Article 3 (1) of the proposed Regulation was to amend Article 4 (3) of Directive (EU) 2018/2001 such that two-way CfDs become the norm for those technologies listed in proposed Article 19b (2) of Regulation (EU) 2019/943, thus replacing the existing requirement to grant public support in the form of a market premium enshrined in the Regulation currently in place. Article 3 (1) of the proposed Regulation further stipulated implementation of two-way CfD schemes across Member States within "[six months after entry into force of this Regulation]."

[31] Cf. European Commission (footnote 10), p. 37.

Finally, Article 5 of the proposed Regulation stated that entry into force should be within "[xxx]"[32] days after publication in the Official Journal of the European Union (OJEU), with it being "binding in its entirety and directly applicable in all Member States", as is always the case with EU regulations.

2.2.2. Staff working document on reform of electricity market design

In the accompanying SWD, the Commission set out its underlying thinking and the background to the reform proposals contained in the proposed Regulation presented in section 2.2.1 above, as well as a parallel process aimed at improving the Union's protection against market manipulation in the wholesale energy market.[33] It is thus very useful to take a closer look at the analysis undertaken by the Commission (to the extent not already contained in the explanatory memorandum presented in the preceding section), as this should facilitate a better understanding and interpretation of the concrete proposals submitted to the Parliament and the Council.

The SWD starts with a description of the upheaval seen in the European energy market in 2021/22, since largely abated (cf. Subchapter 2.1). In further explaining the policy background, the SWD refers to a Council Regulation adopted on 6 October 2022 that introduced coordinated measures aimed at electricity demand reduction and the collection and redistribution of windfall profits from power plant operators to final consumers.[34] Additionally, conclusions of the Council meeting of 15 December 2022[35] are cited as justification (and background) for the Commission's reform proposal, namely to "create a buffer between short-term electricity markets and the impact on consumer bills, while at the same time improving the functioning and oversight of those markets [.... and providing] long-term price signals to boost the deployment of renewable energy through improvements to the regulatory framework."[36]

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[32] The square brackets in this paragraph and the previous one are the Commission's, suggesting that the Commission intentionally left both the implementation period and the entry into force open for discussions/negotiations with Parliament and Council.

[33] That is, European Commission (footnote 11).

[34] Council Regulation (EU) 2022/1854 on an emergency intervention to address high energy prices [2022] OJ L 261 I/1

[35] Cf. European Council (footnote 9), para. 19.

[36] Cf. European Commission (footnote 11), p. 6.

The SWD then continues with what constitutes a strong defence of the *merit order principle* underpinning the European electricity market. Amidst the energy crisis, the merit order had been called into question by several Member States, which insisted it no longer served the interests of electricity consumers as wholesale prices skyrocketed in 2021/22.[37] Here, the Commission took a different position by stressing that, firstly, Member States "benefitted from lower electricity prices thanks to the single market [being based on the merit order]" and, secondly, that "the merit-order approach remains fit for purpose for these [short-term] markets", which are still based on a mix of fossil fuel and renewable technologies.[38] In the Commission's assessment, such a system remains useful and adequate even in a market increasingly dominated by renewable energy technologies, as it allows power generators to recover both their initial investment cost (for constructing the power plant) as well as the variable cost of operation (e.g. for fuel and maintenance). According to the Commission, the merit order thus ensures that investments are made, and the power system is developed in an (economically) efficient manner.

Yet, the EU's executive acknowledged that "the energy crisis has highlighted a number of shortcomings, which the reforms proposed by the Commission aim to address."[39] Thus, the fact that gas-fired power plants are (often) the price-setting technology, despite the increasing market penetration of clean energy sources, and their impact on consumer prices, are identified as key shortcomings. Additionally, the Commission pointed at the "unexpectedly higher commercial returns" for so-called "inframarginal generators" that arose from the market upheaval to the detriment of end-consumers of electricity. Moreover, the Commission stated that volatile prices and policy interventions to address them could undermine price and investment signals, thus denting investment appetite at a time when investments into the energy transition should be ramped up rapidly to meet the objectives of the European Green Deal.[40]

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[37] Lead by Spain and France, several southern Member States called for a decoupling of gas and electricity markets, which could have implied abolishing (or at least tweaking with) the merit order (cf. Nikolaus J. Kurmayer, 'Berlin, Brussels join calls for 'fundamental reform' of EU power market' *EURACTIV* (Brussels, 29 August 2022) <www.euractiv.com>, last accessed 21 June 2024). However, other Member States (later) resisted these calls and came out in favour of the merit order, cf. for instance the 'Joint Letter by DE, DK, EE, FI, LU, LV, NL on priorities for a targeted EU electricity market reform' *BMWK et al.* (Berlin, 22 February 2023) <www.bmwk.de> (last accessed 21 June 2024).

[38] Cf. European Commission (footnote 11), p. 7.

[39] Cf. European Commission (footnote 11), p. 11.

[40] Cf. European Commission (footnote 11), p. 12.

In order to decouple retail electricity prices (at least somewhat) from wholesale power prices, the Commission then introduced two-way CfDs (of "typically more than ten years"[41]) as a means to increase price stability for consumers. Under the scheme, Member States would claw back any windfall profits from power generators (i.e. those resulting from a sales price above the CfD's strike price) and use the revenues thus generated to lower consumer prices at times of high wholesale prices. This mechanism sets two-way CfDs apart from the sliding FIP schemes (currently) most commonly used across the EU as the main instrument to support and stimulate investments in renewable energy technologies. As these guarantee the power plant operator a minimum price per unit of output (based on a *strike price* either set by government fiat or in a competitive auction), sliding FIP schemes are also known as "one-sided CfD" schemes that provide operators with a floor price, but not a ceiling price (or revenue cap).

In Chapter 2.2, the SWD presents the Commission's views regarding two-way CfDs in most detail. Referring to a public consultation carried out by the Commission, the SWD reports high levels of public support (of 60-70%) among "professional respondents" for the introduction of this instrument ("or similar arrangements").[42] Looking at the increasing role of fully privately-funded projects (i.e. those without any involvement of the state, e.g. through financial support), the Commission underlined that Member States "should consider the significant potential for the PPA market [...], alongside other market arrangements and public support," such as two-way CfDs, which should thus act as a complement only to private-sector solutions (and hence be limited to addressing any existing market failures).[43]

Citing data on support schemes underlying auctions for renewable energy projects from 17 Member States for the period 2014-21, the Commission observed a "move towards greater use of two-way CfD", with 40-50% of all auctions (unweighted number of observations) based on two-way CfDs in recent years, about as many as one-sided CfDs/sliding FIP schemes.[44] In addition to the increasing popularity of two-way CfDs among Member States, the Commission reports that it estimates the potential revenues that could be generated by Member States through

[41] Cf. European Commission (footnote 11), p. 17.

[42] Cf. European Commission (footnote 11), p. 23.

[43] Cf. European Commission (footnote 11), p. 27.

[44] Cf. European Commission (footnote 11), p. 28.

the clawback of windfall profits, and that could be returned to consumers and companies as price support, could amount to "about [4.5-6 bn] EUR in 2023, [9-12bn] EUR in 2024, [13.5 – 18 bn] EUR in 2025 (and so on)."[45]

The SWD then contains a short section on key design principles for two-way CfDs, which have been mentioned in section 2.2.1.3. The Commission identified as main design elements of (and differentiators between) different CfD schemes the reference price (to determine the difference to the strike price for payout/payback under the CfD) and the reference volume (to determine the quantity of generated electricity to which the payout/payout refers), among other aspects (e.g. technology type, project location, grid availability, etc.).[46]

Regarding the existing EU framework that needs amendment in order to implement the proposed reforms, the Commission referred to Directive (EU) 2018/2001, particularly its Articles 4-6, which specify design principles for support schemes RE projects. Further requirements can be found in Articles 107 and 108 of the TFEU, which deal with State aid, as well as related legislation and, especially, the Commission's "Guidelines on State aid for climate, environmental protection and energy" of 2022 (CEEAG)[47], which need to be observed by Member States in devising two-way CfD schemes and which likely will need to be amended as well, to reflect the EMR currently underway.[48]

The SWD then explains the concrete Commission proposal for two-way CfDs, thus summarising the Commission's rationale and main ideas for this new instrument, as contained in the proposed Regulation, and as presented before. However, the Commission additionally mentioned in concrete terms (for the first time in the document) the desire of some Member States to invest

[45] Cf. European Commission (footnote 11), p. 29. Square brackets are the Commission's. It is important to note that no additional information is provided on the assumptions and the calculations carried out by the Commission to arrive at these estimates.

[46] Cf. European Commission (footnote 11), pp. 29-31.

[47] European Commission 'Communication from the Commission: Guidelines on State aid for climate, environmental protection and energy 2022' [2022] OJ C 80/1

[48] However, the Commission did not identify such need as a subsequent action in the SWD.

in, and support, nuclear energy as a "[form] of low carbon, non-fossil fuel electricity generation" alongside the accelerated expansion of renewables.[49]

Most of the design principles then listed by the Commission have been presented before, and are thus not repeated here. However, it is important to note that, while most principles for the design of two-way CfDs (which are meant to complement, rather than replace, the existing design principles enshrined in Directive (EU) 2018/2001) are reflected in the articles – or at least the recitals – of the proposed Regulation, two elements are missing from it: Firstly, this concerns the choice of instrument for state support and for which the SWD seems to suggest that the Commission's original intention was to leave it to Member States to use either two-way CfD "or a similar contractual formulation."[50] In contrast, the proposed Regulation would only allow two-way CfDs, as explained before (cf. section 2.2.1.3). Secondly, according to the SWD, the Commission had originally intended to include a requirement to design two-way CfDs in such a way that they include "penalty clauses in case of early termination of the contract by the producer, with the aim of avoiding that producers opt-out from the contract in periods of high prices where they would have been obliged to pay-back *[sic!]* the revenues above the contract strike price."[51] This requirement had also not been included in the proposed Regulation, but was added during the trilogue at the request of the Parliament.

Finally, with respect to existing generation capacity, the SWD gives a number of economic and legal reasons for why the Commission considered the retroactive application of two-way CfDs both harmful and unlawful. Namely, these concern the effect of retroactive changes to existing support schemes on (perceived) investment risks and the resulting increase in the cost of capital for new investments, the effect on the efficient operation of existing generation projects and competition, and the high legal risks associated with retroactive changes to existing support

[49] The possible inclusion of nuclear energy in two-way CfD schemes was long contested between Member States, mainly France and Germany, and resulted in drawn-out negotiations in the Council until a compromise could be reached in October 2023 (cf. European Commission (footnote 11), p. 32; Kira Taylor, 'Breakthrough as EU countries agree position on electricity market reform' *EURACTIV* (Brussels, 18 October 2023) <www.euractiv.com> (last accessed 21 June 2024); Frédéric Simon and Nikolaus J. Kurmayer, 'Deal on EU electricity market reform: What did Paris and Berlin obtain?' *EURACTIV* (Brussels, 19 October 2023) <www.euractiv.com> (last accessed 21 June 2024); 'Paris and Berlin compromise on reform of the electricity market' *The Economist* (London, 19 October 2023) <www.economist.com>, last accessed 21 June 2024).

[50] Cf. European Commission (footnote 11), p. 32. It is worth noting that the Parliament requested such an opening clause, which was in the end agreed during the trilogue (cf. Subchapter 2.4).

[51] Cf. European Commission (footnote 11), p. 33.

schemes as well as their incompatibility with the strict prohibition of retroactive changes enshrined in Directive (EU) 2018/2001 ("preventing the revision of support granted to renewable energy projects when it affects their economic viability"[52]).

As regards more drastic changes to the electricity market design, along the lines of the emergency measures put in place in 2022, the Commission explained in Chapter 3 of the SWD on "Limiting revenues of [existing] inframarginal generators" why such measures should not be continued beyond the acute emergency situation, and why they therefore did not form part of the proposed Regulation. In a similar vein as before, the Commission cited (perceived) investment risk and (potential) harm to forward markets as the reasons for not incorporating "the inframarginal revenue cap or similar emergency measures as a permanent feature of the market design" in its proposal.[53]

2.3. Positions of the European Parliament and the Council of the European Union

Following publication of the Commission's reform proposal, the Parliament and the Council were asked to formulate their respective positions on the proposal in order for the three institutions to reach agreement in the required "ordinary legislative procedure".[54] Formerly known as a "co-decision procedure", thus Parliament and Council needed to adopt the proposed Regulation, while the Commission's legislative proposal only formed the basis for what later on culminated in the trilogue of all three institutions.

To better understand the final outcome reached in the inter-institutional negotiations (i.e. the *trilogue*), as further presented in the next Subchapter, the main positions of the Parliament and the Council are presented in Annex 1 to the extent that they differ from the Commission's original proposal and where important for the further economic and legal analysis carried out in subsequent chapters. It is noteworthy that the positions of the three institutions where largely aligned from the outset, and differed (mostly) only in details – albeit important ones, as will be shown next.

[52] Cf. European Commission (footnote 11), p. 34.

[53] Cf. European Commission (footnote 11), p. 50.

[54] Cf. Article 294 TFEU.

2.4. Agreement reached in the inter-institutional negotiations (trilogue)

On 13 December 2023, the last of three informal trilogues between the representatives of the three institutions (Commission, Parliament, and Council) took place and concluded in the small hours of 14 December 2023 with a provisional agreement from inter-institutional negotiations.[55] Before turning to the provisional agreement reached, it seems useful to summarise the main positions of the three institutions going into the trilogue in the following table.

Table 3: Main positions on two-way CfDs[56]

1. European Commission	**2. European Parliament**	**3. Council of the EU**
Form of direct price support schemes (Article 19b (1) of the amended Regulation):		
- only through two-way CfDs - investments in new power-generating facilities, repowering, capacity expansion and life-time extension of existing facilities	- through two-way CfDs **or equivalent schemes achieving the same goals** - investments in new power-generating facilities, repowering **and capacity expansion** (if substantial), with support limited to cost of expansion **- voluntary participation in two-way CfDs**	- only through two-way CfDs - investments in new power-generating facilities **(with term left undefined)** **- voluntary participation in two-way CfDs**
Technologies covered by two-way CfDs (Article 19b (2) of the amended Regulation):		
- wind energy, solar energy, geothermal energy, hydropower without reservoir, nuclear energy		
Sizes and types of projects covered by two-way CfDs (recital 32 of the amending Regulation):		
- small-scale installations, including renewable energy	- small-scale installations, including renewable energy	- small-scale installations, including renewable energy

[55] Cf. Council of the European Union, 'Proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design – Analysis of the final compromise text with a view to agreement', document ID: 16964/23 (Brussels, 19 December 2023), pp. 2-7, for a summary of the co-decision and negotiation process at EU level.

[56] References in the table to recitals, articles and paragraphs refer to the proposal of the Commission, unless otherwise stated. Table based on Pause et al. 'Das Fit for 55-Paket und REPowerEU: Updates sowie Erneuerbaren-Förderung und EU-Strommarktreform' *Stiftung Umweltenergierecht* (Online seminar: 'Green Deal erklärt', 24 October 2023) <https://stiftung-umweltenergierecht.de> (last accessed 21 June 2024), pp. 22-28, as well as the original source documents mentioned before.

communities, and demonstration projects can be exempted	communities, and demonstration projects can be exempted, but **projects with more** *[sic!]* **than 1 MW or more** *[sic!]* **than 6 MW to be exempted**	communities, and demonstration projects can be exempted
Use of revenues from two-way CfDs (Article 19b (3) of the amended Regulation):		
- equal distribution to all final electricity consumers, incentives and competition not to be distorted	**- multiple additional options for use of revenues and recipient groups**	**- multiple additional options for use of revenues and recipient groups**
Key design principles for two-way CfDs (recital 35 of the amending Regulation):		
- efficient, competitive and liquid functioning of electricity markets to be maintained	**- alignment with State aid rules**, emphasis on competition and efficiency **- penalty clauses for early termination of CfD**	**- alignment with State aid rules**, emphasis on competition and efficiency
Timeline for implementation (Article 5 of the amending Regulation and Article 36 (1) of the amended Directive (EU) 2018/2001):		
- entry into force [xxx] days after publication in the OJEU - two-way CfDs obligatory [six months] after entry into force	- entry into force [xxx] days after publication in the OJEU **- two-way CFDs obligatory 1 year after entry into force**	- entry into force **20** days after publication in the OJEU **- two-way CFDs obligatory 3-5 years after entry into force**

As the above Table 3 and Annex 1 in the Appendix show, the institutions were quite well-aligned on many aspects concerning the new instrument of two-way CfDs even before their negotiations started. Thus, the provisional agreement reached in mid-December 2023 probably did not come as a surprise to observers of the legislative file. Given that its main elements will form the main basis for the ensuing economic and legal analysis, they will be summarised next.

In its analysis of the final compromise text agreed during the trilogue, the Council identified the following points as the two most important results concerning two-way CfDs:

> "1. For reasons of legal certainty and clarity, Articles 2 and 3 of the proposed Electricity Market Regulation, which amend Directives (EU) 2018/2001 and (EU) 2019/944, have been split from that Regulation and are now a self-standing Directive, in line with the General Approach. [...]
>
> 2. On the **key political issues**, the provisional agreements are the following:
>
> **(a) Direct price support schemes in the form of two-way Contracts for Difference (CfDs) (Article 19b Electricity Regulation 2019/943).** The Presidency and the European Parliament maintained the core elements of the General Approach. The agreed compromise keeps CfDs as mandatory only for investments in new power-generating facilities. The scope of direct price support schemes has been broadened with the inclusion of a reference to 'equivalent schemes with the same effects', while the design criteria have been maintained as in the General Approach."[57]

Thus, in line with the agreement reached between the institutions, recital 35 in the provisional agreement (recital 30 in the Commission's original proposal) expands the range of acceptable instruments in line with the Parliament's position to "two-way contracts for difference ***or equivalent schemes with the same effects***"[58], an addition to the text that is repeated, verbatim, throughout the document whenever the choice of instrument was previously restricted to two-way CfDs. What constitutes such an "equivalent scheme with the same effects" remains unclear, however, as no definition or concrete description was added to the final text – thus seemingly leaving it to the Commission or Member States to flesh out under which circumstances a scheme could be considered equivalent in its effects.[59] This matter will be addressed later.

The substance of the Council's other changes to recital 35 (and subsequent passages of the text) were equally retained, implying that two-way CfDs (or equivalent schemes) would only be made

[57] Cf. Council of the European Union (footnote 55), p. 3. Emphasis is the Council's.

[58] Cf. Council of the European Union (footnote 55), p. 28. Emphasis is the Council's.

[59] During his press conference following conclusion of the trilogue, the Parliament's *rapporteur*, Nicolás Gonzaléz Casares, explained that, based on this change, "[Member States have the option to] use other support schemes that have the same effects [as two-way CfDs], but [that] could be a little bit different. [The] idea is to support big investments, e.g. in offshore wind, [where a two-way] CfD could not be enough." (Cf. Nicolás Gonzaléz Casares, 'Press conference on the reform of the EU electricity market' (14 December 2023) <https://multimedia.europarl.europa.eu>, relevant passage starting ca. at 11:49:15; last accessed 21 June 2024).

compulsory for investments in new power generating facilities, whereas for investments in repowering, capacity-expansion and lifetime-extension "Member States should be able to decide to grant support schemes in the form of two-way CfDs or equivalent schemes"[60], meaning they would not be obliged to do so. This difference in treatment between *greenfield* and *brownfield* investments will also be analysed later.

In the agreed text, recital 36 stipulates that a transitional period of three years from entry into force of the amending Regulation (and five years in the case of "offshore hybrid assets connected to two or more bidding zones"[61]) should apply, implying two-way CfDs (or equivalent schemes) would become compulsory around mid-2027 or mid-2029, respectively.

Recitals 37-39 in the agreed text are identical to the Council's proposed additions, thus enshrining the clarification on the voluntary nature of participation in two-way CfDs (or equivalent schemes) and references to Articles 4 and 6 of Directive (EU) 2018/2001 sought by the Council. Recital 41 in the agreed text consolidates design principles proposed by the Council and the Parliament, which are later reflected in Article 19b (1a) of the agreed text for the amended Regulation. However, it is worth noting that several of the terms introduced in this recital are neither defined nor otherwise explained (e.g. "injection-based", "capability" or "yardstick" CfDs[62]), making the recital's future application and its correct interpretation difficult.

In recital 42, the Parliament's suggested amendment of limiting the (compulsory) application of two-way CfDs (or equivalent schemes) to projects of "more *[sic!]* than 1 MW installed capacity, and more *[sic!]* than 6 MW[,] where the project is a citizen energy community or renewable energy community"[63], was not agreed upon in the trilogue. Thus, the Commission's original carve-out was retained, as it was considered sufficient by the Council, too.

Regarding the use of (potential) revenues from two-way CfD (or equivalent) schemes by Member States, it is useful noting that recital 44 significantly broadens the Commission's original

[60] Cf. Council of the European Union (footnote 55), p. 28.

[61] ibid (Note the term of "offshore hybrid assets" remains undefined.)

[62] Cf. Council of the European Union (footnote 55), p. 30.

[63] Cf. European Parliament, 'Report on the proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design', document ID: A9-0255/2023 (Brussels, 27 July 2023), p. 21.

proposal by allowing many more uses of these funds beyond the direct price support for electricity consumers (which now also include energy-intensive undertakings). For instance, "investments in distribution grid development, RES and electric vehicle charging infrastructure"[64] are now to be eligible for financing from such revenues as well.

As concerns definitions in Article 2 of Regulation (EU) 2019/943, the changes proposed by the Council were retained in point (76), which leads to a shorter definition of a two-way CfD (as mentioned before), and a deletion of point (78), which was to define the term "market revenue". As mentioned previously, a definition of the term "equivalent scheme with the same effects" was not added to Article 2, even though one might be needed.

For the wording of the central Article 19b of Regulation (EU) 2019/943, the proposed amendments of the Council to paragraphs 1, 1a, 1b, 2, 3 and 4 were retained in their entirety during the trilogue. For obvious reasons, "equivalent scheme with the same effects" was added in several places, however. With the exception of the Parliament's addition of penalty clauses in case of "undue unilateral early termination of the contract"[65], which was added as point (f) in paragraph 1a, none of the other amendments to Article 19b proposed by the Parliament found their way into the agreed text.

The other institutions also followed the Council's proposals regarding entry into force of the amending Regulation ("on the twentieth day following that of its publication in the Official Journal of the European Union"[66]) as well as the splitting of Article 3 from the amending Regulation and moving it to a self-standing directive amending Directives (EU) 2018/2001 and 2019/944. Thus, Article 2 of the (new) amending Directive will now change Article 4 (3) of Directive (EU) 2018/2001 in order to accommodate the introduction of two-way CfDs (or equivalent schemes) in line with the amending Regulation. The amending Directives transposition shall occur within six months from entry into force of the amending Directive, which will also be on the twentieth day following that of its publication in the OJEU, according to Articles 3 and 4 of the amending Directive, respectively.

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[64] Cf. Council of the European Union (footnote 55), p. 32.

[65] Cf. Council of the European Union (footnote 55), p. 65.

[66] Cf. Council of the European Union (footnote 55), p. 86.

2.5. Way forward and next steps (as of 30 April 2024)

Following conclusion of the informal trilogue on 14 December 2023, the secretariats of the Parliament and the Council adapted the draft texts (for the amending Regulation and Directive) to the political agreement reached between the institutions, resulting in the final compromise text as presented before.

Subsequently, and following the agreement of the Permanent Representatives Committee of the Council, its chair sent a formal letter to the Parliament's Committee on Industry, Research and Energy (ITRE) by which the Parliament was invited to accept the compromise text as is ("but subject to revision by the legal linguists of both institutions") and to adopt it at first reading. After the Parliament's approval, the Council would then "approve the Parliament's positions and the acts shall be adopted..."[67]

On 15 January 2024, the ITRE committee discussed the final compromise text[68] and the first (and only) reading took place in the Parliament's plenary session on 11 April 2024, during which the amending Regulation and Directive agreed in the trilogue were adopted by the Parliament.[69] As a final step in the legislative process, the Council will now need to formally approve them as well, before both acts can be expected to enter into force during the summer with a need to transpose the amending Directive (approximately) by the end of 2024.

[67] Cf. Council of the European Union, 'Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design', document ID: GEDA/A/(2024)000028 (Brussels, 22 December 2023), p. 1.

[68] Cf. European Parliament, 'ITRE agenda January 2024', (Brussels, 15 January 2024) <https://emeeting.europarl.europa.eu> (last accessed 21 June 2024).

[69] Cf. European Parliament, 'Minutes', (Brussels, 11 April 2024) <www.europarl.europa.eu> (last accessed 21 June 2024).

Chapter 3

ECONOMIC ANALYSIS OF TWO-WAY CFDS FOR RENEWABLE ENERGY PROJECTS IN THE EU

3.1. Introduction

Expanding the share of RES in the European energy sector is a cornerstone of the European Green Deal, with which the EU aims to reduce its greenhouse gas emissions by at least 55% (compared to 1990) by 2030 and to reach *carbon neutrality* (i.e. net-zero emissions) by 2050. To achieve these targets, Europe aims to reach a share of at least 42.5% of renewable energy by 2030[70], which according to the Commission implies a 69% share of renewable electricity (RES-E).[71] With less than seven years left until the target year of 2030, the EU faces an uphill struggle to reach this target – at the end of 2022 the share of RES-E had reached only around 41%.[72] Thus, the remaining gap of about 28 percentage points needs to be closed much faster than in previous years, which requires, *inter alia*, the right regulatory environment and adequate financial incentives for the required investments to take place at the needed pace.

Traditionally, it was the responsibility of Member States to devise and implement the necessary support schemes for RES, not least because Article 194 TFEU gives them exclusive authority over national energy policies. However, over the last years the Commission has become increasingly involved in certain aspects of the promotion of RES, especially where it touches upon the proper functioning of the single market. Thus, instead of leaving the design and implementation of support schemes to Member States alone, the Commission has more recently defined the main elements that such schemes would need to contain across the EU, in order for national schemes to be considered compliant with State aid rules.[73]

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[70] Cf. Article 1 (2), subparagraph (a), of Directive (EU) 2023/2413 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 [31 October 2023] OJ L series.

[71] Cf. European Commission (footnote 11), p. 8.

[72] Cf. Eurostat, 'Share of energy from renewable sources' (online data code: nrg_ind_ren__custom_11859421), <https://doi.org/10.2908/NRG_IND_REN> [2024] (last accessed 21 June 2024).

[73] That is, European Commission (footnote 47).

It is in this *tradition* that the Commission had been tasked by Member States with a reform of the IEM and the promotion of RES-E in 2022. Therefore, a critical analysis of the economic aspects of the on-going reform process at EU level is very much needed, as is the critical legal analysis that will be carried out in Chapter 4. More specifically, in this chapter the four economic research questions that were set out in the introductory Chapter 1 will be addressed in detail. Further aspects that have arisen from the descriptive analysis of the reform proposal (as presented in Chapter 2) are considered in passing, wherever this is useful for the wider economic analysis. The remainder of this chapter will thus be organised along the four leading research questions in Subchapters 3.2 to 3.5, which are followed by a short summary and key conclusions in Subchapter 3.6.

3.2. Is there a need for the existing public support instrument of market premium (or "one-sided CfD") to be amended from an economic perspective?

Before addressing the question of whether the prevailing market premium schemes for RES-E need to be amended, it seems useful to take a step back and ask whether any form of public support – that is, market intervention by the state – is even needed. After all, for economic efficiency the state should only intervene in a liberal market economy in case of a market failure; hence, the presence of such a market failure needs to be established first, before looking at suitable ways to address it in an economically efficient manner.

3.2.1. The economic case for supporting renewable energy technologies in general

When it comes to the promotion of renewable energy technologies, e.g. for electricity generation, it has been long established that such state intervention may be required to develop and adopt such technologies at the pace and scale required for the decarbonisation of the energy sector, often also referred to as the *energy transition*. An analysis of the EU's Renewable Energy Directive of 2004 listed a number of market failures that justified financial support for RES-E, among them market distortions in the electricity market, knowledge spillovers and establishing a level playing field, that would otherwise slow down or even prevent the necessary research and development of so-called *backstop technologies*, as well as their widespread adoption in the marketplace.[74] The benefits of state intervention through financial incentives, such as feed-in tariffs

[74] Cf. Janosch Ondraczek, 'Implementation of EU Directive 2001/77/EC (on electricity from renewable energy sources) in Germany and the United Kingdom: Lessons learnt and the way forward' (MSc thesis, University College London 2004).

(FIT) or FIP, were further illustrated through the emergence of entire industries, such as the German solar PV industry in the 2000s, which helped develop and scale-up new technologies that are now underlying the global energy transition. Had early-adopting countries such as Germany not committed to support the emerging renewable energy technologies with vast funds at an early development stage (in the case of Germany paid for by electricity consumers through the renewable energy levy), would the energy world look very different today.[75]

However, what was true ten or twenty years ago may no longer apply today. Therefore, it is necessary to – at least briefly – revisit the case for state intervention in today's (very different) energy market. After all, the majority of annual investments in the global power sector nowadays are in renewables, suggesting they have long ago become mainstream technologies that are increasingly competitive with fossil fuel-based generation technologies, such as coal and gas.[76] Yet, even though it is true that the most mature renewable energy technologies (such as onshore wind and solar PV) can compete on a generation-cost basis with incumbent technologies using fossil fuels in many instances, continued public support remains essential to underpin their uptake at the scale and speed required for the global energy transition in the coming years. Indeed, it is during this very transition that persistent market failures need to be addressed in order to establish the *level playing field* necessary for the transition to succeed.

At least as long as the European electricity market is organised around the merit order principle with wholesale power prices based on marginal generation costs, a mix of competing technologies that have very different characteristics (chiefly *intermittent* vs. *firm* capacity) and limited sector coupling and storage capacities to balance supply/demand inter-temporally, will inflexible, variable power generation projects (such as wind and solar PV) require long-term financial support to stimulate the required investments in new generation capacities.[77] Among the key arguments presented for the continued support of mature RES-E technologies (not to speak of emerging

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[75] Cf. Claudy et al., p. 15: "[T]he expansion of the PV sector in Germany, supported by the government and paid for by German energy consumers, was a pioneering undertaking[,] which will benefit all users of solar energy globally due to falling prices (thanks to economies of scale and learning curves)."

[76] According to the IEA, global investments in renewable power reached around 55% of total power investments in 2023. Cf. IEA, 'World Energy Investment 2023' (Paris, May 2023) <www.iea.org> (last accessed 21 June 2024).

[77] Variable renewable energy sources (VRE), such as wind and solar energy, are typically characterised by high investment costs and low operating costs, which means they require a high initial investment compared to other technologies. Their ability to generate electricity depends on resource availability (wind or sun) and thus varies over time.

technologies) are the remaining cost-gaps compared to fossil fuels, further cost-reduction potentials (through learning-by-doing and technology spill-over effects) and the reduction of investment risk and financing costs through dedicated support schemes.[78] However, it needs to be stressed that the RES-E market can be expected to segment further in future, with many projects and technologies proving economically feasible even without any public support, such as those based on PPAs, small-scale *prosumer* projects or those realised by large, vertically integrated utilities with a large customer base and their own generation facilities. This fact was also acknowledged – and taken into account – by the Commission.[79]

3.2.2. The need for amending market premium schemes

Thus, the question if investments in renewable energy generation need to be supported by the state at all in future can be answered with a definitive yes, at least for the time being and at least for a part of the market. Therefore, the next question to investigate is whether the prevailing market premium schemes are still fit for purpose, or whether they should be amended – and, if so, how. Here, the origins of the Commission's proposal for the *redesign* of the electricity market can be found in the market upheaval seen during 2021/22, which led to enormous political pressure to structurally reform the EU's electricity market in order to make it "fully fit for a decarbonised energy system and [to facilitate] the uptake of renewable energy"[80], as requested by the Council in its meeting on 15 December 2022. At the time, several Member States[81] as well as market observers and other experts[82] suggested that it might be necessary to move away from the merit order principle as such, given its influence on skyrocketing wholesale and consumer prices for electricity, as well as the windfall profits for some *inframarginal generators*.

Amidst the immediate energy crisis, these market disruptions were addressed with emergency interventions, to mitigate their impact on consumers hit hard by escalating energy prices. How-

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78 Cf. Held et al., 'Do Almost Mature Renewable Energy Technologies Still Need Dedicated Support Towards 2030?' (2019) 8 Economics of Energy & Environmental Policy, 81.

79 Cf. European Commission (footnotes 10 & 11) and Subchapter 2.2.

80 Cf. European Council (footnote 9), para. 19.

81 Cf. Nikolaus J. Kurmayer, 'Berlin, Brussels join calls for 'fundamental reform' of EU power market' *EURACTIV* (Brussels, 29 August 2022) <www.euractiv.com> (last accessed 21 June 2024).

82 Cf., e.g., Hans-Peter Schwintowski and Christoph Brömmelmeyer, 'Die Merit Order auf den europäischen Strommärkten – außergewöhnliche Markterlöse aufgrund eines verbotenen Preiskartells?' (2023) NZKart, 201.

ever, the Council was right to ask for a more structural (and hence long-term) reform that would avoid a possible repeat, or that would at least give the EU means and ways to act in case a similar situation were to arise in future. The Commission thus undertook the analysis presented in its SWD alongside the reform proposal, and concluded that what was required were rather targeted changes to how the electricity market operates, not a complete overhaul of its fundamental design. Thus, the Commission steered clear from abolishing the merit order at the heart of the single electricity market and rather attempted to address the various problems observed during the crisis one by one, as already explained in Subchapter 2.2.

As the Commission explains in its SWD, "the current electricity market design has delivered well over the years, allowing Europe to reap the economic benefits of a single energy market under normal market circumstances, ensuring security of supply, increasing socio-economic welfare and supporting the decarbonisation process. [...] Member States benefitted from lower electricity prices thanks to the single market delivering cheaper electricity across Europe, increasingly from renewable sources."[83] The Commission therefore argues that the merit order approach "remains fit for purpose"[84], while acknowledging that certain market outcomes could be politically, socially and economically undesirable and would thus need to be addressed *outside* the market design as such.

The Commission's view that the merit order principle based on marginal prices is, fundamentally, the right market design for Europe's electricity market (for the time being, at least) is based on decades of academic thinking and practical experience, and thus widely shared and supported by energy economists.[85] Under normal circumstances, an electricity market based on the merit order principle will ensure that electricity demand is met at all times at the least (overall) cost to consumers, by providing suppliers of electricity with the right incentives to invest and operate efficiently in the market. So far, no other market design has been identified in the academic literature that would better ensure an economically efficient market outcome, suggesting the

[83] Cf. European Commission (footnote 11), p. 8.

[84] ibid

[85] Cf. Janosch Ondraczek, 'Harnessing the Sun: The Economics of Solar Photovoltaic Electricity in East Africa' (DPhil thesis (Annex on LCOE methodology), Universität Hamburg 2014); ACER, 'ACER's Final Assessment of the EU Wholesale Electricity Market Design' (Brussels, April 2022).

Commission's unwillingness to throw out the figurative baby with the bathwater may be very much justified.

Nevertheless, the Commission is equally right in saying that the "energy crisis has highlighted a number of shortcomings, which the reforms proposed by the Commission aim to address."[86] Several of the shortcomings identified by the Commission are related to the interplay of demand and supply and the resulting prices in the electricity market, whereby rising natural gas prices (mainly as a consequence of the Russian attack on Ukraine in early 2022) led to big price increases in the wholesale electricity market, which was a direct result of the merit order principle, with gas-fired generation plants setting the price in many hours during that period. Even though other generation sources (such as renewables, but also coal and nuclear energy) did not face similar increases in their generation costs, the marginal power plants based on gas set the market price for all market participants – allowing non-gas plants to reap windfall profits in the process.

Increasing wholesale power prices and particularly windfall profits for such *inframarginal generators* attracted the ire of politicians across Europe, as it was end-consumers (including industrial users of electricity) who ultimately needed to bear these costs. This was considered both economically damaging (by increasing production costs and reducing the international competitiveness of European industry), socially explosive (by squeezing the budgets of already hard-hit households) and grossly unjust – given that (part of the) increased consumer prices would translate into unexpected and *undeserved* windfall profits for some electricity producers, such as renewable energy producers with negligible variable costs (e.g. wind and solar energy).

Arguably, at their core, these are all political more than economic arguments, as the electricity market in its existing design delivered exactly those outcomes (setting aside the allegations of market rigging mentioned before) that it was supposed to deliver, with (increasing) wholesale prices signalling scarcity in the market and with this price signal then leading consumers to reduce their electricity consumption and producers increasing their output of electricity (e.g. in the case of coal-fired power plants) to plug supply gaps (due to the reduced use of gas-fired power plants). These market outcomes thus raised questions of political acceptability (as well as that of a *just* split between consumer and producer rents), but high consumer prices could – and should

[86] Cf. European Commission (footnote 11), p. 11.

– be addressed through income support or price subsidies at consumer-level (thus not weakening the much-needed price signal). Thus, what the Commission put forward in its reform proposals seems correct from an economic perspective.

Yet, there is an additional aspect to the Commission's reasoning that is of equal importance. This has to do with the "investment signals and future investment appetite" needed to achieve the energy transition at the pace and scale required for the EU decarbonisation target. Here, the Commission (rightly) notes that "extreme price volatility and short-term emergency interventions"[87] may deter investors from undertaking the required investments, because the political and investment risks are considered too high. This seems a valid point, as in the past such ad hoc and retroactive market interventions have dented and slowed renewable energy markets on several occasions (e.g. in the Czech Republic and Spain, where existing FIT were unexpectedly and retroactively reduced for political reasons). Thus, including in the electricity market design suitable safeguards against (politically) undesirable market outcomes seems both necessary and superior to another round of emergency measures in case of a repeat of the energy crisis, as this would considerably lower political and hence investment risk (and thereby, ultimately, the risk premium and hence cost of capital for investors).

To summarise, the Commission concluded, rightly, that while there were good reasons to leave the underlying electricity market design (centred on the merit order principle) untouched, additional measures were needed to address the shortcomings observed during the energy crisis. In the Commission's reckoning, several of these shortcomings can and should be addressed by amending the prevailing market premium schemes, which so far are designed as one-sided CfD schemes in most Member States (as well as in the State aid guidelines of the Commission), by moving to two-way CfDs to limit windfall profits and using revenues generated through these schemes to support electricity consumers, which is not possible with one-sided CfDs that allow inframarginal generators to fully capture rents arising from market distortions.[88]

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[87] Cf. European Commission (footnote 11), p. 12.

[88] In this context, two-way CfDs are but one of several *fixes* contained in the reform proposal, alongside the strengthening of the PPA market, improving the functioning of the forward electricity market and the support of energy sharing among consumers, as mentioned before. However, looking at the whole set of proposals (and their interaction) is beyond the scope of this thesis.

Whether two-way CfDs are indeed a suitable instrument to achieve these aims will be looked at next. However, before doing so, it is important to mention that the proposed reform explicitly does not address the stock of existing renewable energy and nuclear power projects ("inframarginal generators") and their (potential) windfall profits (as happened in 2021/22), for the reasons already explained.[89] Thus, the reform provides no safeguards against a repeat of a similar situation on the supply side (with windfall profits for such *inframarginal generators*), but only on the demand side (in case of a declared "emergency", enabling Member States to implement price controls/caps for consumers). Thus, while the political risk arising from escalating electricity prices and windfall profits is being reduced with the proposed measures, it is not eliminated for existing projects, which is important keep in mind in the further analysis.

3.3. Are two-way CfDs a suitable instrument to balance risks (and rewards) between producers and consumers of renewable electricity from an economic perspective?

As documented by the agreement reached in the trilogue, the Commission, the Parliament and the Council all expect that two-way CfDs (or equivalent schemes with the same effects) can help to achieve the stated aims of the reform, which in this case are to shield both electricity consumers and producers from the risk of rising prices and the resulting risk of retroactive price caps (clawbacks of windfall profits), thus reducing investment risk and lowering the cost of capital for new investments. Whether two-way CfDs are indeed a suitable – let alone the best – instrument to better balance risks and rewards flowing from future investments in renewable energy generation assets will be analysed in this subchapter.

3.3.1. Suitability of two-way CfDs – the official view

The compromise documents as agreed during the trilogue (i.e. the amending Regulation and the amending Directive) seem to take it as a given that two-way CfDs (or equivalent schemes with the same effects) can better achieve such balance than market premium schemes (i.e. one-sided CfDs), or indeed any possible alternative measures (including changes to the actual electricity market design, i.e. the merit order principle). In fact, recital 35 of the amending Regulation simply states that "[w]here Member States decide to support publicly financed investments by "direct price support schemes" in new low carbon, non-fossil fuel electricity generation-facilities to

[89] Cf. European Commission (footnote 11), pp. 49-51.

achieve the Union's decarbonisation objectives, those schemes should be structured by way of two-way contracts for difference or equivalent schemes with the same effects..."[90], without providing any justification or explanation for this choice of particular instrument. Likewise, the definition of two-way CfD added as number (76) to the amended Regulation merely states that such instrument shall "provide[] both minimum remuneration protection and a limit to excess remuneration,"[91], but does not provide a justification or additional details. Thus, it is necessary to dig deeper and look at the documents preceding the compromise version, particularly the Commission's initial draft proposal and SWD, to investigate this point further.

Indeed, it is in both documents that the Commission presents a clearer justification for the choice of instrument, but still falls short of explaining whether other (possible) instruments had even been considered. As mentioned in the explanatory memorandum to the proposed Regulation, future public "investment support should be structured as [...] two-way contract[s] for difference, which set a minimum price **but also a maximum price, so any revenues above the ceiling are paid back [to the public]**", in order to "curb [windfall profits arising from high market prices] and so stabilise [consumer] prices."[92] However, in the SWD the Commission goes into at least some more detail when it describes the range of state support instruments currently used in Member States. These range from *traditional* FIT schemes over fixed FIP to sliding FIP schemes. CfDs, both of the one-sided and the two-way kind, are sliding FIPs, but only two-way CfDs "avoid[] excessive returns for investors and overcompensation from Member States in periods when market prices are high [...] and alleviate the pressure of high prices on consumer bills if the revenues are channelled back to consumers."[93]

Regarding the Parliament's reasons for accepting two-way CfDs, its written response to the Commission's proposal[94] does not provide any clues. Moreover, it remains completely unclear what could be "equivalent schemes with the same effects" that were included in the compromise text at the insistence of the Parliament, i.e. how such schemes are meant to differ from two-way

[90] Cf. Council of the European Union (footnote 55), p. 28.

[91] Cf. Council of the European Union (footnote 55), p. 44.

[92] Cf. European Commission (footnote 10), p. 5. Emphasis is the author's.

[93] Cf. European Commission (footnote 11), p. 28.

[94] That is, European Parliament (footnote 63).

CfDs or whether they are the same in all but name.[95] Likewise, the basis for the Council's acceptance of two-way CfDs is not documented in its general approach[96], so it is impossible to say whether the Council or the Parliament considered any alternatives to two-way CfDs or whether they (blindly) followed the Commission's lead.

3.3.2. Suitability of two-way CfDs – the economic perspective

However, by definition alone, and without any further investigation, it seems safe to expect that a two-way CfD can indeed fulfil the objective of limiting market revenues for renewable (or other clean) energy projects, so the Commission seems right in its assessment that a two-way CfD can be considered a suitable instrument to prevent or at least limit windfall profits.[97] So, while the choice of instrument seems to make intuitive sense, it is neither really clear how the Commission came to select this particular instrument over possible alternatives, nor on which basis the Parliament or the Council decided to support the Commission's proposal. As a matter of fact, the academic and professional literature abounds with views on and suggestions for alternative ways to address windfall profits (and other shortcomings of the current market design that surfaced during the recent energy crisis).[98]

Part of the explanation why the Commission proposed two-way CfDs as the new default instrument for the public support of low-carbon, non-fossil fuel electricity generation (and, one might surmise, why the Parliament and the Council agreed) is that it is a known and proven instrument already widely in use in various Member States: In recent years, ca. 40-50% of all auctions (number of observations not weighted by capacity or investment volume) were based on two-way CfDs, about as many as those based on one-sided CfDs/sliding FIP, according to the Commission's research.[99] This probably made the proposal widely acceptable among Member

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[95] Also cf. footnote 59 regarding the verbal explanations of the Parliament's *rapporteur*, which were equally opaque.

[96] Cf. Council of the European Union, 'Proposal for a regulation of the European Parliament and of the Council amending Regulations (EU) 2019/943 and (EU) 2019/942 as well as Directives (EU) 2018/2001 and (EU) 2019/944 to improve the Union's electricity market design – General approach, document ID: 14339/23 (Brussels, 19 October 2023).

[97] According to the Commission, a large majority of respondents in its public consultation (60-70%) also shared this view; cf. European Commission (footnote 11), p. 23.

[98] Cf. ACER, 'ACER's Final Assessment of the EU Wholesale Electricity Market Design' (Brussels, April 2022), pp. 18-19 and 74-77; Löschel et al., 'Stellungnahme zum Strommarktdesign und dessen Weiterentwicklungsmöglichkeiten' (Expertenkommission zum Monitoring-Prozess 'Energie der Zukunft', Berlin/etc., February 2023), pp. 71-76, among others.

[99] Cf. Figure 5 in European Commission (footnote 11).

States and industry participants, whereas other (as-yet-unproven) schemes might have caused more concerns or opposition.

In addition to warnings of the European Union Agency for the Cooperation of Energy Regulators (ACER), among and others, regarding the possible impacts of the EU's reform plans on market fragmentation and liquidity[100], there are at least two more areas of concern arising from the final compromise text and the preceding analysis undertaken by the Commission. The first relates to the lack of clarity on the definition of the "excess remuneration" (leading to windfall profits) that is to be avoided by means of a two-way CfD, and the second relates to the lack of a proper (quantitative) impact assessment, as would usually be required for a legislative proposal from the Commission.

Regarding the first point, the amending Regulation provides very little clues and few details on how the two-way CfD schemes should be designed by Member States and how the Commission would assess their proposals. As mentioned before, the definition of a two-way CfD in number (76) merely states that it provides "a limit to excess remuneration", without specifying what counts as excess remuneration. This is clarified a bit by point (c) in paragraph 1a of Article 19b of the amended Regulation, whereby "the level of the minimum remuneration protection and of the **upward limit to excess remuneration** are **[to be] aligned with the cost of the new investment**, the market revenues *[sic!]*, **to guarantee the long-term economic viability of the power generating facility while avoiding overcompensation.**"[101] This clause, which was originally proposed by the Council, gives a general sense of the intended purpose of two-way CfDs, but remains too vague to serve as a blueprint for the design of such a scheme, not least because it is unclear how the half-sentence "..., the market revenues, ..." is to be construed in this context and because the term market "market revenue" is no longer defined in the compromise text, whereas the Commission had initially proposed adding a definition in number (78) of Article 2 (cf. Annex A1.2).

That aside, it seems reasonable to assume that what counts as "excess remuneration" will need to differ at least by technology and location, and will evolve over time. Thus, the point at which

[100] Cf. ACER, 'ACER's Final Assessment of the EU Wholesale Electricity Market Design' (Brussels, April 2022), pp. 55 and 75.

[101] Cf. Council of the European Union (footnote 55), p. 65. Emphasis is the author's.

"normal remuneration" will turn into "excess remuneration" will, in all likelihood, need to be determined at the level of the individual project and its specific costs and energy yield (power output), rather than at a general level. After all, it will be only at this level of granularity that the cost of the new investment and the required revenues (obtained or regulated through the two-way CfD) can be taken into account, and hence the long-term economic viability of the power generating facility be guaranteed, as required under point (c) of paragraph 1a.

As the information on these aspects is private and thus not known to a tendering or regulatory authority, the most likely way in which it will be *discovered* is through the process of competitive auctions, as already in place for the existing one-sided CfD (market premium) schemes. Through such auctions market participants (i.e. developers/operators of new renewable energy projects) need to disclose the level of support – e.g. in the form of one (*uniform*) or two (*collar*) strike prices – that they require to operate their project in an economically viable way. This kind of *price discovery* to overcome the inherent information asymmetries (where project operators have full knowledge of their costs, but public authorities do not) is a common element of – and key reason for – the competitive auctions that are nowadays the norm for renewable energy projects in Member States. In that sense moving from auctions for one-sided to two-way CfDs will be no revolution, but rather the continuation of an ongoing evolution. However, it is to be expected that the move to auctions for two-way CfDs will have far-reaching consequences for the bidding behaviour of market participants, something that will be investigated further in the next Subchapter (3.4).

3.3.3. Lack of a quantitative impact assessment

Regarding the second point mentioned before, it is striking that the Commission has not carried out the (quantitative) impact assessment (IA) that would usually be required for a legislative proposal of this kind. The Commission acknowledges the lack of an IA and justifies it with "the urgency of the [legislative] initiative"[102], referring to the SWD that was produced in its stead. Given the significance of the legislative proposal, it seems beyond doubt that, in line with the

[102] Cf. European Commission (footnote 10), p. 12.

applicable agreements and guidelines[103], such an IA would indeed have been preferable to the SWD, which raises at least two major concerns regarding the analytical quality of the Commission's preparatory work, which will be discussed below.

Even though the term "significant economic [...] or societal impacts" is not clearly defined in the Commission's guidelines on better regulation, it seems obvious that the expected revenues for Member States from the introduction of two-way CfDs mentioned before, which could grow to €13.5-18.0 billion in 2025 and €58.5-78 billion by 2035 (on the Commission's reckoning), must be considered to have significant economic and societal impacts, thus necessitating an impact assessment.[104] Next to the question of significance, an IA is only required if/when the Commission has a "choice between alternative policy options"[105], which *a priori* should be assumed to have existed. Thus, given that an IA was required (as also acknowledged by the Commission), it could only be replaced by an SWD if derogation was granted by the Commission's Secretariat-General[106], which seems to have been the case here, "due to the urgency of the policy initiative."[107]

However, against this backdrop, the available SWD gives rise to two methodological problems: Firstly, it is not clear to what extent the Commission has identified and investigated the "wide range of alternative policy options" (other than changes to the merit order principle and the introduction of two-way CfDs discussed in the SWD), as required by its own guidelines.[108] Secondly, it is unclear how the Commission has arrived at its quantitative cost estimates for the revenues to Member States mentioned before, as a clear explanation of how they have been

[103] Cf. Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on Better Law-Making [2016] OJ L 123/1, p. 4; European Commission, 'Commission Staff Working Document: Better Regulation Guidelines' (SWD(2021) 305 final, 3 November 2021).

[104] In this context, it is worth mentioning that when it comes to spending programmes, financial instruments and budgetary guarantees, the Commission considers spending more than just €5m as "significant" (cf. European Commission, 'Better Regulation Toolbox' (July 2023), Tool #9, p. 56). Thus, by analogy, the revenue amounts from two-way CfDs estimated by the Commission should be considered significant as well.

[105] Cf. European Commission, 'Better Regulation Toolbox' (July 2023), Tool #7, p. 42.

[106] Cf. European Commission, 'Better Regulation Toolbox' (July 2023), Tool #8, p. 49.

[107] Cf. European Commission (footnote 10), p. 12.

[108] Cf. European Commission, 'Better Regulation Toolbox' (July 2023), Tool #16, p. 113.

calculated is missing in the SWD, even though this would have been required by the guidelines.[109]

This lack of transparency on both fronts is problematic, given that the Commission's path to proposing two-way CfDs as the new *instrument of choice* thus remains somewhat opaque. Neither has it been documented which other policy options (i.e. instruments) were identified and investigated (if any), nor has the final choice of instrument (or any of its alternatives) undergone the necessary cost-benefit analysis – or (at the very least) that cost-benefit analysis has not been presented in the necessary detail in the SWD, as would be required to ensure the proportionality of the measure is assured. This is of concern as other policy options could indeed have existed[110], and as the quantitative estimates for expected revenues could turn out to have been overly optimistic, given the actual experience from inframarginal revenue caps implemented by Member States during 2022/23.[111]

3.4. How is the introduction of two-way CfDs likely to influence future investment and operating decisions of producers of renewable electricity?

In its simplest form, a two-way CfD will set a strike price that fixes the achievable sales price for a renewable energy project at a certain level, thus eliminating both *upside potential* and *downside risk*, i.e. of revenues exceeding or falling short of the expected *base case*. This sets the investment case under a two-way CfD apart from that under a one-sided CfD, where the project owner's base case will include such *upside potential* in some way (depending on his level of risk aversion and market price expectation).[112] As a two-way CfD restricts the possibility of actual revenues

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[109] Cf. European Commission (footnote 11), p. 7.

[110] For instance, in a study for the ITRE committee, the *Bruegel* institute also addressed the lack of an impact assessment and mentions that a range of alternative policy options existed that the Commission did not evaluate thoroughly; cf. Conall Heussaff, 'The Design of the European Electricity Market' ('Shaping EU climate and energy policy: Insights from and questions for the Ariadne project' conference, Brussels, 5 December 2023) <https://ariadneprojekt.de> (last accessed 21 June 2024), pp. 14-17. In addition, Bruegel pointed out several practical challenges that could arise from implementation of the Commission's reform proposals; cf. Georg Zachmann, 'Der Strommarkt-Reformvorschlag der Europäischen Kommission' (2. Sitzung des Plenums der PKNS, virtual, 8 May 2023) <www.bmwk.de>, pp. 31-37.

[111] In Germany, for example, windfall profits of approximately 9bn EUR could be collected from inframarginal generators during the period 12/2022-06/2023 (final numbers not yet available), when this element of the StromPBG was in force (see footnote 159). This was below earlier estimates. Cf. BMWK, 'Erste Zahlen zur Überschusserlösabschöpfung nach Strompreisbremsengesetz vorgelegt' (Berlin, 18 August 2023) <www.bmwk.de> (last accessed 21 June 2024).

[112] However, it is important to note that the actual revenues – and ultimately the project's profitability – will not only depend on the sales price for the generated electricity, but also other factors, such as the amount of electricity produced, which may vary from year to year, depending on resource availability, technical performance, and other factors.

exceeding the revenues stemming from the support scheme (e.g. market premium or FIT), it should be immediately clear that the investment case would differ fundamentally between both CfD schemes. Thus, assuming that the CfD design is known ex-ante, introducing two-way CfDs should intuitively lead to different investment decisions when compared to those under one-sided CfDs.

3.4.1. Impact of two-way CfDs on investment decisions

In order to test this hypothesis and to assess the likely impact of the introduction of two-way CfDs on the investment behaviour of clean electricity generators, a simple quantitative model was developed and used to simulate a number of hypothetical cases based on one-sided or two-way CfDs. The modelling results allow a number of important observations and conclusions, which will be briefly presented next.

The financial model is based on a hypothetical onshore wind energy project. In order to analyse the effect of different CfD schemes, the model allows simulating different power price scenarios and different project lives. Keeping everything else equal, the model allows calculating strike prices and project revenues (which, for simplification, are considered equal to consumer costs) under a one-sided versus a two-way CfD, leading to the following main results.[113]

Firstly, the investment behaviour and auction outcomes are unlikely to differ much in case of low (2.5% p.a.) or no (expected) electricity price increases over the lifetime of the hypothetical onshore windfarm modelled for illustrative purposes. In order to achieve the target rate of return (assumed as 7.5%), project developers would bid similar strike prices on the assumption that the investment case for their project would be entirely based on the revenues stemming from the strike price (i.e. market price plus premium from CfD), as market prices would not exceed the strike price in case of a 20-year business case. If bidders were to assume a 30-year project life, bid prices would be lower overall (due to the additional market revenues generated in operating years 21-30), but would again be almost identical between the two CfD schemes (given the assumed electricity prices). In this case, the total cost to consumers would not differ significantly (if at all) between a one-sided and a two-way CfD scheme.

[113] The quantitative model as such, its underlying assumptions and the full set of results are presented in detail in Annex 2.

Secondly, the investment behaviour and auction outcomes will likely differ considerably in case of higher (expected) electricity price increases (i.e. 5% p.a.) over the lifetime of the hypothetical onshore windfarm. In this case, project developers would bid very different strike prices depending on the prevailing CfD scheme in order to achieve their target rate of return of 7.5%. Thus, for a 20-year project life, the strike price would be around 9% higher in the case of a two-way CfD compared to a one-sided CfD as the project operator in this case would not be able to benefit from rising power prices and earn additional market revenues. Therefore, the bid price would need to be higher in order to achieve the same target rate of return as in the case of a one-sided CfD with additional revenues from the market. However, despite the higher strike price under a two-way CfD, the total cost to consumers would be about 6% higher under a one-sided CfD, given that consumers would not only pay the strike price but also the higher (uncapped) market price. This first important finding suggests that focussing only on differences in the strike price could misleadingly suggest that a one-sided CfD scheme would be beneficial to consumers.

In the case of an assumed 30-year project life the difference between both CfD types is even more pronounced, suggesting that under *extreme* power price assumptions (with prices rising by 5% p.a., which is not unheard of) the investment behaviour and auction outcomes would diverge fundamentally. Thus, while the investment case for a project would be entirely based on the revenues stemming from the strike price under a two-way CfD during the first 20 years, under a one-sided CfD project operators would be expected to submit what is commonly referred to as *zero-subsidy bids*, where they bid a strike price of zero and fully base their investment case on (expected) market revenues. With power prices expected to increase so rapidly, the windfarm owner would not require a subsidy if he can benefit from these market prices. In this case, he could look forward to a rate of return nearly 20% higher than his target rate. However, whereas operating the project under a one-sided CfD would be beneficial to the project owner, the total cost to consumers would be about 16% higher under one-sided CfD scheme, given that they would need to pay market prices that are consistently above the strike price obtained under the two-way CfD scheme. This second important finding suggests that while zero-subsidy bids might look like a good deal for consumers, it is the price cap that comes with a two-way CfD scheme that would be more beneficial to consumers overall – at least if electricity prices rise steeply over time.

Thirdly, while the second finding already points at the shift in the balance of power from producers to consumers that is likely to arise from a move towards two-way CfDs, a fourth scenario underlines this point even more strongly – and conclusively. In this scenario, moderate electricity price increases (of 2.5% p.a.) are assumed (as in the first scenario before), but in addition, a drastic price spike (of 500% compared to the previous year and lasting for two years) is additionally considered in operating years 11 and 12 of the hypothetical windfarm. In the case of a one-sided CfD, this price spike would generate significant windfall profits for the project, lifting its actual rate of return above 10%, whereas with the revenue cap of a two-way CfD, increasing market prices would not be passed on to consumers and revenues (and profits) would be capped for the producer. In this case, the total cost to consumers would differ by around a quarter to a third between the one-sided and the two-way CfD schemes.

This result leads to the third important finding that two-way CfDs provide a suitable hedge against future energy (price) crises, by effectively shielding electricity consumers from this risk. However, while this seems true in all cases, one could argue that from an economic perspective (and possibly a legal perspective as well), the design of two-way CfD schemes should still allow for zero-subsidy bids where project owners bear the full market-price risk without any recourse to state support in case of lower-than-expected power prices. As shown, this would result in a 20% higher (expected) rate of return for a 30-year project life, but only in case the market price rises by the assumed 5% p.a., whereas at lower price increases (of 2.5% or even 0% p.a.), the rate of return actually achieved would fall far short of the target rate (as no market premium would be paid despite the low market prices). At the same time, with revenues based only on (lower-than-expected) market prices, the total cost to consumers would be considerably lower (up to 20%) than under a two-way CfD scheme, meaning consumers would benefit more directly from such lower prices.

In summary, the modelling undertaken thus suggests that two-way CfD do restrict/constrain windfall profits/excess remuneration in case of drastically increasing power prices (but only then), even though a lack of zero-subsidy bids might suggest otherwise. At the same time, the higher (expected) rate of return in case of zero-subsidy bids would seem justified as operators

bear the full price risk[114] due to lack of subsidy element (with the auction providing just a *licence to operate*[115]). This implies that zero-subsidy bids should still be allowed (effectively outside the usual two-way CfD scheme), but that two-way CfDs are generally beneficial from a consumer perspective – and fulfil their core purpose of providing them with a suitable hedge against future price crises.

3.4.2. Impact of two-way CfDs on operating decisions

In addition to the changed investment – and thus bidding – behaviour addressed in the preceding section, operating decisions of project operators are likely to differ with two-way CfDs as well. While this aspect cannot be modelled easily, a qualitative assessment suggests that with the unavailability of *market upside*, project operators can no longer expect to generate additional revenues from their active participation in the electricity market. Thus, whereas they should have an incentive to align their generation as much as possible with demand (and hence market prices), the incentives provided by such *scarcity pricing* (with market prices reflecting levels of demand and supply) could effectively disappear with price caps through a two-way CfDs, unless designed with a price band (or *collar*) that retains at least a certain incentive level. Otherwise, the result could be less active participation of renewable electricity generators in power markets and less market efficiency overall, which is certainly to be avoided.[116]

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[114] Companies bidding zero in an auction also bear the risk of the *winner's curse*, whereby they may have only been successful with their bid because they were overly optimistic in their price expectation, meaning their investment case may in hindsight prove to have been seriously flawed and doomed to fail. However, this entrepreneurial risk would be (adequately) rewarded through the higher-than-needed rate of return in case of a successful project operation.

[115] To date, such zero-subsidy bids have only been observed for offshore wind energy projects, where successful participation in an auction confers the right to build, own and operate an offshore windfarm in a specific location, whereas without such *licence to operate* realizing an offshore wind farm would not be possible. For onshore wind energy and other clean energy technologies without restricted access to suitable sites, zero-subsidy bids appear rather unlikely given that project promoters could operate their projects on a purely commercial basis, e.g. as a merchant project or based on a PPA, instead.

[116] This point is also acknowledged in the design principles set out in the amended Regulation, whereby two-way CfD (or equivalent) schemes shall be designed in such a way that projects "operate and participate efficiently in the electricity market" and that "operation, dispatch and maintenance decisions" are not distorted (cf. Article 19b (1a), subparagraphs (a) and (b)). However, arguably, the mostly variable clean energy technologies (except nuclear) addressed by the Regulation offer very little scope for flexible generation that can be aligned with fluctuating demand levels and their role is therefore overrated in the absence of cheap and abundant storage options. This means that the impact on operating decisions should be less of a concern.

3.4.3. Unequal treatment and lack of harmonisation in two-way CfD schemes

Several rules in the proposed Regulation are likely to affect investment and operating decisions and shape the renewable electricity market in future. While it is beyond the scope of this thesis to investigate all of these points in detail, they should still be mentioned at least briefly.

Firstly, this concerns the unequal treatment of different technologies and project types, which has multiple dimensions, as laid down in the amending Regulation. This concerns, *inter alia*,

- the distinction between existing generating facilities and investments in new generation facilities[117],
- the conclusive enumeration of technologies falling under the required two-way CfDs at the exclusion of all other technologies[118], and
- the possibility for Member States to exempt small-scale renewables installations and demonstration projects from two-way CfD schemes.[119]

Regarding the distinction between existing and new facilities, this clearly makes sense as there is a fundamental difference between retroactive changes to the support for existing projects, e.g. by imposing two-way CfDs on them (which is rightly barred under current rules[120]) and on changing the rules for new projects where the changed support scheme can be incorporated in the investment decision of project developers, assuming sufficient lead time is provided (more on this later). However, the Commission's original idea had been to include repowering, capacity expansions and lifetime extensions in the definition of "new investments", which would have made two-way CfDs compulsory for such investments as well. Instead, at the insistence of the Council, the compromise text now stipulates that "Member States **should be able to decide to**

[117] Article 19b (1), subparagraph 1

[118] Article 19b (2)

[119] Article 19b (4), which refers to Article 4 (3) of Directive (EU) 2018/2001

[120] Cf. Article 6 (1) of Directive (EU) 2018/2001.

grant support schemes in the form of [two-way CfDs] ...," i.e. that using two-way CfDs for such investments has become merely an option for Member States.[121]

From a technical and economic perspective, this unequal treatment of different types of new investments, i.e. so-called *greenfield* projects, where no other project existed before, and *brownfield* projects, where an existing project is repowered, expanded or extended, makes no sense. In both cases, the project owner will take a new investment decision based on the prevailing market circumstances (including the support scheme in place) and the different treatment of green- and brownfield projects might lead to unintended consequences, with promoters attempting to label greenfield projects as brownfield projects in order to benefit from the financially more attractive market premium (one-sided CfD) scheme available in this case, which would allow them to (potentially) make windfall profits. Furthermore, this reduces the reach of two-way CfDs by limiting the share of renewable electricity generation capacity covered by its revenue cap, and leads to further market fragmentation.

Regarding the distinction between technologies to be supported (predominantly) by two-way CfDs or by equivalent schemes (subject to the other distinctions), the original reasoning of the Commission has been retained throughout the trilogue, with the compromise text containing the same list of *mature* technologies (wind, solar and geothermal energy, *run-of-river* hydropower and nuclear energy) that the Commission had originally proposed.[122] What sets these technologies apart from those based on other energy sources are, as the Commission rightly argued, their (generally) low and stable operational costs and their missing ability to provide flexibility to the electricity system. Other low-carbon, non-fossil fuel generation technologies with higher marginal costs (e.g. due to fuel costs) or those able to offer flexibility to the electricity system, are to be excluded from the required two-way CfDs in order to assure their economic viability.[123] Even though this distinction segments the market further, it makes sense from an economic perspective, as the technologies outside the narrow list defined in the compromise text are indeed fundamentally different from a technical and economic perspective.

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[121] Cf. recital 35 of the amending Regulation. Emphasis is the author's. As explained before (cf. footnote 49), this substantial weakening appears to have been the result of the political compromise reached between Member States, including Germany and France, on the future support for nuclear power. With the compromise found, France (among others) seems free to support – and benefit from – its ageing fleet of nuclear reactors with other financial instruments than (just) two-way CfDs.

[122] Article 19b (2)

[123] Cf. recital 42 of the amending Regulation.

More specifically, while some of the technologies outside this *bucket* can be considered technically immature or at an early stage of their market development (and are thus excluded from two-way CfD schemes), the remainder either have considerably higher operating costs and/or can be operated in a flexible manner supporting the stable operation of the electricity system.[124] It is therefore technically and economically justified to exempt (demonstration and other) projects based on these technologies from the requirement for two-way CfDs.

In giving Member States the possibility of exempting small-scale projects (including those developed by renewable energy communities) from two-way CfDs, the amended Regulation[125] continues a distinction that by now is well-established in the relevant EU legislation as well as the Commission's State aid guidelines. Without analysing this point in detail, exempting such types of projects probably continues to be technically and economically justified given their additional complexity, and hence higher (relative) transaction costs for smaller projects (even though it segments the market yet further and can sometimes lead to *gaming* of the market rules). However, in this context, it is somewhat puzzling to note that the Parliament had in fact proposed to mandate the use of two-way CfDs *only for small projects* below a certain threshold, which was a nonsensical proposal not in line with the common approach.[126] This must have been an (obvious) mistake that was (rightly) corrected during the trilogue.

Moreover, investment decisions will be influenced by two more aspects that need to be mentioned at least in passing: The first aspect concerns the certainty and clarity on the design of future two-way CfD schemes that will be needed early enough before projects subject to such CfDs become operational, in order to enable project developers to incorporate this information when they bid for inclusion in the CfD scheme. Hence, the long transition phases foreseen in the amending Regulation (of three or even five years from its entry into force), as well as the requirement for Member States to put schemes in place well in advance (i.e. within six months from entry into force of the amending Directive) are needed.[127] Assuming that entry into force

[124] While the amended Regulation does not specify which technologies fall outside its narrow scope, Article 2 of Directive (EU) 2018/2001 contains a much broader definition of "energy from renewable sources", and hence technologies that can still be supported with one-sided CfDs (market premiums) or other types of direct price support schemes.

[125] Recital 42 of the amending Regulation as well as Article 19b (4)

[126] Cf. European Parliament (footnote 63), p. 21.

[127] Cf. recital 36 of the amending Regulation, Article 19b (1), subparagraph 2, of the amended Regulation and Article 3 (1) of the amended Directive.

of both the amending Regulation and the amending Directive occurs around mid-2024, Member States would need to have their revamped support schemes in place by the end of 2024, for them to apply from mid-2027/mid-2029, respectively. Arguably, this should give market participants sufficient time for the transition from one-sided CfDs to two-way CfDs.[128]

Finally, the second aspect concerns the possible lack of harmonisation of two-way CfD schemes between Member States. While the amending Regulation sets out a number of broad design principles that will need to be observed by Member States[129], the Regulation still leaves significant leeway for the specific design elements, meaning that such schemes must be expected to differ significantly across the EU. In principle, this variety of schemes is not new in the area of renewable energy support and may not be inherently bad from an economic perspective, as it allows Member States to experiment and reflect national circumstances in the design of their support schemes. However, too much variation between different schemes can lead to a very fragmented and intransparent market not aligned with the aims of the IEM. Therefore, the amending Regulation rightly foresees that the Commission will need to ensure at least a certain level of harmonisation when it assesses national schemes.[130]

3.5. Do two-way CfDs constitute a market intervention that contravenes the principles of the social market economy and the EU's single market from an economic perspective?

Unhindered competition is one of the core principles of the EU's social market economy, as are the legal protection of property and other fundamental rights.[131] In the same vein, its internal market for electricity is to be organised such that RES are integrated, competition is free and supply is secure.[132] In some quarters it has been argued that the Commission's proposals for

[128] In fact, one could argue that for some of the technologies concerned, e.g. solar photovoltaic projects, a lead time of such length would not even be required. Solar PV projects can be developed and implemented much more quickly than onshore, let alone offshore, wind energy projects, meaning the 2.5 years of advance notice may be excessive in their case and unnecessarily restrict the reach of future two-way CfD schemes.

[129] Article 19b (1a)

[130] Article 19b (1b)

[131] Article 3 (3) TEU

[132] Article 1 (3) Directive (EU) 2019/944

two-way CfDs would contravene these central tenets of the single market.[133] This claim will therefore be investigated from an economic perspective in this last subchapter of Chapter 3, before revisiting the issue from a legal perspective in the next chapter.

Setting aside the political-economy aspects of the criticism levelled at the Commission's CfD proposal, the following four economic and legal arguments (or *allegations*) from critics are worth looking at.

3.5.1. Allegation I: Risk to competition in the single market

The Commission's original proposal and the compromise text agreed in the trilogue acknowledge the importance of a well-functioning (electricity) market and of safeguarding competition, by calling for the design of two-way CfDs to "avoid undue distortions to competition and trade in the internal market [...]".[134] The amending Regulation further requires that the "remuneration amounts [under two-way CfDs] [are determined] through a competitive bidding process that is open, clear, transparent and non-discriminatory."[135] Therefore, the allegation that a move to two-way CfDs would create an obstacle to the competitive functioning of the IEM seems misplaced, or at least it cannot be said with certainty that competition will be restricted through their introduction. Instead, whether two-way CfDs will restrict the reign of the *free market* more than one-sided CfDs do will depend very much on the specific design determined at Member State level, as the amending Regulation merely spells out the broad outlines for which the Commission will need to devise more detailed design parameters and assessment criteria (most likely in the form of updated State aid guidelines).

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[133] For instance, the German Liberal Democrats (FDP) claimed (before the Commission's proposal was published) that "CfDs put competition in the single market in danger; they are a planned economy in all but name. […] What we need is more market economy. The single market will be hit hard by the shockwaves in case the EU allows CfDs." Their opposition to the possible introduction of CfDs was explained by a possible decoupling of market prices from the cost of energy and an undermining of the merit order and scarcity pricing, which would lead to less flexible power prices and less efficient operation by electricity generators. According to the FDP's spokesperson for energy policy, the Commission's upcoming proposal was supported by the Green party's minister for economic affairs and climate action, only for "ideological reasons" and to siphon off profits from offshore wind energy projects. (Cf. Florian Güßgen, 'FDP greift Grüne wegen EU-Strommarktreform an', *WirtschaftsWoche* (Düsseldorf, 30 January 2023) <www.wiwo.de> (last accessed 21 June 2024); original quote translated by the author).

[134] Cf. especially recital 41 of the amending Regulation as well as Article 19b (1a), subparagraph (d), of the amended Regulation.

[135] Article 19b (1a), subparagraph (d)

3.5.2. Allegation II: Move to a planned economy

As explained previously, there are good economic reasons to publicly support electricity generation from RES as the *free and unfettered* market left to its own devices would not produce a socially optimal outcome (cf. section 3.2.1). Correcting for market failures through state interventions will therefore not create a planned economy as long as these interventions are targeted, proportional and limited to what is strictly needed to address these market failures. Based on the analysis presented before, the reform proposal meets this requirement – i.e. the introduction of two-way CfDs (or equivalent schemes) will narrowly tackle the potential windfall profits for certain technologies resulting from a future energy price crisis, and the cost thereof borne by consumers, instead of throwing out the baby with the bathwater, as it were, by fundamentally redesigning the electricity market based on marginal prices and the merit order. Wisely enough, this was left untouched by the Commission proposal and the trilogue agreement, which is good for efficiency in the electricity market as price signals to producers and consumers are retained. Therefore, the EMR now underway is far from moving to a planned economy and instead ensures a fairer balance of risks and rewards between producers and consumers. In fact, one could argue that with one-sided CfDs, this balance was heavily tilted in favour of producers as what they benefitted from so far was, effectively, an insurance (against decreasing prices) for which they did not need to pay an insurance premium. With two-way CfDs this is now being corrected, thus strengthening a fundamental principle of the social market economy.

3.5.3. Allegation III: Decoupling of market prices from the cost of energy and wrong incentives for expansion of RES-E

By sticking with the merit order principle and scarcity pricing, the reform proposal does not tinker with the fundamental workings of the IEM. However, what it does – as explained before – is to provide a certain amount of decoupling of electricity prices for consumers from the prevailing wholesale market price (through subsidies), but only in certain circumstances (i.e. during a declared "electricity price crisis") and tightly restricted in its scope in order not to distort the price signal too much.[136]

[136] While not the focus of this analysis, it is useful to refer readers to the relevant section in the accompanying SWD (cf. section 6) and Article 66a of the amended Regulation.

In fact, while market revenues for clean energy projects are to be capped through two-way CfD schemes (or equivalent), the reform explicitly aims to ensure that they continue to participate in the electricity market as before.[137] Moreover, the reform aims to ensure that "the level of [remuneration is] aligned with the cost of the new investment"[138], which achieves the decoupling of (market) prices from the generation costs of inframarginal generators while leaving the merit order (and thus a single *market clearing price*) in place. Thus, the decoupling achieved is wholly intentional and indeed fully justified by the more efficient functioning of the electricity market, while not distorting the price signals needed for the flexible operation of power plants.

3.5.4. Allegation IV: Taxing windfall profits especially from offshore wind

The avoidance of windfall profits for "low carbon, non-fossil fuel technologies, with low and stable operational costs"[139] is a key objective of the reform proposal. Whether it is specifically targeted at offshore wind energy projects, as alleged, is hard to say and actually unlikely, given the much larger capacity installed in the other technologies, such as onshore wind and solar energy. Thus, what is to be avoided in future through two-way CfDs is a repeat of windfall profits accruing to renewable energy generators during another electricity price crisis, whereby increasing natural gas prices would translate into increasing wholesale electricity prices that would in turn translate into excess remuneration for technologies whose generation cost have not changed. As was explained before, this is more a political than an economic argument (as it has nothing to do with efficiency in the electricity market as such) and could be seen as a rebalancing of the split between consumer and producer rents. This addresses the question of the political acceptability of price spikes and of a *fair* balance between the needs of producers and consumers (rather than of market design/outcomes), hence reducing the political risk of retroactive changes to the support scheme (and thus the investment risk of producers) – which, as the reform proposal rightly argues, is clearly needed to make the energy transition a success.

While a concrete definition of what constitutes "excess remuneration" leading to windfall profits is lacking in the compromise document (as mentioned), the general idea (as understood) seems reasonable enough. Indeed, in principle any revenues (strike price) above the *base case* at the time

[137] Cf. Article 19b (1a), subparagraphs (a) and (b), of the amended Regulation.

[138] Article 19b (1a), subparagraph (c)

[139] Recital 42 of the amending Regulation

of the investment decision could be considered excess remuneration and clawing it back would be no problem for (perceived) investment risk if the CfD terms are known ex-ante (cf. section 3.4.1). Therefore, as long as the two-way CfD schemes are put in place ahead of time (and not changed retroactively), this mechanism should not cause any concerns.

3.6. Summary and conclusions

As explained earlier, the energy (price) crisis of 2021/22 and the European Green Deal explain the need and justification for the EMR now underway in the EU. The concrete reform proposals put forward by the Commission, and since adopted by Parliament and Council, raise many important economic questions, four of which have been addressed in this chapter. While important and useful in its own right, this chapter also lays the foundation for the legal analysis that follows in Chapter 4.

To fully decarbonise the European electricity sector, direct price support schemes for RES-E projects need to continue for the foreseeable future (cf. section 3.2.1). However, the recent energy crisis has highlighted weaknesses in existing market premium schemes and exerted enormous political pressure to claw back windfall profits for the benefit of electricity consumers and taxpayers. At times, there were calls for very drastic design changes that could have resulted in abolishing or replacing the merit order principle; in addition, many Member States introduced price caps and clawback schemes for windfall profits. If the crisis showed one thing, it was that mitigating the political and economic risks from future market upheaval and balancing the interests of producers and consumers better necessitated changes to current support schemes, particularly to market premium (or one-sided CfD) schemes (cf. section 3.2.2).

While the Commission makes a convincing case when arguing that reforms to existing support schemes are necessary, the EU's executive does not explain well why two-way CfDs are the preferred solution (or indeed, seemingly, the only available solution). Neither do the EU's co-legislators, Parliament and Council, explain why they followed the Commission's lead and accepted two-way CfDs (or equivalent schemes) as the new *gold-standard* for supporting RES-E (cf. section 3.3.1).

The reason for why the choice has fallen on two-way CfDs can probably be found in their widespread adoption in a growing number of Member States, making them a known and proven

instrument. Yet, despite their prevalence at Member State level the reform proposals leave many important terms and design elements – such as the central one of what constitutes "excess remuneration" – not clearly defined, which is good and bad at the same time. Good, as it provides Member States with the necessary flexibility in implementing such schemes according to their needs and national circumstances; bad, as the European electricity markets risks fragmentation through diverging CfD designs (cf. section 3.3.2).

The lack of a proper impact assessment is problematic as well: In its preparation of the reform proposals, the Commission neither seems to have weighed costs and benefits properly, nor to have analysed possible alternatives to two-way CfDs. (Or, at the least, it has not provided the necessary transparency on these points.) Likewise, the Commission's estimates for Member States' revenues from two-way CfDs lack transparency (cf. section 3.3.3).

Since two-way CfDs differ fundamentally from market premium schemes in their risk/reward profile, investment decisions under two-way CfD schemes should be different from those under one-sided CfD schemes. This can be seen in the results of the quantitative model developed for the purpose of testing this hypothesis under different assumptions. For operating decisions this is less clear, as it very much depends on the detailed design of such scheme, and modelling such operating decisions was left to future researchers. Regarding investment behaviour, the model shows the expected effects of the introduction of two-way CfDs on bidding decisions; furthermore, some interesting insights emerge from the quantitative analysis (cf. section 3.4.1):

(1) A focus on strike prices may be misleading, as total costs to consumers are what matters.

(2) Whether zero-subsidy bids are beneficial depends on the perspective (consumers vs. producers) and the evolution of wholesale power prices. All things considered, the analysis suggests that zero-subsidy bids – understood as a licence to operate, rather than financial support – should remain possible.

(3) Finally, two-way CfDs seem to provide an effective hedge against future energy (price) crises and their economic and political fallout.

Depending on the design of two-way CfDs, efficiency in the electricity market could suffer in theory (provided less incentive is given to producers to consider demand fluctuations). However, since variable RES (such as wind and solar; *VRE* for short) are mostly non-dispatchable in

practice, the practical impact of two-way CfDs on operating decisions is likely to be rather limited in the absence of cheap and abundant storage options (which would need to be embedded in VRE projects for demand/supply considerations to be internalised by operators). Thus, while operating efficiency needs to be considered as a design element for such schemes, it should be of lesser concern than other aspects (cf. section 3.4.2).[140]

Among these is the lack of harmonisation and equal treatment between projects, technologies and operators within and across Member States foreseen in the EU's EMR. This could lead to undesired market fragmentation and reduced liquidity in the (renewable) electricity market; however, much of this unequal treatment may be justified by technical, economic or legal considerations – with the possible exception of the differentiation between green- and brownfield projects, which seems to be mainly the result of political considerations (cf. section 3.4.3).

While the initial reform proposal from the Commission was fiercely criticised by some commentators for infringing on fundamental rights and the central tenets of the single market, upon closer analysis these allegations appear to have been largely unfounded or at least premature (e.g. concerning their impact on competition). Far from moving to a *planned economy*, the introduction of two-way CfDs as now envisaged is unlikely to have a negative impact on price signals and an efficient electricity market. Instead, avoiding – or at least reducing – windfall profits in future reduces costs for consumers and investment risk for producers going forward, which brings about a change that should be beneficial to both sides (cf. Subchapter 3.5).

Overall, the economic analysis presented in this chapter suggests that moving to two-way CfDs (or equivalent schemes) represents a balanced and reasonable reform that should be able to achieve its stated policy aims without imposing undue costs on producers or consumers. Rightly, the EU has abstained from more radical changes to the fundamental workings of its IEM, which had been called for by many when electricity prices approached – and then exceeded – €1,000 per megawatt hour, as these would have produced unintended (negative) consequences.

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[140] In this conclusion, this analysis disagrees in an important way with that of other researchers, e.g. Löschel et al. (footnote 98), by finding that two-way CfDs are a useful instrument to better balance risks and rewards between producers and consumers of clean electricity, not least because their impact on actual operating decisions is likely to be minor. However, this analysis agrees with others (including Löschel et al.), that – as always – *the devil is in the detail*, meaning any future support schemes need to be designed well to work well.

Chapter 4

LEGAL ANALYSIS OF TWO-WAY CFDS FOR RENEWABLE ENERGY PROJECTS IN THE EU

4.1. Introduction

As was mentioned before (cf. section 2.2.1.2), the Commission's original proposal of March 2023[141] set out the legal basis for the proposal, how it complied with the subsidiarity principle and why the Commission considered the envisaged measures and instruments to be proportional. It also explained the choice of instrument of an amending regulation (which will now be complemented by an amending directive), which is all fine and well.

However, the Commission's explicit legal reasoning remained limited to just 3.5 pages, with only half a page dedicated to the (possible) impacts of its proposals on various fundamental rights. Even though these are clearly named, a proposal of potentially far-reaching consequences certainly merits a closer look that goes beyond the Commission's rather blunt summary that "to the extent that the proposed measures limit the exercise of these [fundamental] rights [i.e. the freedom to conduct a business and the right to property], these impacts are considered necessary and proportionate to achieve the objectives of the proposal and therefore constitute legitimate limitations of such rights as allowed under the Charter [of Fundamental Rights of the EU]."[142]

Therefore, following on from the descriptive analysis of the EMR process in Chapter 2 and the economic analysis presented in Chapter 3, this chapter focuses on a number of legal aspects arising from the compromise text agreed in the trilogue, as well as its genesis (to the extent that it helps in the legal analysis). More specifically, in this chapter the four legal research questions that were set out in the introductory Chapter 1 will be addressed in detail. Additional aspects that have arisen from the descriptive and economic analyses of the reform proposal are considered in passing, wherever this is useful for the wider legal analysis.

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[141] That is, European Commission (footnote 10).

[142] Cf. ibid, p. 14.

The remainder of this chapter will be organised along the four leading research questions in Subchapters 4.3 to 4.6, which are followed by a short summary and key conclusions in Subchapter 4.7.

4.2. Problematic lack of definitions

However, before looking at the four key research questions in more detail, it is important to address one point that concerns the entirety of the EU's reform proposal, namely a lack of clearly defined terms and concepts that can give rise to (legal) ambiguity and hence uncertainty for investors, regulators and other stakeholders – as well as legislators and *mandarins* in Member States needing to transpose and implement the necessary reforms. Here it seems crucial that the Commission fills these terms and concepts with life when it updates its State aid guidelines; alternatively, it will be for the courts to make sense of the legislators' intent and understanding of them. While by no means a complete list, a definition of the following terms and concepts would be of particular importance for the introduction of two-way CfDs, especially if schemes are to be at least broadly harmonised across the 27 Member States.

Focussing on Article 19b of the amended Regulation, the following terms are used in the reform proposal without adequate definition in the Regulation, elsewhere in primary or secondary EU legislation or the State aid guidelines of the Commission (CEEAG):

- Regarding Article 19b (1), whereas "direct price support schemes" are an established term already used – and broadly defined – in the Renewable Energy Directive (RED)[143], what is meant (exactly) by "investments in new power-generation facilities" is not defined in the amended Regulation. However, recital 35 refers to "new [low-carbon, non-fossil fuel] electricity generation-facilities" as falling under the scope of Article 19b. Recital 35 then goes on to suggest that Member States should be able to include "new investments aimed at substantially repowering existing power generation facilities, or at substantially increasing their capacity or prolonging their lifetime," suggesting these kinds of investments fall outside the narrow definition of "investments in new power-generation facilities" used in Article 19b (1). However, it needs to be acknowledged that,

[143] Cf. Article 2, point 5, and Article 4 (3) of Directive (EU) 2018/2001.

with the definition only included in the recitals, strictly speaking this important term remains undefined.

- In the same subparagraph of Article 19b (1), the terms "two-way contracts for differences" and "equivalent schemes with the same effects" also remain undefined. As regards the former term, point (76) of Article 2 of the amended Regulation provides a short definition, but this definition introduces several new terms that are equally undefined, among them "power generating facility operator", "minimum remuneration protection" and "excess remuneration". While this is problematic, as the definition only sets out a broad definition that could be interpreted very differently by different parties, the lack of any definition at all of the latter term could prove disastrous, unless its meaning and practical applicability are clarified by the Commission later on. For the time being, it remains absolutely obscure what such "equivalent schemes" could look like and how they would differ from two-way CfDs while still having the same effects.

- Equally unclear is the term "offshore hybrid [asset] projects" in the second subparagraph of Article 19b (1), which is also mentioned, *inter alia*, in recitals (24) and (36), but nowhere defined as such. However, here one can at least surmise that such projects are (probably) meant to be understood as offshore wind energy projects straddling the border between two or more Member States (= "bidding zones"), but maybe something else entirely is meant here. This is simply not clear.

- Likewise, Article 19b (1a) point (c) is not clearly worded either. While the intention to avoid "overcompensation" (i.e. windfall profits) through two-way CfDs is clearly stated, the wording and terminology as such are unclear, given the same – undefined – terms from point (76) of Article 2 are used here again. Moreover, the insertion "..., the market revenues, ..." added by the Council to point (c) does not make it any clearer, but rather adds confusion on how the asked-for alignment between "the cost of the new investment, the market revenues," and the guaranteed remuneration level of the two-way CfD can be ensured, or what is even meant by it.

- Here it would certainly have helped if the definition of "market revenues" originally proposed by the Commission in point (78) of Article 2 had not been deleted in the

compromise text. This would have defined "market revenue" as the "realised income an electricity producer receives in exchange for the sale and delivery of electricity in the Union, regardless of the contractual form in which such exchange takes place, and excluding any support granted by Member States." To the outside observer it remains unclear why the Council asked for (and secured) the deletion of this definition.

- Next to note is that whereas in Article 19b (1), first subparagraph, it is "investments in new power-generating facilities" that are being referred to, in the second subparagraph as well as in Article 19b (2) reference is made to "investments in new generation [of electricity]", which may or may not be intended as synonymous terms. Given the political wrangling in the Council on the possible support of nuclear power[144], the ambiguity thus introduced could be seen as problematic. However, if read in conjunction with the explanations provided in recital 35, it should be quite clear that the difference in wording between paragraphs 1 and 2 is probably due to sloppy craftsmanship rather than a hidden agenda (e.g. of France being able to siphon off funds from its fully written-off fleet of nuclear reactors, or to financially support upgrades and retrofits to nuclear power plants through the backdoor). In fact, no such backdoor is needed, as the right (but not the obligation) to support these activities is already given to Member States through the same recital.

- However, it is important to acknowledge that recital 35, and hence the legal terms and concepts spelled out in it, is not legally binding as such, of course, but rather helps in the interpretation and implementation of Article 19b. This important caveat extends to the other terms contained in this recital, such as "**substantially repowering** existing power generation facilities, or at **substantially increasing** their capacity **or prolonging** their lifetime", as well as the "revenue guarantee" mentioned earlier in the same recital. The same holds for other terms and concepts introduced in recital 41, among others, for example: "**injection-based** contracts for difference with one or several **strike prices**, a

[144] Cf. footnote 49.

floor price, or **capability or yardstick** contracts for differences,"[145] which are all undefined in the amended Regulation and in EU law.

All this is legally and economically problematic as the EMR is to be implemented (primarily) through the amended Regulation, which will be directly applicable across the EU. While the Regulation is clear that it will be for Member States to put in place the secondary legislation (in the form of national laws) to establish two-way CfDs in line with the design principles established through the amended Regulation, legal scholars interpreting those national laws and assessing their coherence with EU legislation will need to fall back on the Regulation and its (lack of proper) definitions.

4.3. Do two-way CfDs constitute a market intervention that contravenes the principles of the social market economy and the EU's single market from a legal perspective?

After finding that the introduction of two-way CfD schemes proposed by the EU was very much aligned with the principles of the EU's social market economy and its single (electricity) market from an economic perspective (cf. Subchapter 3.5), this question shall now also be looked at from a legal perspective. In order to do this, the two concepts will be broadly defined and described first. This will be followed by the subsumption of the main elements of the proposed two-way CfDs under these concepts, in order to assess whether the proposed market intervention contravenes their core principles.

4.3.1. Compliance with the principles of the social market economy

Article 3 (3) of the Treaty on European Union (TEU) refers to "a highly competitive social market economy" as one of the goals of the EU's single market, without defining the term in any way. The origins of the social market economy lie in the German term *soziale Marktwirtschaft*, which was coined nearly 80 years ago by post-war Germany's first Minister of Economic Affairs and later chancellor, Ludwig Erhard, and Alfred Müller-Armack, a German economics professor, in order to set the German economic model apart from the competing concepts of both a

[145] Emphasis is the author's.

capitalist free market and a planned economy.[146] From Germany, the term then entered the European vocabulary, both at Member State level and at the pan-European level.[147]

Subsequently, the term entered the EU treaties through the Treaty of Lisbon (which came into force in 2009), by being added to the revised TEU as Article 3 (3). In contrast to the German Basic Law, which does not prescribe a certain economic model, the social market economy is thus enshrined as the EU's economic model of choice.[148] However, and maybe surprisingly, EU law – and jurisprudence – so far have stayed mostly mum on how this goal is to be interpreted, and how it is to be attained – particularly where it could conflict with other goals of the EU.[149]

In fact, "the EU Court of Justice, which can clarify the provisions of the Treaty that the legislators left without content, neither uses the reference to the social market economy goal as an argument, nor defines it in its judgments in terms of content and related measures. The European Commission seems to be more responsive in this regard, but only at a general level. It explains the aim of Article 3 (3) TEU as being an expression of the need for balance and sustainability of the model that is Europe's own and that is based on two complementary pillars: 'on the one hand, the enforcement of competition, and on the other, social policy measures to guarantee social justice by correcting negative outcomes and bolster[ing] social protection.'"[150] Thus, the concept remains very abstract and poorly defined which makes it impossible to assess in concrete legal terms whether the EMR currently underway complies with the overarching ambition of establishing a social market economy. In abstract terms, however, one could argue that the rebalancing of the costs and benefits between producers and consumers that underlies the instrument of two-way CfDs (or equivalent schemes) seems well-aligned with this principle.

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146 Cf. Christian Joerges and Florian Rödl, "Social Market Economy' as Europe's Social Model?' (2004) EUI Working Paper LAW No. 2004/8, as well as Nils Goldschmidt and Michael Wohlgemuth, 'Social Market Economy: origins, meanings and interpretations' (2008) 19 Const Polit Econ 261, which offers an entertaining history (and multiple conflicting accounts) of the term's origins in German economic policy. Terhechte, 'Wettbewerbsfähige soziale Marktwirtschaft' (in: Das Recht der Europäischen Union, Werkstand: 80. EL August 2023) provides a comment in German.

147 Cf. Claassen et al., 'Rethinking the European Social Market Economy: Introduction to the Special Issue' (2019) 57 JCMS 3.

148 Cf. Nils Goldschmidt and Michael Wohlgemuth, 'Social Market Economy: origins, meanings and interpretations' (2008) 19 Const Polit Econ 261.

149 Cf. Václav Šmejkal, 'Competition law and the social market economy goal of the EU' (2015) 1 ICJ 33.

150 Cf. ibid, p. 33.

4.3.2. Compliance with the principles of the internal electricity market

Fortunately, the EU's IEM is more clearly defined and circumscribed, thus helping to predict the likely outcomes of a legal interpretation of the social market economy principle by the courts. Given that they form part of secondary EU law, the IEM Regulation[151] and the IEM Directive[152] shed light on the co-legislators' goals in the realm of the single electricity market, thus supplementing and specifying the general market principles set out in the EU treaties as primary law.

Among other goals, the IEM Regulation aims to "(a) enabl[e] market signals to be delivered for increased efficiency, higher share of RES, security of supply, flexibility, sustainability, decarbonisation and innovation" and to establish "(b) well-functioning, integrated electricity markets, which allow all resource providers and electricity customers non-discriminatory market access, [...] demand response, [...] and enable market and sectoral integration and market-based remuneration of electricity generated from renewable sources."[153] While it is beyond the scope of this analysis to look at these goals in detail, it is important to note that many of them are competing aims, e.g. as concerns the goal of an increasing share of RES that may be hampered by the aim to have their remuneration based (only) on the market.

More generally, the proposed two-way CfDs certainly seem to broadly comply with the aims of the IEM Regulation (to the extent that these are not mutually exclusive or contradictory). However, they could somewhat dampen the price signal from the wholesale electricity market, especially as regards the operating phase of low-carbon generation facilities (cf. section 3.4.2), which was also flagged as a *necessary evil* by the Commission. In order to mitigate the risk to the efficient functioning of the electricity market from the price caps put in place through two-way CfDs, the amended Regulation requires that they are designed in such a way that "incentives for the gener-

[151] Regulation (EU) 2019/943 on the internal market for electricity (recast) [2019] OJ L 158/54

[152] Directive (EU) 2019/944 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast) [2019] OJ L 158/125

[153] Article 1 of Regulation (EU) 2019/943

ating facility to operate and participate efficiently in the electricity markets, in particular to reflect market circumstance"[154] are preserved, thus aligning them with the general aims of the IEM.

In the same vein, Article 3 of the IEM Regulation sets out a large number of principles that are to be observed in the operation of European electricity markets. Here, it seems useful to reproduce and analyse how the proposed two-way CfDs would comply with these principles (with the analysis limited to those principles that are of immediate relevance to the question at hand):

- *"(a) prices shall be formed on the basis of demand and supply":* While this principle is observed as just described at the level of the wholesale electricity market, the price signal will be somewhat dampened through the revenue cap newly put in place through two-way CfDs. However, in broad terms this seems to be a worthwhile trade-off, given the benefits to consumers arising from this cap.

- *"(b) market rules shall encourage free price formation and shall avoid actions which prevent price formation on the basis of demand and supply":* Same conclusion as under (a) above. Additionally, it is worth noting that strike prices for two-way CfDs will also form on the basis of demand and supply, as electricity generators will need to participate (and succeed) in competitive auctions before they can benefit from the minimum remuneration protection provided by the two-way CfD. Therefore, free price formation will, ideally, occur at two stages in a project's life – before investment decision and during the operating phase.

- *"(c) market rules shall facilitate the development of more flexible generation, sustainable low carbon generation, and more flexible demand":* This principle relates to the preceding two principles, as flexibility of generation and market prices to remunerate flexible generation are two sides of the same coin. Thus, while the Commission's reform package also addresses the flexibility of generation in later parts (which are beyond the scope of this analysis), it can be argued that two-way CfDs could potentially (and somewhat) dampen the incentives to make generation more flexible. However, as mentioned before, there is only limited technical scope for the technologies concerned to become more flexible (in the absence of electricity storage).

[154] Article 19b (1a) point (a) of the amended Regulation

- *"(f) market rules shall enable the decarbonisation of the electricity system and thus the economy, including by enabling the integration of electricity from renewable energy sources and by providing incentives for energy efficiency":* Both this principle and the preceding one should be supported by the introduction of two-way CfDs, as they provide long-term certainty on revenues by fixing the strike price(s), thus reducing the risk of retroactive changes to the support scheme to claw back windfall profits. Hence, investment risk is reduced and incentives to invest are increased (ceteris paribus).

- *"(g) market rules shall deliver appropriate investment incentives for generation, in particular for long-term investments in a decarbonised and sustainable electricity system, energy storage, energy efficiency and demand response to meet market needs, and shall facilitate fair competition thus ensuring security of supply":* This principle overlaps with and in many ways repeats the preceding principle and the conclusion there holds true here as well.

- *"(k) all producers shall be directly or indirectly responsible for selling the electricity they generate":* This principle should not be affected by the introduction of two-way CfDs as the obligation to market renewable electricity will remain with project owners.

- *"(l) market rules shall allow for the development of demonstration projects into sustainable, secure and low-carbon energy sources, technologies or systems which are to be realised and used to the benefit of society":* This principle should not be affected by the introduction of two-way CfDs as Member States are free to exempt demonstration projects from two-way CfDs.[155]

- *"(m) market rules shall enable the efficient dispatch of generation assets, energy storage and demand response":* This principle overlaps with and in many ways repeats the preceding principles and the conclusions there hold true here as well.

- *"(n) market rules shall allow for entry and exit of electricity generation, energy storage and electricity supply undertakings based on those undertakings' assessment of the economic and financial viability of their operations":* Subject to successful participation in tenders for two-way CfDs, free entry into the scheme should be of no concern. Additionally, clean energy projects could also

[155] Article 19b (4) of the amended Regulation

enter the electricity market as such in other ways, e.g. on the basis of PPAs or on a purely merchant basis, as participation in a two-way CfD scheme is to be made on a voluntary basis.[156] However, regarding free exit, the Commission and Member States need to ensure in their design of the guidelines and the national instrument, respectively, that the required "penalty clauses applicable in the case of undue unilateral early termination of the contract" take into account this requirement. Hence, they should be restricted to the (intended) case of "early termination of the contract by the producer, with the aim of avoiding that producers opt-out from the contract in periods of high prices where they would have been obliged to pay-back the revenues above the contract strike price,"[157] rather than to include cases where a project becomes technically, economically or financially unviable for other reasons.

- *"(o) in order to allow market participants to be protected against price volatility risks on a market basis, and mitigate uncertainty on future returns on investment, long-term hedging products shall be tradable on exchanges in a transparent manner and long-term electricity supply contracts shall be negotiable over the counter, subject to compliance with Union competition law":* Although not strictly applicable to two-way CfDs, one can certainly argue that the general spirit of this principle is strengthened by their introduction. As two-way CfDs are designed to reduce price volatility for producers and consumers, they will mitigate uncertainty on future investment returns and they will be freely negotiable (in terms of the strike prices) between producers and off-takers. Clearly, legislators had other hedging instruments in mind when they worded this principle (e.g. forwards and futures contracts), but the general idea holds also in the case of two-way CfDs.

While the IEM Regulation sets out the principles for the EU's IEM, the IEM Directive has little to offer in terms of rules and principles of direct relevance to the introduction of two-way CfDs. In this field, the IEM Directive merely states the general aims of "a smooth transition towards a sustainable low-carbon energy system" and of increasing "the integration of electricity from renewable sources [...]."[158] Arguably, a trade-off similar to the one described in the conflicting

[156] Article 19b (1), subparagraph 3, of the amended Regulation

[157] Cf. European Commission (footnote 11), p. 33.

[158] Article 1 (1) and (3) of Directive (EU) 2019/944

goals of the Regulation exists here as well, but in general terms one should expect that two-way CfDs do not contravene, and possibly support, these two aims.

4.3.3. Practical implications of aligning two-way CfD schemes with single market principles

The lack of a proper definition of the "excess remuneration" for clean energy projects that is to be limited through two-way CfDs (or equivalent schemes) was discussed several times already (including in sections 3.3.2, 3.5.4 and Subchapter 4.2). In the context of alignment of these schemes with the principles of the social market economy and the IEM this could become problematic as well, for the reasons explained before. In order to ensure that producers operate on a level playing field, a fair degree of harmonisation of the concept of "excess remuneration" will be required, while leaving it to Member States to specify in more detail what levels of remuneration they would consider *excessive* per project, technology, location, and point in time. How difficult it will be to devise and implement such rules in practice could be observed during the recent energy price crisis, when Member States struggled to appropriately define the level of remuneration at which windfall profits would start to arise and be taxed accordingly under Council Regulation (EU) 2022/1854 on an emergency intervention to address high energy prices.[159]

Another issue concerning the level playing field, or rather a lack thereof, has to do with the limited reach of the obligation to enter two-way CfDs, which was already discussed before (cf. section 3.4.3). The fact that two-way CfDs may be limited to certain investments in new power-generating facilities, after long transition periods and only on a voluntary basis[160] could inevitably conflict with the principle of fair competition enshrined in the IEM Regulation. In fact, as was explained before, it would appear that the balance struck in the inherent trade-off between a fully-level playing field and the goal of safeguarding investment incentives (and keeping investment risk as low as possible) may not be optimal, as the carve-outs concerning the types of investments falling under the CfD-requirement (e.g. for repowering projects) cannot be justified by technical or economic differences, but rather seem to come down to political reasons.

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[159] Cf. Council Regulation (EU) 2022/1854 (footnote 34), p. 1. A good point in case is the German *electricity price break law* (Strompreisbremsegesetz, StromPBG) of 20 December 2022 which was highly contested and bitterly fought over by the affected producers, including through two pending legal challenges before the Federal Constitutional Court, cf. section 4.5.2.

[160] As stipulated in Article 19b (1), subparagraphs 1-3, of the amended Regulation.

4.4. Is the EU's EMR proposal consistent with current EU legislation and case law, particularly on the promotion of renewable energy?

Separate from, but of course linked with, the preceding question are the matters of alignment with existing EU legislation and case law that will be addressed next.

4.4.1. Impact of introduction of two-way CfD schemes on fundamental rights

According to the Commission's legal assessment of its reform proposal, a number of fundamental rights established by the Charter of Fundamental Rights of the EU could be impacted. First and foremost, these are the freedom to conduct a business (Article 16) and the right to property (Article 17), but other fundamental rights could be affected as well.[161] However, as mentioned in Subchapter 4.1, the Commission did not provide details on its assessment of the proportionality of the proposed measures; instead, it stated rather bluntly that "these impacts are considered necessary and proportionate to achieve the objectives of the proposal."[162] It therefore appears necessary to carry out a somewhat more rigorous analysis of the rights that could be negatively affected and the proportionality of limiting them through two-way CfDs:

- Freedom to conduct a business (Article 16): While the Charter recognises "the freedom to conduct a business", this freedom may be limited through "Union law and national laws and practices." However, such limitation would be subject to the principle of proportionality, whereby "limitations may be made only if they are necessary and genuinely meet objectives of general interest recognised by the Union or the need to protect the rights and freedoms of others."[163] On which basis the Commission arrived at the conclusion that this freedom is not unduly restricted was not documented. However, it seems safe to assume that the slight limitation of this freedom brought about by the shift from one-sided to two-way CfDs was considered proportionate to achieve the stated aims of rebalancing risks and rewards from the further expansion of low-carbon technologies for producers and consumers (whose economic interests will be advanced, cf.

[161] The Commission considers the following rights to be positively impacted by the reform proposal as a whole: "Respect for private and family life (Article 7), the right to protection of personal data (Article 8), the prohibition of discrimination (Article 21), access to services of general economic interest (Article 36), the integration of a high level of environmental protection (Article 37) and the right to an effective remedy (Article 47)"; cf. European Commission (footnote 10), p. 14.

[162] Cf. European Commission (footnote 10), p. 14.

[163] Article 52 (1) of the Charter on Fundamental Rights of the EU

footnote 161 and section 3.4.1). Here – and also in case of the right to property (see next) – it thus makes a huge difference that the terms of (future) two-way CfDs will be known ex-ante and participation in them is made voluntary (with many other options, or *routes-to-market*, remaining for project owners in case they find the CfD-terms unacceptable), which restricts the limitation of the right as much as possible.

- Right to property (Article 17): While the Charter recognises "the right to own, use, dispose of and bequeath his or her lawfully acquired possessions", this freedom may be limited when this is "in the public interest [or] necessary for the general interest."[164] Again, the principle of proportionality applies. Clearly, and in a similar vein to the preceding freedom, retroactive changes to the public support for operating projects, e.g. by imposing two-way CfDs on generators or by introducing windfall taxes or ex-post cuts to market premiums would be very problematic. In contrast, making changes (only) to the support scheme for future projects should not infringe on the right to property at all in case there is a sufficiently long transition period.[165] This seems to have been the reasoning of the Commission as well, which distinguished between existing and new generation facilities for this very reason.[166]

- Equality before the law (Article 20): Whereas there are no major concerns on the proportionality of the (restricted) limitations to the above fundamental rights, it is more difficult to determine whether "everyone is equal before the law"[167] in case of two-way CfD schemes under the amended Regulation: Whereas treating existing and new projects differently appears justified and necessary (not least for the reasons just explained), differentiating between different kinds of new projects (i.e. greenfield vs. brownfield) could turn out to be very problematic from a legal perspective. For instance, there is no obvious technical or economic reason why a repowering project (where, say, a brand-

[164] The right to property also applies to legal persons; cf. Jarass GrCh, 4. Aufl. 2021, EU-Grundrechte-Charta Art. 17, para. 16.

[165] Whether the transition period of 3-5 years foreseen in the amending Regulation would be sufficient in all cases is another matter, of course, as it depends on the specific circumstances of the individual project. However, in general it seems long enough if judging by the time usually needed for renewable energy project development and implementation. For nuclear power this could be very different, however.

[166] Cf. section 2.2.2 and European Commission (footnote 11), pp. 33-34.

[167] This right also applies to legal persons; cf. Jarass GrCh, 4. Aufl. 2021, EU-Grundrechte-Charta Art. 20, para. 7.

new onshore wind farm replaces an older one) should be able to benefit from the upside potential (for revenues) of a one-sided CfD (market premium), whereas a greenfield project of similar cost and complexity would be obliged to participate in a two-way CfD scheme. This unequal treatment could be challenged in court unless legislators in Member States (or the Commission in its State aid guidelines) explain its justification better. Similar, but less severe, concerns could be voiced regarding the other exceptions foreseen in the amended Regulation (for technologies and small-scale and demonstration projects, respectively; cf. section 3.4.3).

Ultimately, it would fall to the European Court of Justice (ECJ) to judge whether the above freedoms have been unnecessarily or disproportionately limited by the changes brought about through the EU-wide introduction of two-way CfDs. While it is impossible to predict how the ECJ could rule in such a case (not least because this would depend on the specific circumstances of the case), legal precedent suggests that the limited changes brought about by the introduction of two-way CfDs at EU level are unlikely to be found unlawful. In fact, whereas the ECJ has on several occasions pointed out that equal treatment and the protection of legitimate expectations (*Vertrauensschutz*) of project developers are important general principles of law[168], in other cases it has ruled that these rights do not extend *ad infinitum*.

Instead, the Court has found that "Articles 16 and 17 of the Charter of Fundamental Rights of the European Union, read in the light of the principles of legal certainty and of the protection of legitimate expectations[] must be interpreted as not precluding national legislation which provides for the reduction or delay of the payment of incentives […], where that legislation concerns incentives for which provision has previously been made but which are not yet due." In the same ruling, the ECJ also recalled precedent "that future income cannot be considered to constitute 'possessions' that may enjoy the protection of Article 17 of the Charter unless it has already been earned, it is definitely payable or there are specific circumstances that can cause the person concerned to entertain a legitimate expectation of obtaining an asset."[169] Thus, changes

[168] See, for instance, Case C-470/20, paragraph 30, and Case C-11/22, paragraphs 2 and 31.

[169] See, for instance, Joined Cases C-798/18 and C-799/18, paragraphs 39 and 72. In this context, it will also be interesting to see the outcome of the pending Case C-148/23, in which the Court will again rule on the legality of retroactive changes to an existing support regime for renewable energies in Italy.

to the financial support scheme at EU level should also be allowed as long as they come with sufficient advance warning and are not applied retroactively.

4.4.2. Implementation of reform proposal through amendments of the IEM Regulation and the Renewable Energy Directive

As explained previously, the Commission's initial proposal had been for a single amending regulation that would have changed two existing regulations on the IEM (Regulation (EU) 2019/943) and ACER (Regulation (EU) 2019/942), as well as two existing directives on the promotion of RES (Directive (EU) 2018/2001) and the IEM (Directive (EU) 2019/944).[170] Regarding the introduction of two-way CfDs, the relevant amendments to Regulation (EU) 2019/943 and Directive (EU) 2018/2001 would have been introduced through Articles 1 and 3, respectively, of the amending Regulation.

However, at the request of the Council, the proposed amendments to the directives were split from the amending Regulation and moved to a self-standing directive.[171] While this split may improve the legal certainty and clarity of the amendments (which were the stated rationale[172]), this split leads to considerable duplication in the recitals and possible overlaps and ambiguities in the legal treatment of the subject matters at the heart of the reform process.

However, what is most striking (and possibly counter-intuitive) is the fact that the introduction of two-way CfDs (or equivalent measures) at EU level will take place mostly through the amendment of the IEM Regulation, rather than through an amendment of the RED. To date, Regulation (EU) 2019/943 stays mostly mum on the support for RES, leaving it to the RED to define on which terms such sources may be supported with public funds. Thus, one could have expected that the *system change* now underway should have been implemented through a much more comprehensive amendment of Directive (EU) 2018/2001, rather than the short cross-reference to the (amended) IEM Regulation added to its Article 4 (3).

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[170] Cf. European Commission (footnote 10), p. 11.

[171] Cf. Council of the European Union (footnote 96), p. 74.

[172] Cf. Council of the European Union (footnote 55), p. 3.

In all likelihood, the explanation for this seeming legal muddle can be found in the fact that the reform proposal not only intends to introduce two-way CfDs for many kinds of renewable energy projects (which could have been implemented through a revision of the RED), but also paves the way for the financial support of nuclear energy, as desired by some Member States (cf. section 2.2.2).[173] Thus, a better place had to be found for the introduction of two-way CfDs (or equivalent schemes), which seemingly *just happened* to be the IEM Regulation as this regulation was being revised anyway. Joking aside, this is a paradigm shift that may lead to further fragmentation of the legal landscape regarding RES, which could prove to be problematic later on. Furthermore, other elements introduced through same Chapter IIIa of the amended Regulation (of which Article 19b on two-way CfDs is but one part), such as those on PPAs (Articles 19a and Article 19ab) and on EU level measures to promote renewables (Article 19ac), potentially could also have been placed (exclusively) in the RED due to their subject matter, had it not been for the inclusion of nuclear energy in Article 19b.

4.4.3. Necessary revision of State aid guidelines to implement two-way CfDs at Member State level

In addition to the need for amendments to existing regulations and directives discussed before, implementing two-way CfDs or equivalent measures with the same effects at Member State level will, in all likelihood, require a revision of the State aid guidelines of the Commission (CEEAG). It is in these guidelines that the Commission has set out more detailed criteria for the direct price support schemes currently envisaged by the RED, which are to be designed as "a market premium, which could be, inter alia, sliding or fixed."[174] Maybe surprisingly, such a revision is mentioned neither in the amending Regulation nor the initial Commission documents. Such reference to the CEEAG is only made in recital 49 of the amending Regulation, but this relates to the design of capacity mechanisms, not the promotion of low-carbon power generation. Otherwise, neither the original proposal of the Commission nor its SWD mentioned the need for amending the CEEAG explicitly (cf. section 2.2.2).

[173] Cf. recital 35 of the amending Regulation and Article 19b (2), point (e), of the amended Regulation, as well as European Commission (footnote 11), p. 16.

[174] Cf. Article 4 (3) of Directive (EU) 2018/2001.

Realising that there was a need for such guidelines to ensure the harmonised implementation across the EU, the Parliament (cf. Annex A1.1) did include wording in its amendment of the proposed Regulation that would have called for "the Commission [to] draw up guidelines on the implementation of two-way contracts for differences to assist Members States on their establishment."[175] However, this suggestion was not taken onboard during the trilogue negotiations.

Nevertheless, it seems necessary for the Commission to update its State aid guidelines in order to reflect the mandatory switch from one-sided to two-way CfDs (at least for certain types of generating facilities) that underpins the EMR. At present, the CEEAG already foresee "limits to profitability and/or clawbacks linked to possible positive scenarios"[176], thus giving Member States the possibility to restrict windfall profits or excess remuneration in their market premium schemes – but so far there exists no obligation to do so. Thus, in order to align the CEEAG with the requirement for two-way CfDs, a change to this clause would be needed. While the State aid guidelines already mention (two-way) CfDs as a possible support instrument[177], their definition regarding the use for low-carbon, non-fossil fuel electricity generation-facilities may need to be revised and strengthened as well, in order to make clear in which cases two-way CfDs (or equivalent schemes) are compulsory.

Before moving on to the next research question, a final point to note regarding the CEEAG concerns their requirement that "incentives must not be provided for the generation of energy that would displace less polluting forms of energy."[178] The Commission gives several important justifications for this requirement and even though nuclear energy is not mentioned, it could be argued that financial support for it may be prohibited under the current State aid guidelines. The reasons for this high-level assessment include the possible curtailment of RES, which may increase due to the operation of inflexible, *must-run* nuclear power plants, as well as the lock-in of technologies using "low-carbon fuels from non-renewable sources and energy carriers that do not emit at the tailpipe but are produced in a carbon-intensive process"[179], which may include

[175] Cf. European Parliament (footnote 63), p. 54.

[176] Cf. European Commission (footnote 47), para. 90, p. 32.

[177] Cf. European Commission (footnote 47), para. 121 and footnote 69, p. 38.

[178] Cf. European Commission (footnote 47), para. 126, p. 38.

[179] Cf. European Commission (footnote 47), para. 127 and footnote 72, p. 39.

nuclear fuel (i.e. uranium). While this question merits further investigation, it is beyond the scope of this thesis.

4.5. Would the introduction of two-way CfDs (disproportionately) impair the basic rights of German renewable electricity producers?

Once (and only once) Member States have transposed the amending Directive into national laws, designed their two-way CfD (or equivalent) schemes and passed the required legal acts (laws, ordinances, etc.) to fully implement the amending Regulation at national level, will these be open to public scrutiny and legal challenges (in case deemed necessary by the affected parties). The following analysis, which uses Germany as a case study, is therefore based on the current status of the reform process and the design principles and guardrails contained in the EU's legal acts that are close to being – but currently not yet – finally adopted by the Council. This is an important caveat as the legality of two-way CfDs in Germany (and those in other Member States) will be determined on the basis of its national laws, first and foremost, and compliance with EU law would be assessed by the ECJ only as a second step, and only if deemed necessary.[180] Thus, the following analysis can give but a first indication, which will need to be followed up with a more detailed assessment later on.

4.5.1. Possible impact of introduction of two-way CfD schemes on basic rights

While it is *early days* regarding the implementation of two-way CfDs (or of equivalent schemes with the same effects), as just explained, the broad outlines of any future law and/or ordinance to put in place such a scheme are already known, of course. Thus, on the assumption that Germany will not deviate from the outlines set out in the amending Regulation and Directive, one can test this hypothetical legal act against the rights enshrined in Germany's Basic Law.[181]

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[180] Cf. Wimmer et al., 'Effizienzvorgaben für Gebäude im EU-Recht und Heizungsvorgaben im Gebäudeenergiegesetz - Vereinbarkeit mit der Eigentumsgarantie nach Art. 14 Grundgesetz' *Stiftung Umweltenergierecht* (Würzburger Studien zum Umweltenergierecht, Nr. 34), pp. 21-23. While this addresses the German Buildings Energy Act (*Gebäuderenergiegesetz*, GEG) with which Germany has *pre-emptively* transposed some key elements of the forthcoming EU's Energy Performance of Buildings Directive (COM(2021) 802 final), the adoption of the amending Regulation and the transposition of the amending Directive related to two-way CfDs should be considered in an analogous manner.

[181] In the following analysis the German Basic Law's English translation of Tomuschat et al., < www.gesetze-im-internet.de/englisch_gg/>, will be used (last accessed 21 June 2024).

Given the similarity of the fundamental rights established by the Charter and the basic rights enshrined in the Basic Law, it seems safe to assume that the conclusions drawn in section 4.4.1 will also hold, *grosso modo*, in Germany. However, even at this early stage it is possible to carry out a more concrete, albeit preliminary, analysis of the basic rights that could be negatively affected, and of the proportionality of limiting them, through two-way CfDs:

- Personal freedoms (Article 2): The Basic Law stipulates that "[e]very person shall have the right to free development of his personality [...]."[182] This is commonly understood to include the freedom to undertake economic activities, such as entering into contracts (or not) and what to produce and how (including price-setting), and may be "interfered with only pursuant to a law."[183] Thus, the legislator is free to limit this right subject to constitutionality.

- Equality before the law (Article 3): The requirement that "[a]ll persons shall be equal before the law"[184] is commonly understood to include the right to competition on equal terms, implying a role for the state to establish and safeguard the level playing field for economic actors.[185]

- Occupational freedom (Article 12): While "[a]ll Germans shall have the right freely to choose their occupation or profession [...], [t]he practice of an occupation or profession may be regulated by or pursuant to a law."[186] Thus, the legislator is free to limit this right subject to constitutionality.

- Right to property (Article 14): Likewise, "[p]roperty [...] shall be guaranteed." However, "[its] content and limits shall be defined by the laws." Moreover, "property entails obligations. Its use shall also serve the public good."[187] Thus, the legislator is free to limit

[182] The personal freedom also applies to legal persons (including foreign ones); cf. Article 19 (3) of the Basic Law.

[183] Article 2 (1) and (2) of the Basic Law

[184] Article 3 (1) of the Basic Law

[185] The right to equal treatment also applies to legal persons (including foreign ones); cf. Article 19 (3) of the Basic Law.

[186] Article 12 (1) of the Basic Law. This right does not extend to foreigners (including foreign legal persons); however these can demand equal treatment under Article 3 (1) of the Basic Law.

[187] Article 14 (1) and (2) of the Basic Law

this right subject to constitutionality. In so doing, he must weigh the right of the individual against the interest of the public.

Even though possible infringements of these basic rights would need to be analysed separately in a detailed investigation of their legality, at this early stage in the legislative process it seems useful to look at them in combination for two reasons. Firstly, as long as the detailed clauses of a German law on two-way CfDs are not known, it is impossible to assess their constitutionality in concrete terms. Secondly, that assessment would follow the same established principles, irrespective of the basic right concerned. Hence, in undertaking a high-level review of the legality of infringing upon (i.e. limiting) these four rights, it should be possible to lump them together.

Subject to the same conditions set out in section 4.4.1, namely the avoidance of retroactive changes to direct price support schemes and sufficiently long transition periods, it should be possible to change the support scheme for RES currently in place in Germany without impairing the rights enshrined in Articles 2, 12 and 14 of the Basic Law in a way that could be found unconstitutional. In accordance with Article 20 (3) of the Basic Law, this would ensure that the principles of legal certainty and of the protection of legitimate expectations are observed. Additionally, proportionality[188] would need to be ensured, as in the case of Union law, which seems achievable if German legislators do not deviate materially from the European *blueprint*. Similarly, infringements of the right to equal treatment (Article 3) cannot be ruled out in case Germany opts to treat different kinds of projects and technologies differently (as will be possible under the amended Regulation), for the reasons explained in section 4.4.1. In this case, it will be even more important that the principle of proportionality is adhered to, which means any such differences in treatment must be justified and explained very well.

4.5.2. Legal precedent from Germany's Federal Constitutional Court

How Germany's highest court would (probably) rule should a case against two-way CfDs be brought before it can be gleaned from the recent precedent of two constitutional complaints against certain changes to the Offshore Wind Energy Act (*Windenergie-auf-See-Gesetz,* WindseeG), which came into force on 1 January 2017.[189] The Act brought about a fundamental change in the

[188] Cf. footnote 18.

[189] Order of 30 June 2020 in the Joined Cases 1 BvR 1679/17 and 1 BvR 2190/17

way offshore wind energy projects are approved in Germany and how the rights to operate offshore windfarms are allocated among market participants. The complainants, who had developed (or were in the process of developing) such offshore windfarms, took offence at these changes, claiming that several of their constitutional rights had been violated.

More specifically, and mirroring the preliminary assessment presented in the preceding section, complainants claimed rights violations related to Articles 2 (1), 3 (1), 12 (1) and 14 (1) and (3) of the Basic Law. Thus, it is very instructive to summarise the order of the Federal Constitutional Court as follows:

- With one exception, the Court found that the changes brought about by the Act were constitutional and the complaints, while admissible, thus "only in part well-founded."[190] More specifically, the Court concluded that regarding Article 2 (1), the personal freedoms of the complainants had been violated by the lack of a compensation regime for development work already undertaken in the legitimate expectation of a continuation of the previous legal order. Here, the Court found that the WindSeeG brought about "quasi-retroactive effects" that contravened the protections afforded by Article 2 (1) in conjunction with Article 20 (3) of the Basic Law. Therefore, the Court ordered the legislator to adopt a (tightly circumscribed) compensation regime for the benefit of developers affected by these quasi-retroactive effects.[191]

- Regarding Articles 12 (1) and 14 (1) and (3), the Court found that neither the occupational freedom nor the right to property of the complainants had been violated in an unconstitutional way. In the case of Article 12 (1) the Court found that, while the law interfered with the right of occupational freedom, the impairment was proportionate and thus constitutional. The Court further stressed the importance of maintaining existing provisions for operating offshore wind farms.[192] In the case of Article 14 (1), the Court

[190] Paragraph 73 of the order

[191] Paragraphs 157 ff. and 173 ff. of the order

[192] Paragraphs 89 ff. and 111 of the order

found that the law did not affect protected property rights, but rather the complainants' investments (in the form of development costs), which were not protected as such.[193]

- Finally, on the question of Article 3 (1), to the extent that its violation was claimed, the Court found that the principle of equal treatment had not been breached, as it was justified by the legislative aim. According to the Court, differentiation of projects on the basis of zones and clusters was the prerogative of the legislator in order to ensure the economic expansion of offshore wind energy and planning certainty.[194]

Regarding the admissibility of the constitutional complaints, the Court found that these were not precluded by the supremacy of Union law. This finding was based on the fact that the WindSeeG did not (merely) implement the exact letter of Union law, but was, rather, a bespoke legal act unique to Germany. Furthermore (and for the same reason), the Court stated that it did not consider the question of whether one of the claimants' position that his legitimate expectation (as protected by EU law) had been violated as relevant.[195]

While the above order of the Federal Constitutional Court holds important lessons regarding the constitutionality of a future two-way CfD scheme in Germany, two other cases still before the Court can be expected to be at least as informative. These concern the retroactive introduction of a windfall tax on certain renewable energy producers during the energy crisis.[196] In all likelihood, the rulings will, when they come, again underline the strong protections of legitimate expectations and other basic rights for existing projects. Thus, the legality of retroactive changes to an existing support regime for renewable energies would, most probably, be looked at by the Court in a fundamentally different way from one that would only affect new investments. In the case of two-way CfDs such retroactivity is not foreseen by the EU.

[193] Paragraphs 74 ff. and 110 of the order

[194] Paragraphs 170 ff. of the order

[195] Paragraphs 72 and 168 ff. of the order

[196] Joined Cases 1 BvR 460/23 and 1 BvR 611/23 (cf. <www.bundesverfassungsgericht.de/EN/Verfahren/Jahresvorausschau/vs_2024/vorausschau_2024_node.html>, last accessed 21 June 2024).

4.6. How would the German Renewable Energy Act need to be amended in order to incorporate the EU's EMR?

Germany's Renewable Energy Act (*Erneuerbare-Energien-Gesetz*, EEG) will need to be overhauled in order to implement the EU's EMR.[197] So far, the EEG stipulates that electricity generation from RES is to be supported by one-sided CfDs, i.e. sliding market premiums.[198]

Before taking a closer look at the areas in which the EEG would need to be amended, it is important to mention that the EEG has been amended regularly since it came into being over twenty years ago, sometimes in minor and sometimes in major ways, in order to reflect changing market circumstances as well as changes in Union law. Thus, overhauling the EEG yet again in order to incorporate two-way CfDs would be in keeping with that *tradition*, and could coincide with other changes to the law's many provisions. As a matter of fact, the current version of the EEG (2023) already requires a proposal from the federal government on the financing of the further expansion of RES once the coal-phase-out has been completed (i.e. latest in the year 2038).[199]

The introduction of two-way CfDs will need to be implemented with this provision in mind and could occur in parallel with ongoing efforts to overhaul the design of the German electricity market more generally. However, while it is still unclear which changes will flow from the work of Germany's market design process under the auspices of the *Climate-neutral Electricity System Platform* (*Plattform Klimaneutrale Stromversorgung*, PKNS[200]) – and by when these will be promulgated in the form of changes to the laws concerned (e.g. EnWG, EEG) – the EU's amending Regulation and Directive that are likely to be adopted in the coming months will need to be transposed and implemented (likely) before the end of 2024 (cf. Subchapter 2.5). This will leave German lawmakers with precious little time to work out the details of two-way CfDs, and much besides, and one should hope they have started looking at this already.

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[197] Other German laws, such as its energy industry act (*Energiewirtschaftsgesetz*, EnWG) and the WindSeeG, will need to be amended as well, but are outside the scope of this analysis. As Germany has phased out the use of nuclear energy in April 2023, no amendments are needed for the support of this energy source.

[198] §§19 (1), 20 and 23a in conjunction with Appendix 1 of the EEG 2023

[199] Cf. §1a (3), sentence 2 of EEG 2023. It is important to note that the deadline for this proposal (31 March 2024) has lapsed without the federal government having submitted it.

[200] Cf. PKNS, 'Bericht über die Arbeit der Plattform Klimaneutrales Stromsystem (PKNS)' (April 2024), for a summary of the process, including discussions on two-way CfDs, up to April 2024.

After all, implementing two-way CfDs in Germany will require many decisions on the nitty-gritty design details mentioned in the preceding chapters, without which such schemes will not work and/or cause legal ambiguities, thus potentially holding back market development and giving rise to lawsuits.[201]

4.6.1. Changes required to the main body of the EEG 2023

With the exception of a few minor tweaks, next to nothing would need to be changed in the main body of the EEG in order to shift from the one-sided CfD scheme currently in place for most kinds of renewable electricity generation projects in Germany. In fact, the main articles that set out the requirement of a sliding market premium for most projects do not specify that such premium must necessarily be positive (or equal to zero).[202] As these articles do not put a constraint on the prefix of the market premium, it could be both positive (i.e. a premium paid out to the project) as well as negative (i.e. a clawback of *excess* remuneration). Rather, it is only in Appendix 1 that it is stipulated that the market premium may not be negative (see below).

However, some changes will also be required in the main body of the EEG, namely where the modalities under which the remuneration scheme can be changed are set out, in order to reflect the new requirement that operators must not terminate a two-way CfD in case market prices exceed its strike price.[203] Moreover, the specific conditions under which different technologies and project sizes (in terms of MW of installed capacity) are supported through market premium, FIT or nothing at all, will need to be amended. While the EEG 2023 already differentiates by technology (maturity), project capacity and investor background[204], this differentiation would need to be fully aligned with the amending Regulation and Directive (cf. Subchapter 2.4). Whereas the current requirements for participation in competitive tenders are already broadly aligned with the Regulation's criteria for projects subject to two-way CfDs in future, full align-

[201] Cf. PKNS (footnote 200), pp. 36-37.

[202] That is, §§19 (1), 20 and 23a of the EEG 2023.

[203] This mainly concerns §§21a-21c of the EEG 2023.

[204] §§22 ff. of the EEG 2023

ment will need to be ensured – and a decision made on whether to include brownfield projects as well (i.e. projects undergoing repowering, capacity-expansion and lifetime-extension).[205]

4.6.2. Changes required to Appendix 1 of the EEG 2023

As mentioned, Appendix 1 in conjunction with §23a of the EEG 2023 sets out the technical details of determining the market premium for the technologies covered by it, which includes the technologies mentioned in the amended Regulation (wind, solar, geothermal and hydro), but also some additional technologies (e.g. biomass and biogas) that are excluded from the requirement of two-way CfDs (or equivalent schemes). These technology lists thus need to be aligned when amending the appendix for the new world of two-way CfDs.

The other substantial amendment that is required in the appendix, which is also an important one, concerns its numbers 2 (regarding the applicable regime based on the start of operation of a project, allowing for the transition periods required by the amending Regulation and precluding retroactivity) and 4 (regarding the calculation of average market revenues for individual technologies). In number 2, concrete dates aligned with EU law would be needed. In number 4, the following changes to the definition and calculation method of the market premium would be required in order to incorporate two-way CfDs:

- Number 4.1.1: Decision on whether to keep the reference to annual market values (*Jahreswerte*, JW) in place or whether, for the purposes of two-way CfDs and alignment with the amending Regulation, another reference period should be defined (e.g. monthly market values *(Monatswerte),* as before).

- Number 4.1.2: In order to allow for a negative market premium (i.e. clawback), the second sentence in this number should be deleted. In this case, the remaining text would simply set out the formula for the market premium *(MP)* as being the result of the strike price *(AW)* less the market value *(JW)*, which could be positive, negative or equal to zero, thus: **MP = AW – JW, *where MP* $\gtreqless$ *0***.**

[205] A similar decision will be required in the case of the WindSeeG for offshore wind energy projects.

- Whether numbers 4.2 and 4.3 of the appendix would need to be amended as well will depend on the decision required already for number 4.1.1, which would need to be reflected here.

Overall then, implementing the necessary changes in the law would probably not lead to a major overhaul of the EEG 2023, but rather constitute a minor amendment (with potentially far-reaching consequences for the market). The larger challenge would be in deciding on the design aspects of the two-way CfD (or equivalent scheme), which would need to occur prior to amending the law as such (as mentioned before).

4.7. Summary and conclusions

The Commission's legal analysis and reasoning leading up to its reform proposals was very short, with only a few pages in its communication dedicated to the impact of the proposed reforms on fundamental rights. Likewise, it remains equally (if not more so) unclear if and how the Parliament and the Council have analysed the legal implications of the EMR and, particularly, the shift to two-way CfDs. The analysis presented in this chapter attempts to address this gap by looking at the reform proposal from the perspective of EU and German law, with Germany serving as a case study (cf. Subchapter 4.1).

As explained at the outset of the legal analysis, the lack of clear definitions of numerous key terms and concepts is very problematic as it could give rise to (legal) ambiguity and uncertainty. The Commission will need to define these terms and fill these vague concepts with life in the forthcoming update to its State aid guidelines to ensure their harmonised application across the EU; otherwise, it will be left to the courts to fill the void through the long-winded and uncertain process of new case law (cf. Subchapter 4.2).

While it is hard to assess if the instrument of two-way CfD is aligned with the principles of the social market economy (as enshrined in Article 3 (3) TEU), as the principle is only vaguely defined, the analysis carried out suggests such alignment is probably given (cf. section 4.3.1).

In contrast, the IEM is more clearly defined and the relevant legal acts can be used to assess the compliance of CfDs with the IEM's main principles, even though no clear hierarchy of aims exists. Since the concrete design of two-way CfDs is what will determine their impact on effi-

ciency in the IEM, it is impossible to definitively say now what that impact will be in future and in each Member State. However, given that the reform proposal mirrors the IEM's policy goals, the alignment between both legal acts seems broadly assured at a general policy level.

When looking at the IEM's main principles (set out in Article 3 of the IEM Regulation), the proposed two-way CfDs seem generally aligned with these principle. A possible exception is their likely impact on the flexible operation of power plants (which is technically difficult for VRE, e.g. wind and solar, as mentioned before) and hence efficiency in the electricity market. On the other hand, two-way CfDs are likely to significantly reduce the (political) risk of retroactive clawbacks, and hence to lower investment risk, price volatility and risk premiums, thus supporting several aims of the IEM. Finally, the "free exit" of operators stipulated in the IEM might be curtailed through two-way CfDs as proposed in the EMR; here, the Commission and Member States need to ensure that only early termination due to market prices is prohibited or penalised, whereas termination for other reasons should still remain possible (cf. section 4.3.2).

Since the reforms leave ample flexibility to Member States in how they design their two-way CfD schemes, ensuring a level playing field across the IEM might be challenging. Therefore, it will probably be necessary for the Commission to come up with detailed and fairly prescriptive State aid rules, to address the lack of harmonisation (or, rather, risk thereof) and of specific definitions in the amending acts (cf. section 4.3.3).

Regarding the fundamental rights enshrined in the Charter on Fundamental Rights of the EU, the high-level analysis carried out here (no closer analysis is possible at present) suggests that these will not be unduly impaired as long as changes to direct price support schemes are forward-looking only (i.e. not applied retroactively). However, differentiating between greenfield projects (that will need to accept two-way CfDs if they require public support) and brownfield projects (that can be treated differently if Member States so decide) could be very problematic, unless this unequal treatment is adequately justified, as also suggested by recent case law of the ECJ. In recent cases, the ECJ ruled more generally that limits exist to Articles 16, 17 and 20 of the Charter and "legitimate expectation" based thereon, but also found that retroactivity is (almost) always problematic (cf. section 4.4.1).

Strikingly, several crucial elements of Europe's future support regime for RES-E projects are moving from the RED to the IEM Regulation. This *tectonic shift* became necessary due to the inclusion of nuclear energy in the group of low-carbon technologies eligible for public support in the reform package. However, this shift might prove consequential for legal certainty and clarity, particularly for the support of renewable energy projects, by scattering the relevant legal framework among multiple legal acts (cf. section 4.4.2).

In order to mitigate this risk, but also to facilitate the harmonised implementation of two-way CfDs across the EU, the Commission's State aid guidelines will need to be updated (as already explained before). However, this need was not acknowledged in the amending laws of the reform package, even though the Parliament asked to include this as a Commission obligation in the amending Regulation. In the necessary revision of the CEEAG, main changes stemming from the EMR concern the design of two-way CfDs and the scope of the obligation to use this instrument, i.e. for which types of projects CfDs will be compulsory. In this context, the case of nuclear energy will also need to be considered in more detail, as current State aid guidelines might rule out direct price support for this energy source (cf. section 4.4.3).

In addition to looking at the legal implications of two-way CfDs at the European level, further – and very pertinent – legal questions will arise when the EU's reforms are implemented at the national level. Even though we are still some way from that point, it is already possible to analyse conformity of the EU's proposal with national laws today and this analysis is carried out for Germany as a case-study (cf. Subchapter 4.5).

On the assumption that Germany designs its two-way CfD scheme broadly in line with the EMR (i.e. without any major deviations) and the further details still to be determined by the Commission, it is possible to investigate compliance with the relevant provisions of Germany's Basic Law. This analysis leads to basically the same conclusions on the constitutionality of two-way CfDs in Germany as in the EU, which is not surprising given the similarity between basic rights in Germany and fundamental rights in the EU. Thus, the main basic rights concerned (enshrined in Articles 2, 12 and 14 of the Basic Law) should not be disproportionately impaired if the direct price support scheme is only changed for new projects with a sufficient lead time (in line with the principle of legitimate expectations). However, a question mark arises regarding compliance with the requirement of equal treatment (Article 3), but it is too early to say if the

unequal treatment foreseen in the amending Regulation will be proportionate as this depends on its detailed implementation and justification by German legislators (cf. section 4.5.1).

As at the EU level, legal precedent suggests that Germany's Federal Constitutional Court would probably come out in favour of two-way CfDs, assuming they would be legislated and implemented properly. A recent case decided by the court concerning offshore wind energy should be instructive in this regard, whereby the court ruled that there were clear limits to the principle of legitimate expectations, but that in case of legal changes with "quasi-retroactive effects" financial compensation could be required. Otherwise, the court found forward-looking changes to laws not to infringe disproportionately on basic rights, including occupational freedom, the right to property and equal treatment. This places strict limits on retroactive changes to existing rights but provides legislators with more room to curtail them in future (cf. section 4.5.2).

In order to implement the EMR in Germany, several laws will need to be amended, but the focus here has been on the central law for the promotion of RES-E, the EEG, whereas the analysis of other laws, such as those concerning on- and offshore wind specifically, was left to future researchers. As regards the EEG, it was found that this law will need to be overhauled soon irrespective of the EMR, based on the review clause in its Article 1a (3) as well as the on-going market design reform process at national level. Implementing and transposing the amending acts of the EMR will bring additional (time) pressure, particularly concerning the introduction of two-way CfDs, for which the necessary details and legal revisions will need to be hashed out and enacted likely before the end of 2024 (cf. Subchapter 4.6).

While only a few changes to the main body of the EEG will be required for the implementation of two-way CfDs (or equivalent schemes), further changes are needed in Appendix 1 to the EEG that sets out the detailed calculation method for the market premium. In the main body, the differentiation between project types (based on stage in project life, technology, size etc.) will need to be amended, in order to align the current differentiation of projects qualifying for FIT and market premium with the requirements of the EMR, and to introduce two-way CfDs as a new instrument. Additionally, the new category of brownfield projects will need to be included and defined.

Since the main body of the EEG is agnostic on the prefix of the market premium, there is no need to amend it in order to allow for a clawback of excess remuneration through a negative market premium, but Appendix 1 will need to be changed accordingly (see below). However, in order to discourage operators from – or even penalise them for – the early termination of the CfDs, the right to change from one remuneration scheme (two-way CfD) to another (direct marketing) must be restricted under certain conditions in future (namely in case of high market prices), which will require additional changes to the EEG (cf. section 4.6.1).

Finally, necessary changes to Appendix 1 of the EEG concern the lists of technologies that will fall under the obligation to enter into two-way CfDs (assuming they require direct price support) as well as the transition periods (of 3/5 years) that will need to be included in the appendix in order to align the EEG with the amending Regulation. Furthermore, the definition of the relevant reference price and reference period for the calculation of excess revenues under two-way CfDs will need to be included, and the existing formula for calculation of the market premium will need to be amended in order to allow for a negative premium (i.e. a clawback) in case the reference price exceeds the strike price of the CfD. While seemingly small in terms of changes to the wording of the EEG, these changes could possibly have a large impact on the RES-E market (cf. section 4.6.2).

Overall, the legal analysis presented in this chapter suggests that moving to two-way CfDs (or equivalent schemes) represents a sound and reasonable reform that should be found constitutional in case of legal challenges as it rebalances the interests of producers or consumers in a proportionate way. However, while such assessment seems possible at EU level, it remains unclear how individual Member States plan to implement these schemes in their jurisdictions. Thus, it is too early to evaluate whether their policies will be equally sound – but as the German case study has shown, this could well be the case if Member States stay close to the letter of the EMR proposals. Nevertheless, implementing this reform across the EU will bring with it many additional legal questions, and likely more than one court case brought by affected parties.

Chapter 5

OVERALL CONCLUSIONS, FURTHER RESEARCH AND EPILOGUE

5.1. Overall conclusions

In this rather sweeping review of the EMR currently underway, the economic and legal analyses presented in the preceding chapters addressed a number of connected research questions. Since the key findings and conclusions were already summarised at the end of each chapter (cf. Subchapters 3.6 and 4.7, respectively), they do not need to be repeated here. Instead, this final chapter shall connect the two chapters by highlighting the two most important findings of the interdisciplinary analysis conducted, before identifying scope for further research (see next subchapter) and then closing with a short epilogue on the status of the reform process reached on the submission date of this thesis (cf. Subchapter 5.3 below).

What emerges from the interdisciplinary analysis carried out over the last months, and as the EMR process was rumbling on, are two important findings: Firstly, the proposed reforms to the direct price support schemes for low-carbon electricity generation projects now envisaged (i.e. the roll-out of two-way CfDs – or equivalent schemes – across Europe) emerges as a sensible step that should help address the shortcomings of the current market design that were brought to light during the energy crisis of 2021/22. Instead of even more far-reaching reforms that had been called for at the peak of the crisis (such as abolishing the merit order principle or very intrusive price controls), the more limited reforms appear economically and legally justifiable, since they strike a reasonable and proportionate balance between the needs and rights of electricity consumers and producers, without unduly interfering with the proper functioning of the electricity market.

However, and secondly, it is important to mention that the above conclusion is but a first assessment of the current reform proposal, as negotiated and agreed in Brussels. This is an important caveat as many details required for a thorough economic and legal analysis of the full implications of the introduction of two-way CfDs are still lacking, both at the EU and the national level. Consequently, the jury on the EMR will be out for quite some time – i.e. until the legal

framework in the EU and individual Member States has been fully fleshed out and thus becomes fully analysable.

5.2. Further research

As mentioned throughout the previous chapters, further economic and legal analyses and research appear merited in a number of areas, which shall be listed here briefly. Firstly, this concerns an investigation of the impact of two-way CfDs on operating decisions and hence efficiency in the power sector, which was beyond the scope of the modelling exercise carried out in Subchapter 3.4. Secondly, definitions of additional terms and concepts that will (probably) be included in the upcoming revision of the Commission's State aid guidelines, should be investigated for their economic and legal implications, as should the updated guidelines – which will have to newly incorporate two-way CfDs (or equivalent schemes) – themselves. Thirdly, it should also be interesting to analyse in detail whether the inclusion of nuclear energy in the list of eligible technologies breaches current State aid guidelines, as explained in section 4.4.3. Fourthly, and more closely related to the implementation of two-way CfDs for RES-E projects, will be the further analysis of the justifications at national level for the unequal treatment of different project types and technologies (if applicable) – i.e. why some of them will fall under the obligation for CfDs and others will not, and why this unequal treatment can be considered proportionate (cf. sections 3.4.3 and 4.4.1). Fifthly, and staying at the national level, assessing the laws and regulations enacted by individual Member States to implement two-way CfD schemes from an economic and legal perspective should be a fruitful exercise of further research, as this is the level at which the framework is set for individual projects and where most legal problems would surface. Finally, the implications of the EMR for other German laws dealing with RES would be suitable targets for in-depth investigations, as this thesis focussed exclusively on the EEG in the case study on Germany (cf. Subchapter 4.6).

5.3. Epilogue

As mentioned in Subchapter 2.5, the analyses presented in the preceding chapters are based on the stage in the legislative process, documents, and information available as of 30 April 2024. Since then, the legislative process has taken another important step forward, with the final adoption of both the amending Regulation and Directive by the Council on 21 May 2024.

After the formal signature of the act by both institutions, the text will soon be published in the OJEU and enter into force on the 20th day after publication. The amending Regulation will then become directly applicable in all Member States, whereas the amending Directive will need to be transposed within six months from the date of publication in the OJEU, i.e. most probably before the end of 2024.[206]

Since the formal adoption by the Council was based on the (materially unchanged) final compromise text agreed with the Parliament during the trilogue, and since adopted by its co-legislator (cf. Subchapter 2.5), the analyses presented in Chapters 2-4 remain valid without any limitation. That said, references used throughout this thesis to and within documents (document identifiers, paragraphs etc.) may have changed due to editing of the final acts, which is to be kept in mind when working with the acts soon to be published in the OJEU.

[206] Cf. Council of the European Union, 'Electricity market reform: Council signs off on updated rules' Press release (Brussels, 21 May 2024) <www.consilium.europa.eu> (last accessed 21 June 2024).

ANNEX 1: POSITIONS OF THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION

A1.1. European Parliament

In the Parliament, the Committee on Industry, Research and Energy (ITRE) was responsible for the legislative procedure initiated by the Commission's proposed Regulation, with several other committees asked for their opinions.[207] The parliamentary process culminated in a report from ITRE[208], which was tabled to the plenary on 27 July 2023, and adopted in a plenary vote by a large majority on 14 September 2023.[209] In the report, ITRE set out the Parliament's position on the proposed EMR in the form of amending the Commission's original proposal, i.e. by adding, deleting or amending text in the proposed Regulation.

While the Parliament added to and amended the recitals in the proposed Regulation in numerous cases, the first amendment of relevance to the proposed two-way CfD schemes came in proposed recital 30, where the Parliament for the first time suggested adding "or equivalent schemes achieving the same goals" behind two-way CfDs.[210] Thus, the Parliament wanted to expand the Commission's narrow set of acceptable support schemes from two-way CfDs only to also allow instruments that are quite similar, but not identical, to a two-way CfD. As mentioned before, the Commission's SWD also spoke of "a similar contractual formulation" as an alternative instrument (cf. section 2.2.2), but this clause was not reflected in its proposal for the regulation. The Parliament thus corrected the proposal for this apparent omission.

The Parliament additionally expanded the wording of proposed recital 30 through a few proposed changes; however, these did not change the Commission's general approach. In contrast, a proposed addition to proposed recital 32 raises an intriguing question that was already ad-

[207] Cf. Procedure File 2023/0077(COD) for further information on the Parliament's involvement and activities, including a detailed timeline and additional documents; <https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2023/0077A(COD)&l=en> (last accessed 21 June 2024).

[208] That is, European Parliament (footnote 63).

[209] Cf. <https://oeil.secure.europarl.europa.eu/oeil/popups/sda.do?id=60345&l=en> for voting results.

[210] Cf. European Parliament (footnote 63), p. 20.

dressed earlier (cf. Table 3 and section 3.4.3). Here, the Parliament suggested adding an exemption from the requirement for "two-way CfDs or equivalent schemes achieving the same goals" for renewable energy projects "with **more than 1 MW** installed capacity, and **more than 6 MW** where the project is a citizen energy community or renewable energy community,"[211] suggesting that two-way CfDs (or equivalent schemes) should only be required for small renewable energy projects, whereas the Parliament is likely to have intended exactly the opposite.

In proposed recital 33, the Parliament added a requirement that during a transition phase, two-way CfDs (or equivalent schemes) would only become compulsory one year after entry into force of the proposed Regulation.

The Parliament also inserted additional design criteria in proposed recital 35, especially regarding the requirement for two-way CfD (or equivalent) schemes to "include penalty clauses applicable in the case of the early termination of the contract". Again, this requirement was also foreseen by the Commission (as mentioned in section 2.2.2), but this clause was not reflected in its proposal for the regulation. The Parliament thus corrected the proposal for this apparent omission.[212]

Regarding Article 2 of the amended Regulation, the Parliament proposed to shorten point (76) in the (revised) definitions by moving some parts of it (on efficiency in the electricity market and compliance with the design principles of Directive (EU) 2018/2001) to same proposed recital 35, thus making the proposed definition somewhat less binding in this regard. Subsequent points (77) and (78) were equally amended by the Parliament (mainly through insertions), but not changed in the substance proposed by the Commission.

Regarding proposed Article 19b on direct price support schemes for new investments in generation, the Parliament made a relatively large number of changes to the Commission's proposal. Some of these seem mainly editorial and with the aim to clear up omissions and mistakes in the Commission's version, whereas others point at disagreements between the Commission and the Parliament. As the Parliament's amendments to the proposed Article 19b are central to the fur-

[211] Cf. European Parliament (footnote 63), p. 21. Emphasis is the author's.

[212] Cf. ibid, p. 23.

ther analysis, its version will be reproduced in full below before highlighting the most important changes suggested by the Parliament[213]:

"Article 19b

Direct price support schemes for new investments in ***electricity*** generation

1. Direct price support schemes for new investments for the generation of electricity from the sources listed in paragraph 2 shall take the form of ▌ two-way ***contracts*** for differences***, or equivalent schemes achieving the same goals after assessment and approval by the Commission on the equivalence of such schemes***. ***The participation in such schemes shall be voluntary for the market participants. Such schemes shall be allocated through a competitive, open, transparent, nondiscriminatory, and cost-effective procedure, in accordance with State aid rules, preventing undue distortions to the efficient functioning of electricity markets and retaining incentives to operate and participate efficiently in the electricity markets***. New investments for the generation of electricity shall include investments in new power-generating facilities ***or*** investments ***aiming to repower*** existing power-generating facilities ***or*** investments ***aiming to extend*** existing power-generating facilities ***if the increase of power generation capacity is substantial***.

For the investments aiming to extend existing power-generating facilities, two-way contracts for differences shall be strictly limited to the share of the total power-generation capacity that reflects the costs of the new investment in relation to the total investment costs of the power-generating facility.

The first subparagraph shall apply to contracts under direct price support schemes for new investments in generation concluded as of … [one year after the date of entry into force of this amending Regulation].

Member States shall ensure that the volume and level of two-way contracts for differences not issued as part of a competitive bidding process under the Directive (EU) 2018/2001, do not surpass the level and volume of those issued as part of competitive bidding processes in their respective Member State.

2. Paragraph 1 shall apply to new investments in generation of electricity from the following sources:

[213] Amendments by the Parliament are denoted as follows. New text is highlighted in bold italics. Deletions are indicated using the ▌ symbol. Replacements are indicated by highlighting the new text in bold italics and by deleting the text that has been replaced. Purely technical changes are not highlighted (cf. European Parliament (footnote 63), p. 2).

(a) wind energy;

(b) solar energy;

(c) geothermal energy;

(d) hydropower without reservoir;

(e) nuclear energy***.***

3. Direct price support schemes ***as referred to in paragraph 1*** shall ***at least***:

(a) be designed so that the revenues collected when the market price is above the strike price are distributed to ▌ final electricity customers***, with particular attention to vulnerable customers and customers affected by or at risk of energy poverty as defined in Article 2, point (52), of Directive [EED]. Member States may also dedicate the revenues to compensate the costs of the support scheme where the market price is below the strike price, or to support investments for the energy transition in distribution grid development, renewable energy sources, electric vehicles charging infrastructure, energy efficiency and storage, or to cover energy-intensive industries at risk of carbon leakage if they demonstrate significant emission reductions through their decarbonisation efforts for reaching climate neutrality, including a transformation plan that sets out key elements on their pathway. Revenues distributed to final customers which are energy-intensive undertakings shall cover all undertakings in proportion to*** their share of consumption (same ▌ refund per MWh consumed)***. The revenues shall be distributed in accordance with a fair, transparent and non-discriminatory methodology***;

(b) ensure that the distribution of the revenues to final electricity customers is designed so as not to remove the incentives of consumers to reduce their consumption or shift it to periods when electricity prices are low and not to undermine competition between electricity suppliers;

(ba) take into consideration locational criteria to ensure that new investments for the generation of electricity take place in optimal locations, taking into account congestion conditions and grid development plans;

(bb) be designed so that the level of, and the conditions attached to, the support granted to the energy projects are not revised in a way that negatively affects the rights conferred thereunder and undermines the economic viability of projects that already benefit from support. Member States may adjust the level of support in accordance with objective criteria, provided that such criteria are established in the original design of the support scheme;

(bc) include penalty clauses applicable in the case of unilateral early termination of the contract;

(bd) not receive support for production in any period in which the market value of that production is negative;

(be) minimise their possible negative impact on the liquidity of forward market and on competition between suppliers;

(bf) be designed to retain the incentives for the generating facility to operate and participate efficiently in the electricity markets, in particular to adjust its production to reflect market circumstances;

(bg) be designed to comply with Article 4(2) and (3), first and third subparagraphs, of Directive (EU) 2018/2001, and with State aid rules and competition law.

3a. By ... [12 months after the date of entry into force of this amending Regulation], the Commission shall draw up guidelines on the implementation of two-way contracts for differences to assist Members States on their establishment.

3b. ACER shall monitor the implementation of direct price support schemes in Member States and issue a report on implementation and impact of price support schemes on competition and functioning of the internal electricity market."[214]

The Parliament's version of proposed Article 19b was more than four times as long as the Commission's original proposal, as can be seen in the excerpt above. Beyond the amendments already presented before, the Parliament appears to have seen a need for additions to the main body of the proposed Regulation, rather than just its recitals and/or definitions. Thus, its proposed revision of paragraph 1 not only included the possibility of using support schemes other than two-way CfDs, but it also clarified that it would be for the Commission to assess and approve such equivalent schemes. Remaining additions to paragraph 1 aimed at ensuring competition in and the efficient functioning of electricity markets. They were also intended to strengthen the definition of qualified investments (particularly for the repowering of projects), as well as the voluntary nature of two-way CfDs (or equivalent).

Paragraph 2 (on eligible technologies) was not amended by the Parliament.

[214] CF. European Parliament (footnote 63), pp. 51-54.

In paragraph 3 (a) it is noteworthy that the Parliament added a whole list of additional policy goals and recipients for which revenues collected through a two-way CfD scheme (or equivalent) could be used by Member States, rather than earmarking those revenues exclusively for electricity price subsidies, as proposed by the Commission. Further, the Parliament proposed adding several new subparagraphs, i.e. (ba)-(bg), that would specify the design criteria already introduced in the amended recitals and/or the definitions. In a new paragraph 3a, the Parliament wanted to oblige the Commission to "draw up guidelines on the implementation of two-way contracts for differences to assist Members States on their establishment" within "[12 months after the date of entry into force of this amending Regulation]".[215] Finally, according to a new paragraph 3b, ACER – rather than the Commission – should be tasked with monitoring the implementation of the direct price support schemes required by the proposed Regulation across the EU.

In Article 3 of the proposed Regulation (regarding amendments to Directive (EU) 2018/2001), the Parliament (again) introduced thresholds for renewable energy projects falling outside the requirements for a two-way CfD (or equivalent) scheme, whereby projects with more than 1 MW (or 6 MW in case of energy communities) of installed capacity would be exempted from such requirement (see discussion of this matter above).

A1.2. Council of the European Union

The Council of the European Union (the Council) adopted its "general approach", which established its provisional position on the Commission's proposal and formed the basis for the negotiations in the trilogue, on 17 October 2023. The Council's document takes the form of an amended version of the Commission's proposal, with deletions and additions for the most part visible in track-change mode.[216]

In contrast to the Commission, which wanted to restrict publicly financed support "to **new investments** ('direct price support schemes') in low carbon, non-fossil fuel electricity generation", as shown before, the Council amended the proposed wording such that support would be given "for **investments in new** power generating facilities", which wording-wise seems more appro-

[215] Cf. European Parliament (footnote 63), p. 54.

[216] That is, Council of the European Union (footnote 96).

priate. However, in addition to this clarification, the Council also changed the substance of the Commission's proposal by stating that "**Member States *may decide*** to grant support schemes in the form of two-way contracts for difference **also for new investments aimed at** substantially **repowering** existing power generation facilities, or at substantially **increasing their capacity or prolonging their lifetime**."[217] Thus, whereas the Commission proposed to make two-way CfDs compulsory for all investments in new power generation facilities in proposed recital 30, including repowering, capacity-expansion and lifetime-extension, the Council's position was less prescriptive for all but the narrowest group of *new* facilities, i.e. greenfield power plants.[218] Furthermore, in new recitals 30a-30c, the Council proposed adding long transition periods, as well as explicit references to Articles 4 and 6 of Directive (EU) 2018/2001 (see below). Furthermore, a new recital 31a set out additional criteria by which the Commission would need to assess two-way CfD schemes of Member States to gauge their impact on, *inter alia*, efficiency in the electricity market and competition among market participants.

In Article 1 of the amending Regulation, the following changes made by the Council to the Commission's draft are noteworthy, as they concern the new instrument of two-way CfDs. First, in point (76), the Council proposed to shorten the definition of a two-way CfD by moving a part of it (on efficiency in the electricity market) to Article 19b (as well as to recital 31a, as mentioned before), new subparagraph 1a (a), thus requesting the same change as the Parliament. Additionally, compliance with the design principles of Directive (EU) 2018/2001 was moved by the Council to new recital 30c. Second, the Council proposed that point (78) on the definition of "market revenue" was to be deleted entirely from the amended Regulation, thus leaving the term completely undefined.

Regarding amendments to proposed Article 19b on two-way CfDs as such, the Council expressed the following main positions regarding required changes: Firstly, the definition of investments for which two-way CfD would be the obligatory instrument for future public support was shortened to "new power-generating facilities" in paragraph 1, while the eligibility of repowering, capacity-expansion and lifetime-extension investments was moved to proposed recital 30

[217] Cf. Council of the European Union (footnote 96), p. 19. Emphasis is the author's.

[218] Without going into more detail on this point it seems fair to assume that this change was intended to accommodate the French position on the life-time extension of its ageing fleet of nuclear power plants (cf. footnote 49).

(see above). Secondly, the Council wanted to introduce a transition period of 3-5 years (depending on type of project) before Member States would need to move to two-way CfDs for new investments (similar to new recital 30a). Thirdly, the Council added a clarification that "participation of market participants in direct price support schemes in the form of two-way contracts for difference shall be voluntary."[219]

In addition to these amendments to paragraph 1 of Article 19b, the Council proposed adding two new paragraphs 1a and 1b on key design principles for two-way CfDs, as well as their required compliance with Articles 107 and 108 TFEU (on State aid). Here, (new) subparagraph (c) is of particular interest, as it is not worded very clearly and may give rise to particular ambiguities in its interpretation:

> "1a. All direct price support schemes in the form of two-way contracts for difference shall be designed to:
>
> [...]
>
> (c) ensure that the level of the minimum remuneration protection and of the upward limit to excess remuneration are aligned with the cost of the new investment, the market revenues *[sic!]*, to guarantee the long-term economic viability of the power generating facility while avoiding overcompensation;
>
> [...]"[220]

Given that the term "market revenues" was no longer defined in the Council's version, it remains unclear what the Council considered the relationship between the "cost of the new investment [and] the market revenues"[221] to be exactly, even though the intention of linking the strike price to the actual costs and revenues of a power-generating facility seems clear enough.

Regarding the use of revenues from two-way CfDs by Member States, the Council proposed the additional options of either refinancing the two-way CfD scheme (i.e. using revenues during periods of high market prices to pay market premiums during periods of low market prices) or

[219] Cf. Council of the European Union (footnote 96), p. 60.

[220] Cf. ibid, pp. 60-61.

[221] Cf. ibid, p. 61.

to "support schemes or investments to reduce electricity costs for final customers"[222], in addition to the main use of distributing them as direct subsidies to electricity customers.

Finally, the Council – like the Parliament – also proposed giving Member States the option of exempting small-scale renewables and demonstration projects (as defined in Article 4 (3) of Directive (EU) 2018/2001) from the two-way CfDs otherwise required in its new paragraph 4 of Article 19b.

Concerning the amendments to Directive (EU) 2018/2001 proposed by the Commission in Article 3 of the amending Regulation, the Council expressed a desire to split this article from the amending Regulation and turn it into a self-standing directive. However, on substance, the Council (unlike the Parliament) accepted the Commission's proposals concerning two-way CfDs as the sole support instrument for wind, solar etc., as well as the required transposition period contained in the Commission's proposed Article 3 of the amending Regulation.[223]

Finally, regarding entry into force of the amending Regulation as well as the new directive, the Council proposed twenty days; however, regarding actual transition periods for the establishment of two-way CfDs the Council foresaw a much longer period (of 3-5 years), as mentioned before, and of two years more generally.[224]

[222] Cf. Council of the European Union (footnote 96), p. 62.

[223] Cf. Articles 2 and 3 in the amending Directive proposed by the Council; ibid, pp. 97-98.

[224] Cf. ibid, pp. 78 and 98.

ANNEX 2: QUANTITATIVE MODEL OF INVESTMENT BEHAVIOUR

As mentioned in section 3.4.1, a simplified financial model was developed to emulate the investment process of the developer/owner of an electricity generation project using a renewable energy source under two different CfD schemes (i.e. one-sided and two-way). In this annex, the Excel-based model, its underlying assumptions and the full modelling results will be described in further detail.

A2.1. Description of the financial model

The model is split into three distinct parts: The main assumptions are contained in rows 1-10, calculations take place in rows 11-43, and results are presented in rows 44-73. The model is semi-automatic, i.e. calculations in Part 2 are updated automatically if/when assumptions are changed in Part 1, but results need to be manually transferred to the results table in Part 3, whereas the graphs in Part 3 update automatically depending on the assumptions chosen.

A2.1.1. Assumptions

The financial model is based on a hypothetical onshore wind energy project comprising just one wind turbine with a rated capacity of 4 MW, a typical capacity factor (assuming 3,000 full-load hours) and typical investment costs, or capital expenditures (CAPEX), and operating expenses (OPEX). The target rate of return for the project, i.e. the weighted average cost of capital (WACC), is assumed to be 7.5%, which can be considered a typical rate of return in today's market environment.

In order to analyse the effect of electricity prices (or, rather, price expectations) on the investment behaviour of clean electricity producers under the two different CfD schemes, the model allows simulating four different price scenarios (keeping everything else equal), which only differ by the assumed rate of annual price increases, ranging from 0% to 5%. Additionally, and as a variant of the low-, medium- and high-price scenarios, the *energy-crisis* scenario allows to model a price spike of 500% (i.e. a fivefold increase, which is much less than the price rises seen in 2021/22) lasting two years, after which prices will revert to their long-term trend. The four price scenarios are shown in Figure A2.1 on the following page, where the price spike is added to the medium-price scenario.

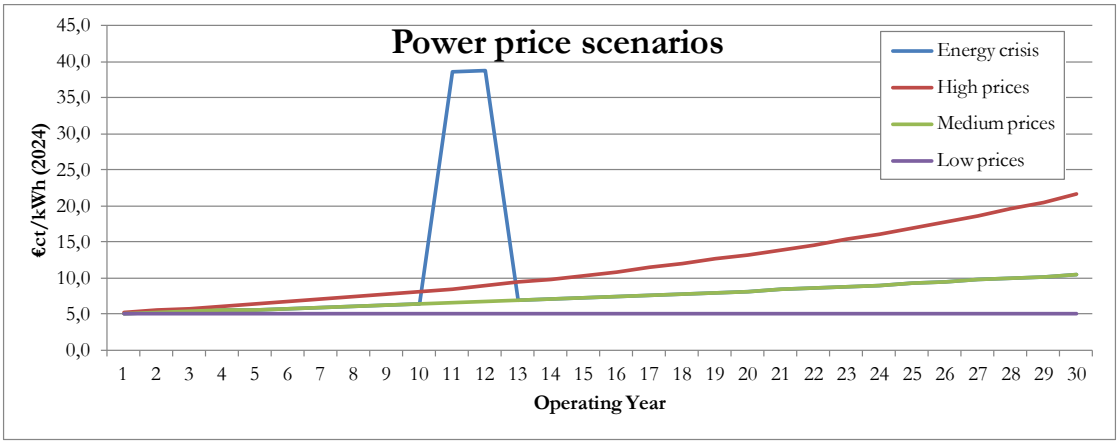

Figure A2.1: *Illustration of power price scenarios*

A2.1.2. Calculations

The calculations for both types of CfD are similar, with a few exceptions that will be explained below. On the revenue side, the assumed energy yield will be multiplied by the effective (sales) price, which could be either the strike price under the CfD scheme (more on this later) or the wholesale power price, in case the electricity is sold at the prevailing market rate. On the cost side, CAPEX will arise during the first year (only), whereas OPEX will arise during all operating years. These could number 20 or 30, depending on the assumed lifetime of the project.

Deducting the costs (i.e. CAPEX and OPEX) from the revenues produces the free cashflow that is available to service any project loans (debt) as well as to generate a return on any investor capital (equity) put into the project. This approach, called the discounted cashflow (DCF) method, is commonly used in investment appraisals and project finance.[225]

However, in this case the model is not used to calculate the return on investment (internal rate of return, or IRR) for the project, but rather to determine the CfD-strike price that the project developer/owner would need to bid in a competitive auction in order to obtain his expected rate of return (assumed to be 7.5%). Thus, the *goal seek* function of Excel is used to calculate the strike at which the IRR will be equal to 7.5% for each of the electricity price scenarios. The cal-

[225] Cf., for instance, Dagmar Tytko, *Grundlagen der Projektfinanzierung* (Schäffer-Pöschel 1999); E J McLaney, *Business Finance – Theory and Practice* (5th edn, Prentice Hall 2000).

culation will further differentiate between expected project lives (i.e. 20 vs. 30 years), as well as the type of CfD scheme (i.e. one-sided vs. two-way CfD).[226]

Finally, regarding the type of CfD, the model allows to calculate both a one-sided (*market premium*) CfD and a two-way CfD, as now proposed by the EU. For simplification, it is assumed that in the case of the two-way CfD there will be only one strike price that will act both as a floor and cap for revenues during the duration of the CfD. In both cases, it is assumed that the duration (*tenor*) of the CfD will be 20 years, meaning the price floor/cap stemming from the CfD will expire after that time and the project will be fully *merchant* thereafter.

A2.2. Modelling results

Table A2.1: Results from scenario analysis

1) One-sided CfD	Project life	Low prices	Med. prices	High prices	Energy crisis
Strike price (€ct/kWh)	20 years	8.920	8.920	8.170	8.920
	30 years	8.125	7.400	0.000[227]	7.400
Revenues (€ thousand)	20 years	21,408	21,408	22,711	28,542[228]
	30 years	25,500	29,292	41,856	36,791[229]
2) Two-way CfD					
Strike price (€ct/kWh)	20 years	8.920	8.920	8.920	8.920
	30 years	8.125	7.450	6.215	7.450
Revenues (€ thousand)	20 years	21,408	21,408	21,408	21,408
	30 years	25,500	29,170	35,941	29,170

The results of the sixteen distinct scenarios described before are presented in Table A2.1 above, as well as illustrated in Figure A2.2 (overleaf). As explained, the results differ by price assump-

[226] The goal seek-function of Excel can only optimize for one distinct assumption of a scenario, even though the scenario may comprise several assumptions. Thus, in order to derive the strike price for a certain scenario (comprising price scenario, project life and CfD-type), the price scenario needs to be selected first in cell E9 and the goal seek-function then applied to two of the following cells: [E16 or E31], depending on the CfD-type, and [E23 or E24 or E38 or E39], depending on the project life (and CfD-type). Hence, the correct Excel prompt will be "Set cell [E16 or E31] to value [0.075] by changing cell [E23 or E24 or E38 or E39]").

[227] Zero-subsidy bid due to the high power price assumption, at which IRR will amount to 8.8% over 30 years.

[228] Excess revenues lead to windfall profits with IRR amounting to 10.7% over 20 years.

[229] Excess revenues lead to windfall profits with IRR amounting to 10.2% over 30 years.

tion, project life and CfD-type, as shown in the table. When interpreting the results, it is important to bear in mind that the strike price is set ex-ante, which implies that any additional market revenues during an energy crisis will result in windfall profits, rather than an ex-post adjustment to the strike price.

Furthermore, when comparing results between different scenarios, it is important to understand that the revenues shown in Table A2.1 are in nominal terms (not adjusted for inflation or discounted). They equal the consumer costs, i.e. the sum of the payments under the CfD and on the wholesale power market over the 20- or 30-year period. The revenues (which equal total consumer costs) are lower under a two-way CfD than under a one-sided CfD in a number of scenarios (highlighted in shades of green), despite the higher strike prices in the same scenarios (highlighted in shades of red).

Figure A2.2 below illustrates the mechanics of the two CfD schemes for the case of the high-price scenario (with a 20-year project life), whereby the expected power market price is identical in both cases, but CfD strike prices differ based on the their design. Thus, the strike price for the two-way CfD will be higher than that for the one-sided CfD as the project will not be able to benefit from increasing prices (which exceed the strike price approximately from operating year 10 onwards). Thus, in order to obtain the target IRR, the project developer/owner will need to bid a higher strike price under a two-way CfD than under a one-sided CfD with *upside* revenue potential.

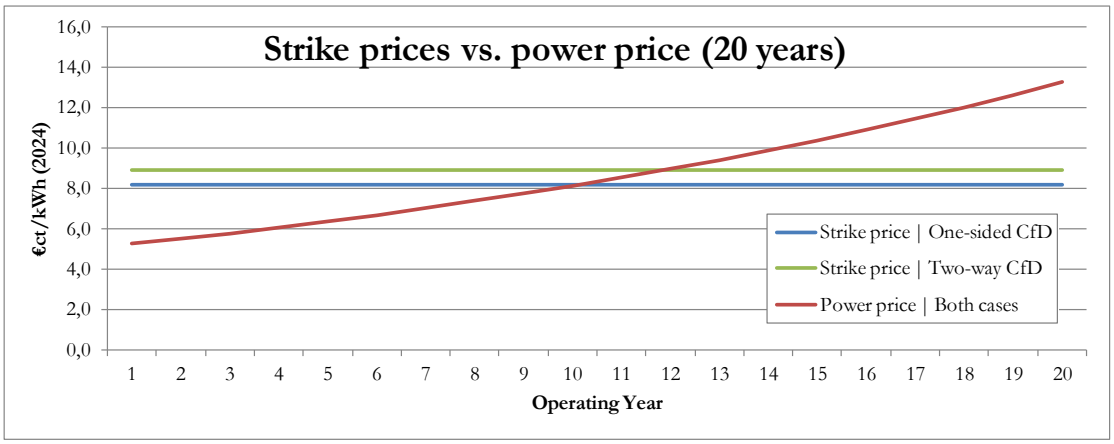

Figure A2.2: *CfD-strike prices in high-price scenario*

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LIST OF ABBREVIATIONS

ACER	European Union Agency for the Cooperation of Energy Regulators
CAPEX	Capital expenditures
CEEAG	Guidelines on State aid for climate, environmental protection and energy of the European Commission
CfD	Contract for difference
DCF	Discounted cashflow
ECJ	European Court of Justice
EEG	Renewable Energy Act (Germany)
EMR	Electricity market reform
EnWG	Energy Industry Act (Germany)
FIP	Feed-in premium
FIT	Feed-in tariff
IA	Impact assessment
IEM	Internal Electricity Market of the European Union
IRR	Internal rate of return
ITRE	Committee on Industry, Research and Energy of the European Parliament
kWh	Kilowatt hour
MW	Megawatt
MWh	Megawatt hour
OJEU	Official Journal of the European Union
OPEX	Operating expenses
PKNS	Plattform Klimaneutrale Stromversorgung (Germany)
PPA	Power Purchase Agreement
PV	Photovoltaic
RE	Renewable energy
RED	Renewable Energy Directive
RES	Renewable energy sources
RES-E	Electricity from renewable energy sources
SWD	Commission Staff Working Document
StromPBG	Electricity Price Break Act (Germany)
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union
VRE	Variable renewable energy
WACC	Weighted average cost of capital
WindseeG	Offshore Wind Energy Act (Germany)