Consumer-funded Policies in Energy Transition: An introduction, an analytical framework and empirical case studies from Germany and the UK

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Abstract

In an effort to contribute to the existing literature on climate finance, this paper analyzes environmental consumer-funded policies. The logic in the unique political economy of consumer-funded policies lies in their ability to circumvent the state budget and avoid conventional budgetary scrutiny in legislative bodies. These features make these policies very convenient for policy makers. Over years, consumer-funded policies have helped governments finance energy transition without having to raise taxes. In addition to their fiscal convenience, these policies have also served as an incentive mechanism to increase energy efficiency and helped overcome state aid restrictions. However, the very factors that make consumer-funded policies attractive to policy-makers have also led to criticism, particularly concerning transparency, accountability, efficiency, and social equity. In response to these concerns, policymakers have implemented certain reforms to improve their practices of consumer-funded policies. By studying the energy transition experiences of Germany and the UK, this paper illustrates how the implementation of consumer-funded policies has evolved over time.

Keywords: Green energy transition, climate finance, policy instruments, renewable energy, Germany and the UK

I. Introduction

In many countries, state budgets draw on a complex web of revenue streams, with taxation typically serving as the primary source of public finance. Using tax money, governments fund a wide range of public services, from infrastructure and education to security and social policy. In democratic settings, however, the allocation of taxpayers' money is often contentious, with government spending subject to intense scrutiny: Due to accountability concerns, policymakers are expected to manage the state budget prudently and avoid reckless expenditures. The concept of so-called "fiscal space" is in circulation reflect this principle of fiscal prudence. It refers to the government's ability to allocate resources for public services without compromising the long-term sustainability of public finance.[1] When fiscal space is insufficient for further public spending, governments must generate it by increasing taxes, seeking external grants, reducing non-essential expenditures, or borrowing from domestic or foreign sources, including the banking system.[2] In many democracies, these issues have underpinned the debates around fiscal conservatism, evolving into major political fault lines, shaping party ideologies and partisan divides.

[1] Heller, 2005
[2] *Ibid.*

On the other hand, the government does not always need to rely on its official fiscal space to fund public policies. In some cases, it can transfer policy costs directly to beneficiaries of such policies, effectively bypassing the state budget. In this way, the government practically generates a *de facto* fiscal space without sapping its tax revenues in the *de jure* fiscal space which is subject to harsher democratic scrutiny. Such policies whose costs are directly passed on to their beneficiaries are called consumer-funded policies (the CFPs hereafter). These policies have constituted the backbone of financing many public policies. In particular, they have turned into a very convenient financial tool for green energy transition policies. Since the 1990s, the CFPs have been used increasingly to fund the renewable energy sources such as solar, wind and biomass.

The CFPs offered numerous advantages. They practically served as a lifeline for the green-oriented policy-makers who intended to maintain policy support for the renewables without being hindered by the government's budgetary constraints[3] and common reluctance to raise taxes[4] to support expensive renewable energy technologies. The rationale for utilizing environmental CFPs extended far beyond financial convenience: There was also political demand for these policies because they could serve as an incentive mechanism to promote more efficient energy use by imposing a financial cost on the consumption of electricity generated from carbon sources. Lastly, the CFPs enabled the government to subsidize the nascent renewable energy technologies without being restricted by the strict EU state aid rules.

Despite their remarkable fiscal convenience and several other advantages, however, the CFPs have also turned into contentious policy instruments over time. While Germany has recently started to phase out their green CFPs, the political perception of the CFPs in the UK have grown more negative, making their continued use in public finance challenging.[5] The prevailing viewpoint, at least in civil society in both countries, is now to move environmental CFPs to taxation.[6] Why have the CFPs faced growing criticism? What explains the demise of their early positive image? This paper addresses these fundamental questions surrounding environmental CFPs.

To be sure, many factors have contributed to this shift including pressure from interest groups and geopolitical developments. To illustrate, many businesses, especially in manufacturing, pushed for the dissolution of the CFPs due to their rising costs in their energy bills. Meanwhile, energy crises —such as the one in Europe in 2022— further heightened the salience of their costs in the public eye. With that said, the fundamental

[3] Anonymous interviewee data
[4] Anonymous interviewees data
[5] There is a strong opposition against the further levies, the recent case of Hydrogen fuel is an example. See Trax 001. Also anonymous interviewees data. Of course, the reasons leading to the downfall of the CFPs in both cases are multiple, some of which relate to the factors discussed in this paper.
[6] Anonymous interviewee data. This is also the case for Germany. Trax 002

issues in the design of the CFPs have also contributed to their decline. I argue that the very characteristics that initially made the CFPs convenient and attractive to policy-makers have, in the end, led to their decline: While the exclusion of the CFPs from budget approvals has given policy-makers a procedural advantage by providing a fast track source of public finance, the lack of sufficient legislative scrutiny have prompted serious concerns about transparency and accountability. The CFPs are frequently viewed as a revenue raising practice that involves "offshoring public accounts"[7] or making an "accountancy trick."[8] In addition, unlike taxation, the flat-rate application of the CFPs has been regressive, casting doubt on its social equity dimension. Finally, despite their ability to bypass EU state aid rules, the applications of the CFPs have not been without challenges before the European Commission.

The criticisms against the CFPs do not necessarily mean that these policies have lost their relevance. Due to the policy-makers' reluctance to finance green energy transitions by raising taxes, they are still seen as "the lesser of two evils". Also, the growing criticisms of the CFPs over years have resulted in sizable policy feedback. To explain how this policy feedback has improved the practices of environmental CFPs, this study also analyzes several policy reforms introduced by policy-makers. The discussion of the challenges faced by the CFPs offers valuable insights into the public policy dynamics in a democratic setting, particularly concerning key dimensions of democratic governance, such as accountability, social equity, transparency, efficiency and regulatory framework.

Even though the CFPs have long been the cornerstone of financing the green energy transition policies, little research has been undertaken to study and explain their theoretical framework. Thanks to their unique revenue mechanisms which escapes conventional scrutiny of government spending, the CFPs constitute a theoretically intriguing case worthy of further study in public finance. Additionally, addressing the flaws in the design of the CFPs is also crucial not to compromise the legitimacy of policy objectives that they serve for —in this case, the green transition. Indeed, many critics of the green transition initiatives opposed it, citing flaws in its funding framework. Implementing well-designed funding mechanisms could boost political and public support of green energy policies.

Moreover, while most renewable technologies are becoming affordable enough to compete with conventional energy sources, and no longer require public support, many other green transition initiatives in the pipeline, such as hydrogen fuel and carbon capture, still need public funding. The public finance of these new initiatives remains a daunting task for policy-makers. That is why, the CFPs retains its relevance as an alternative funding mechanism, despite the controversies surrounding them. In this context, this study provides

[7] Anonymous interviewee data
[8] Anonymous interviewee data

a comprehensive theoretical framework to assess the political feasibility of the CFPs and potential pushbacks they may face in both current and future applications.

After this introduction, the rest of the paper is structured as follows: The next section provides a theoretical background, situating the CFPs within the broader context of climate finance literature. The third section outlines the reasons that have made the CFPs appealing to policymakers. In the subsequent section, I examine the main critiques of the CFPs, illustrating how they evolved into contentious public policies despite their initial convenience. Drawing on the experiences of energy transition in Germany and the UK, the fourth section explores how the policy practices of environmental CFPs have improved over time. Finally, the paper concludes by summarizing the key findings.

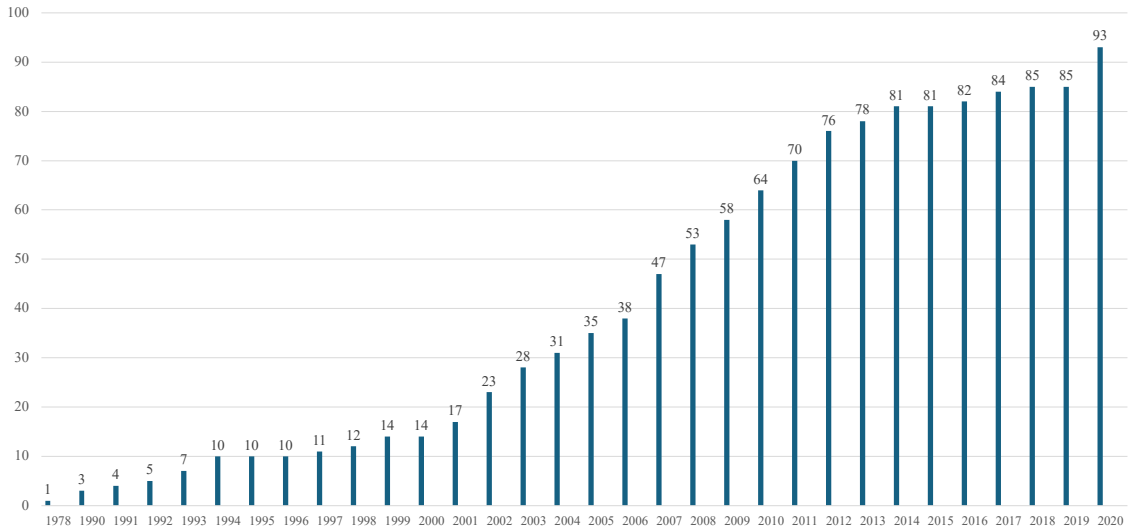
II. A Theoretical Background

Consumer-funded policies (the CFPs) are designed to generate public finance by incorporating policy costs into utility service bills paid by people. The government can use the CFPs in a wide array of issue areas where consumer-utility relationship exists — such as gas, water or electricity services. In the context of green energy transition, the CFPs are usually applied to electricity bills. Government uses the revenues derived through the CFPs to finance several energy policies. Very commonly, the governments are directed towards promoting renewable energy sources. This paper primarily focuses on environmental CFPs designed to finance renewable energy initiatives. In Germany and the UK, environmental CFPs have underpinned a variety of policy instruments, including the feed-in tariff system and auctions (Table 1). However, the appeal of CFPs extends beyond these countries, with feed-in tariff policies emerging as one of the most widely adopted approaches globally (Figure 1). Throughout the paper, environmental CFPs refer specifically to the financing mechanism behind such policy instruments.

Table 1. Policy instruments supported by the CFPs in Germany and the UK

Country	***Policy Instruments***	***Implementation time***
Germany	Feed-in-tariff	1991-Present
	National Auctions	2015-Present
The UK	Non-Fossil Fuel Obligation (Auctions)	1997-2002
	Renewable Obligations	2002-Present
	Feed-in Tariff	2010-2019
	Contract-for-Difference (Auctions)	2013-Present

*Figure 2. Cumulative number of countries with FiT record**



Source: Renewable Energy Policy Network for 21st Century (REN21)
*Including subnational policies
*Cumulative number of countries with FiT record (The data does not necessarily reflect the counrties which might have stopped using the instrument)
*The data for 2020 reflects the addition of the countries with unknown year of introduction for the instrument

A well-developed body of literature on the CFPs do not exist yet. Although limited, some governmental documents —particularly in the UK— make references to these policies (e.g., Department for Business, Energy and Industrial Strategy, 2016, and National Audit Office, 2016). The usage of the term *consumer-funded policies* in this paper is informed by these documents, which were prepared by British authorities. However, these sources only introduce the term without offering a detailed explanations of the nature or operational mechanisms of these policies, instead employing it in a presumed context. The only academic work that explicitly mentions the CFPs is a paper by Rosenow et. al. (2013).[9] In a brief discussion section, the authors argue that relying on the CFPs rather than taxpayer-funded approaches to address fuel poverty may result in undesirable outcomes, due to the regressive nature of the CFPs.

A relevant body of literature that warrants citation here is the research on "on-bill financing". At their core, both CFPs and on-bill financing refer to the same thing. Yet, studies on on-bill financing typically examines how energy companies employ on-bill financing to fund energy efficiency and renovation programs (Brown, 2009, Johnson et. al., 2012, Henderson, 2013, Deason, 2016, Mundaca and Kloke, 2018, Taylor , 2018, Brown et. al., 2019, and Bertoldi et, al., 2021). Focusing on the technical aspects of energy efficiency and streamlining finance for renovation programs, these studies do not address the contentious nature of these financial instruments from a political economy perspective.

[9] While doing this, the work cites several other works in the literature on fuel poverty.

With that said, this literature is valuable in illustrating the broader application of the CFPs beyond the policy support for renewable energy technologies.

Despite the absence of an extensive literature on the CFPs, it is still possible to situate this work within the broader context of climate change finance, particularly in relation to renewable energy financing (e.g., Haites, 2011, and Iskandarova et. al., 2021). This broader literature examines both private and public sources of finance for renewables (e.g., Mazzucato and Semieniuk, 2018; Cárdenas Rodríguez, 2014, Elie, et. al., 2021). Some studies explore alternative financing approaches to support the renewable energy transition such as citizen participation (Yildiz, 2014) and green bonds (Bhutta, 2022). A significant portion of the public finance literature also focuses on different types of policy support mechanisms (e.g., Menanteau et. al., 2003, Klein et. al., 2008; Mitchell et. al., 2006). This body of work often compares policy instruments such as feed-in tariffs, auctions, and tradable certificates, assessing their effectiveness in promoting renewable energy in terms of economic efficiency and deployment speed (Wiser and Pickle, 1998, Ringel, 2006, Haas et. al., 2011, Lena and Weber, 2014, Abolhosseini and Heshmati, 2014, Krupa and Harvey, 2017, and Polzin, et al., 2019).

Environmental CFPs discussed in this paper encompass these policy instruments used in the public financing of renewable energy. However, rather than making a technical analysis of these instruments, this paper aims to contribute to the literature by studying the distinct political economy logic underlying these instruments and the policy questions they raise concerning public finance in green energy transition. More broadly, the paper also advances the current understandings of public finance by developing an analytical framework that juxtaposes the CFPs with taxpayer-funded policies in the literature.

The empirical research in this study draws on extensive qualitative data collection based on a comparative case study. The data primarily comes from a research project which involved 67 semi-structured interviews with various knowledgeable people and experts from business, politics, and non-governmental organizations in Germany and the UK. A list of interviewees is provided in Appendix, though they are cited anonymously throughout the paper. Additionally, the empirical case studies are informed by the analysis of parliamentary documents[10] and gray literature. Further details about these data sources are provided in Transparency Appendix (TRAX) where I maintain raw empirical data in a publicly accessible repository.[11] In footnotes, there are frequent references to the TRAX throughout the paper.

[10] German Bundestag's data source *DIP:* Das Dokumentations- und Informationssystem für Parlamentsmaterialien, see https://dip.bundestag.de/, and British Parliament Westminster's digital library *Hansard,* https://hansard.parliament.uk/.

[11] The dataset for this will be at: Hecan, Mehmet, 2025, "Transparency Appendix for "Consumer-funded Policies in Energy Transition: An introduction, an analytical framework and empirical case studies from Germany and the UK"", https://doi.org/10.7910/DVN/FMB9GZ, Harvard Dataverse.

The purpose of this paper is to offer some generalizable inferences about the CFPs that can travel to different cases. However, it is also important to note that these inferences are based on epistemological sources specific to Germany and the UK. Having achieved comparable renewable energy targets, but through different energy transition pathways, these two countries serve as convenient empirical case studies for theory-building.[12]

III. A Convenient Source of Public Finance

The preference for the CFPs among policy-makers is primarily rooted in their desire to avoid constraining the state budget. Indeed, for policy-makers, the *de facto* fiscal space generated by consumer-funded policies offers a valuable and convenient source of public finance for desired but costly public policies: The CFPs eliminate the need to generate additional budgetary room either though raising taxes or alternative revenue sources such as outside grants, cuts to governmental spending, or borrowing from domestic and foreign lenders.[13] From a technical standpoint, what makes the CFPs politically attractive also lies in the lack of visibility in the associated costs.[14] This feature allows policy-makers to "camouflage" public spending,[15] effectively making these costs less subject to political debate. This is convenient considering that debates across party lines typically involve taxation which requires higher "political profile".[16] Additionally, unlike taxation, generating public finance through the CFPs faces fewer constraints[17] such as annual budget approval,[18] competition with other public priorities funded through taxation,[19] and regular oversight from the legislative bodies.[20] This is why having energy consumers pay for public policies directly through the CFPs is considered far less politically contentious than imposing taxes.[21]

On the other side, the complicated structure of energy bills also adds to this process by weakening the public oversight. Along with the market price of electricity itself, energy bills typically contain dense technical information —such as network and operational costs, various levies including environmental ones— that can be difficult for the public to understand.[22] As a result, people often fail to identify the costs associated with the CFPs,

[12] Hecan, Mehmet. 2025. "Choosing Who to Foot the Bill: Distributional Politics of Green Energy Transition in Germany and the UK." APSA Preprints. doi: 10.33774/apsa-2025-0xv9b. [This content is a preprint and has not been peer-reviewed.]
[13] Heller, 2005
[14] Anonymous interviewee data
[15] Anonymous interviewee data
[16] Anonymous interviewee data
[17] Anonymous interviewee data
[18] Anonymous interviewees data
[19] Anonymous interviewee data
[20] Trax 003
[21] Anonymous interviewee data
[22] Anonymous interviewee data

making it harder to build public awareness and form political opinions about them. Some of these factors explain why the CFPs have become a convenient tool for financing the energy transition in both Germany and the UK:[23] In Germany, the CFPs allowed the government to initiate and maintain an ambitious green energy transition with generous renewable subsidies —all without increasing so-called ecological taxes which the policy-makers were reluctant to raise.[24] Crucially, the lack of necessity to gain approval from the state budget provided investment security for renewable energy producers[25] who did not want to depend on the state budget.[26] Environmentally oriented policy-makers also supported the CFPs as they streamlined and stable finance for green transition initiatives in the long run. From a counterfactual standpoint, it is uncertain whether or not the renewables, especially in Germany, would have been reached the same scale, if it had been funded through taxation and be subject to the budgetary approval periodically.[27] The stable revenue stream in the CFPs has also made these policies attractive for other sectors. In the UK, for example, the energy intensive industries preferred exemptions funded through electricity bills rather than the state budget,[28] especially to shield themselves from potential spending cuts by the Treasury.[29]

The CFPs also eased the burden on governments which were reluctant to spend their tax revenues for green energy transition programs. In the UK, policy-makers acknowledged that the CFPs benefitted the Exchequer —Treasury— by moving the policy cost of supporting renewables like Renewable Obligation Certificates from the state budget to consumers.[30] This approach was not limited to supporting renewables, but also extended to other CFPs aimed at improving energy efficiency and social equity. For instance, when the Conservatives came to power, they began phasing out the tax-funded Warm Front scheme —introduced by Labour in 2000 to support households in fuel poverty and vulnerable ones. In its place, they launched a consumer-funded scheme Warm Home Discount in 2011.[31] In the shift towards regressive policy instruments over years,[32] the ideological orientation of the government also played a role.[33]

On the other hand, the rationale for utilizing environmental CFPs goes beyond financial convenience. In some cases, there can be a political demand for the CFPs because

[23] Trax 004
[24] The information here also draws on Udo Leuschener's Energie Politik (https://www.udo-leuschner.de/energie-chronik/chframe.htm) for more details see, Trax 005.
[25] Anonymous interviewee data
[26] Anonymous interviewee data
[27] Anonymous interviewee data
[28] Anonymous interviewee data
[29] Anonymous interviewees data
[30] Trax 006 [Westminster data]
[31] Information here mostly draws on the following resource: Watson and Bolton, 2013. See also Trax 007
[32] Anonymous interviewee data
[33] Anonymous interviewee data

they can serve as an incentive mechanism to promote more efficient energy consumption.[34] This specifically relates to the *polluter-pays-principle* which discourages using carbon-based energy sources by imposing financial costs on their consumption: Under this system, those who consume more electricity pay higher charges.[35] In this pay-as-you-go financing system,[36] levies or surcharges related to renewables are designed to rise proportionally with electricity consumption rather than being applied at a fixed rate. As a result, the system effectively penalizes higher electricity usage —primarily generated from carbon-based sources like coal and gas. It is hard to determine how much this moral motivation has been instrumental in introducing the CFPs in energy transition. However, it has provided a justification for their implementation. Reflecting this logic, even the UK government considered shifting some environmental CFPs from electricity to gas bills in the early 2020s —both to reduce electricity costs and to discourage gas consumption— though the plans were ultimately abandoned.[37]

Finally, the ability of CFPs to circumvent state aid rules is also another factor to consider: The European Union has strict regulations that disallows member states from utilizing state subsidies to prop up their industries. Historical data indeed shows a long-term decline in non-crisis state subsidies across European countries.[38] Given this, it is a regulatory challenge to finance the renewable sector through subsidies directly funded by the state budget. However, the fact that subsidies for renewables are financed through the electricity bills rather than state budget puts the CFPs in a gray area. Since they are not funded by taxpayers, the CFPs categorically fall outside the jurisdiction of EU Commission.[39] In practice, the CFPs mimics subsidies, but by bypassing the federal or central government budget, they are not seen as illegal theoretically.[40] This ambiguity in the interpretation of the CFPs has enabled governments to financially support renewable energy producers without being constrained by the EU state aid limitations for a long time.

IV. Critiques

Unseen costs, lack of transparency and insufficient scrutiny

Although the CFPs were initially seen as a convenient tool for public finance, their growing use eventually turned into a controversial issue. What once made the CFPs attractive became a point of criticism, as they put "unseen cost"[41] on consumers without budgetary

[34] Anonymous interviewee data
[35] Trax 008
[36] Trax 009 [Bundestag]
[37] Anonymous interviewees data
[38] Trax 010
[39] Anonymous interviewees data
[40] Anonymous interviewee data
[41] Anonymous interviewee data

limits.[42] While initially modest, the rapid expansion of renewable energy installations significantly heightened the costs associated with environmental CFPs. Policy-makers both in Germany and the UK started to criticize deriving public finance from environmental CFPs, noting that unlike taxation—which is subject to regular parliamentary scrutiny—the CFPs lacked clear and upfront costs.[43] Questioning their growing economic cost for people in both Germany[44] and the UK,[45] some perceived them as subsidies rather than simple levies in bills.[46] In response, policy-makers called for stronger monitoring of spending associated with the CFPs.[47] To improve oversight, they proposed a range of policy reforms, including enhanced reporting mechanisms, the inclusion of CFP-related expenditures in treasury statements[48], and the integration of these policies into parliamentary budget procedures[49]. These measures aimed to give parliaments greater control and accountability over the CFP funding. Beyond legislative scrutiny, policymakers also advocated for greater public oversight by making electricity bills more transparent and easier to understand.[50] Concerns over consumer protection further fueled calls to simplify how environmental CFP costs are presented in electricity bills, in order to improve public awareness and understanding of these policies.[51]

When governments first introduced environmental CFPs, there were not clear laws and regulations to guide their application. In lieu of well-defined legal boundaries and adequate instructions, many policy-makers —those with fiscally conservative and pro-market viewpoints— expressed concerns about potential loopholes and exploitation of these policies at the expense of consumers.[52] The fact that most consumers remain unaware of the small costs reflected in their utility bills also lies at the center of this problem. Public opposition to the CFPs is generally difficult to gauge, except among a few well-organized groups such as energy-intensive industries, which tend to be highly sensitive to even small increases in energy costs. On the other hand, it is much harder to assess public acceptance among household users who are not well-informed about the specific costs associated with the CFPs.[53] At first glance, the electricity market may appear to operate like a typical free market, where people meet their energy demands through supply-demand dynamics.

[42] Anonymous interviewee data
[43] Anonymous interviewee data
[44] Trax 012 [Bundestag]
[45] Anonymous interviewee data, and Trax 013 and 014 [Westminster]
[46] Trax 011 [Bundestag]
[47] Anonymous interviewee data
[48] Trax 015 [Westminster]
[49] Trax 011
[50] Trax 016 [Bundestag and Westminster]
[51] *Ibid.*
[52] [TBA]
[53] Anonymous interviewee data

However, in practice, utility markets—such as electricity—do not function as true markets in which consumers can effectively signal their preferences.[54] The low sensitivity to small cost changes in utility market reduced the price elasticity of demand, making the CFPs vulnerable to exploitation. This particularly applies when policy-makers interpret the absence of visible public opposition as a sign of consumers' willingness to pay.[55] Moreover, utility markets have traditionally been highly regulated due to their roles in delivering essential public goods,[56] —a pattern that has continued despite decades of market liberalization: While regulating, the government often employs coercive policy instruments —including the CFPs— without necessarily leaving it to the choice of consumers.[57] This further adds to the potential exploitation of the CFPs by policy-makers. Indeed, the increasing share of policy costs in electricity bills over the years at least suggests this potential.[58] While some argue that it is logical to put levies related to environmental CFPs in electricity bills —since they support electricity generation which benefits end-users[59]— others contend that public initiatives should be funded through taxation.[60]

Violation of state aid rules and the state's duty in providing public finance

"Despite their ability to circumvent EU state aid rules, the implementation of CFPs has not been without challenges. Using the CFPs for green energy transition purposes usually made these policies less exposed to legal and political challenges thanks to strong political support for environmentalism across Europe. However, the CFPs have faced sporadic legal challenges both at domestic and European levels.

Such legal challenges were primarily triggered by utility companies that incurred economic losses due to the use of CFPs in promoting renewables: In Germany, for example, the grid law mandated utility companies to buy relatively expensive electricity from renewable energy producers who were granted priority access to the grid. In 1995, some utility companies, disgruntled with their financial losses,[61] ceased payments to renewable energy producers and took the matter to court, arguing that the financial support given to the renewable energy producers violated the EU state aid regulations. At the time, Germany's experience with using the CFPs to finance coal mining served as a reference point: In 1995, the German Federal Constitutional Court overturned the "Coal Penny"

[54] Anonymous interviewee data
[55] Trax 017 [Bundestag]
[56] Anonymous interviewee data
[57] Anonymous interviewee data.
[58] Trax 074
[59] Anonymous interviewees data
[60] Anonymous interviewee data
[61] Trax 018

(Kohlenpfennig) —a fee charged to electricity consumers since 1974 to subsidize fossil fuels in electricity generation.[62] The court concluded that it was not the responsibility of electricity consumers but rather the state itself to finance coal in the long term.[63] This legal precedent with financing coal-powered electricity generation also constituted a pretext for those which did not support promotion of renewables through environmental CFPs —e.g., the utility companies. Drawing a similarity between these two cases, utility companies sought to legally challenge the German feed-in tariff schemes. To the likes of these companies, a 1995 rule by the Regional Court of Karlsruhe ruled that the Strompreis —the feed-in tariff law at the time[64]— was an impermissible special tax similar to the "Coal Penny". In January 1996, however, the Federal Constitutional Court rejected the ruling on legal grounds. Later on, the Karlsruhe district court also dismissed the legal analogy to the "Coal penny" and ordered utility companies to reimburse the withheld compensation with interest.[65]

Though the lawsuits against environmental CFPs were ultimately defeated in the German courts,[66] the legal challenges persisted until 2001: That year, the European Court of Justice ruled that Germany's feed-in tariff schemes —the primary environmental CFP instrument— did not constitute state aid.[67] However, these schemes once again drew scrutiny from the European Commission in 2012, when the German government exempted energy-intensive industries from most CFP-related charges on their electricity bills. The investigation by the Commission argued that such exemptions amounted to indirect state support.[68] Unlike in the late 1990s, the issue was no longer the compatibility of the CFPs with state aid rules themselves, but rather their indirect impacts.

Fairness

Another major criticism of the CFPs is their regressive nature: These policies are often viewed as imposing disproportionate costs on low-income households because subsidy charges are applied uniformly, regardless of users' income levels. Unlike progressive taxation—where individuals contribute more as their income increases— the CFPs do not adjust charges based on socio-economic status. As a result, lower-income households end

[62] The information here draws on Udo Leuschener's Energie Politik (https://www.udo-leuschner.de/energie-chronik/chframe.htm) for more details see, Trax 021.
[63] The information here also draws on Udo Leuschener's Energie Politik (https://www.udo-leuschner.de/energie-chronik/chframe.htm) for more details see, Trax 022.
[64] Put in practice in 19991, this law was later replaced by Erneuerbare-Energien-Gesetz (EEG) in 2000.
[65] The information in this paragraph largely draws on Udo Leuschener's Energie Politik (https://www.udo-leuschner.de/energie-chronik/chframe.htm) for more details see, Trax 022.
[66] Trax 022
[67] Trax 019 [Bundestag] and Trax 020
[68] Trax 056

up spending a higher share of their income on energy compared to wealthier groups.[69] In fact, electricity bill payers and taxpayers often overlap,[70] but using the CFPs rather than taxpayers-funded policies tends to skew the economic burden of energy transition towards people with lower incomes.[71]

The CFPs can still incorporate some progressive elements if electricity billing is structured in a way that charges higher rates for greater level of consumption. The underlying assumption here is that people with higher income consume more electricity. However, this may not be always the case, as wealthier individuals often have greater access to energy-efficient technologies. A more equitable approach would certainly be to base charges on income levels, but implementing such a system is challenging: Designing income-based electricity charges is complex and can incur significant administrative costs. Policymakers in both Germany and the UK have highlighted these administrative burdens as a key tradeoff when formulating public policies.[72]

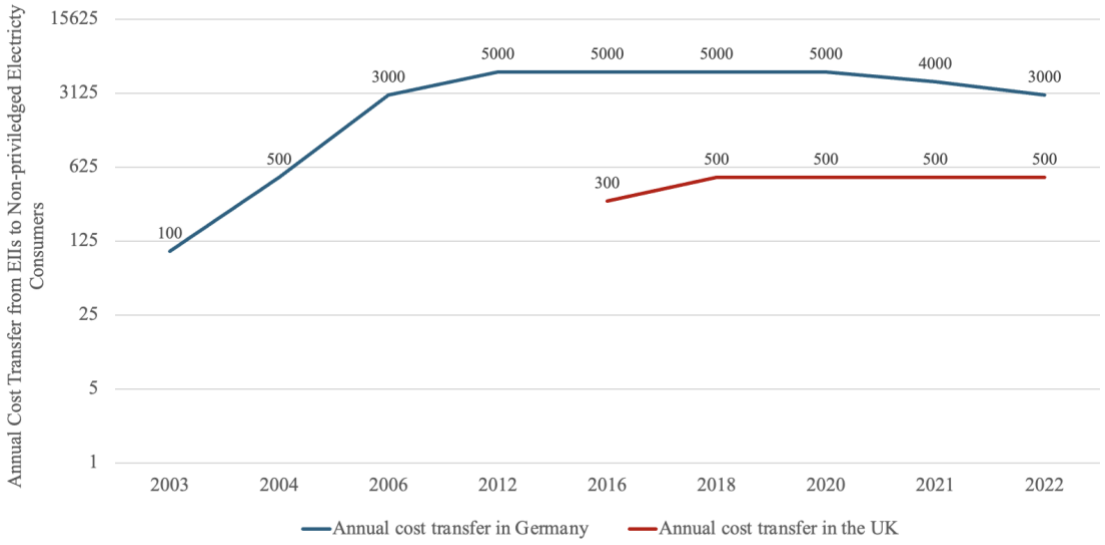
Overall, there is broad consensus that the CFPs are regressive in nature. [73] In the UK, civil society organizations —particularly those addressing fuel poverty, such as National Energy Action— advocated for financing renewable energy through taxation rather than through the CFPs.[74] Similar concerns were echoed in the political sphere:[75] Some policymakers cautioned against the use of the CFPs, considering that rising electricity bills risked pushing more households into fuel poverty[76] and they also called for better assessments of which socio-economic groups would be affected hardest.[77] In Germany, the CFPs were likewise criticized for placing a disproportionate burden on lower-income households.[78] Recognizing that taxation could socialize the costs of the energy transition better and help ease the associated social tension,[79] both civil society groups and political parties—such as the Greens—pushed for the use of state budget to finance the energy transition.[80]

Fairness concerns around the CFPs extend beyond their inherently regressive designs: While the design of the CFPs is problematic from the onset, the exemptions granted to energy-intensive industries have further exacerbated their negative distributional impacts. In many European countries, heavy industries with high electricity usage such as

[69] Anonymous interviewee data.
[70] Trax 015 [Westminster]
[71] Anonymous interviewee data
[72] Trax 024 [Bundestag and Westminster]
[73] Anonymous interviewees data
[74] Anonymous interviewee data
[75] Trax 025 [Westminster]
[76] Trax 013 [Westminster]
[77] Anonymous interviewee data, and also Trax 026 [Westminster]
[78] Anonymous interviewees data
[79] Anonymous interviewees data
[80] Trax 057

steel, paper, chemicals, and cement were exempted from paying the CFP-related charges not to compromise their international competitiveness. However, exemptions shifted the financial burden onto non-exempt consumers —primarily households and small- to medium-sized enterprises (SMEs)— who were left to cover the tab in renewable energy support (see Figure 2). As a result, exemptions came at the expense of social equity. In Germany, where the industrial base is particularly strong, such exemptions were more generous, intensifying the public debate over the fairness of the energy transition.[81]

Figure 2. Amount of cost redistribution from energy-intensive consumers to non-exempt consumers



Source: Author's own compilation, see Trax 066 for more details.

The industrial exemptions from the CFPs also drew criticisms for contradicting "the polluter pays principle". Given the significant contribution of heavy industry to emissions, many argued that these industries should share the costs of the energy transition proportionate to their electricity consumption.[82] This was indeed one of the original aims of the CFPs —to incentivize efficient electricity use particularly among energy-intensive industries by increasing electricity costs.[83] However, widespread exemptions reduced this pressure, undermining the very goals the CFPs were meant to support. In the UK, some policymakers insisted making exemptions conditional on improvements in energy

[81] Trax 027
[82] Trax 008
[83] Anonymous interviewee data

efficiency,[84] and similar calls emerged in Germany.[85] Despite this, exemptions were ultimately not tied to efficiency gains in either country, due to concerns over maintaining international competitiveness —a race-to-the-bottom dynamic.[86] In Germany, where such exemptions were more extensive, the government faced particular criticism for sending the wrong signals to industry with generous exemptions.[87]

Fairness concerns surrounding environmental CFPs also extend to how the benefits are allocated: A common criticism is that these policies effectively transfer wealth from renewable energy consumers to producers. To illustrate, in Germany, when rising policy costs started to undermine the interests of consumers in the early 2010s, the consumer protection organizations like vzbv and policy-makers made calls for a more balanced approach that protected the interests of both groups.[88] More specifically, environmental CFPs were seen as facilitating a transfer of wealth from the poor to the rich. Environmental CFPs such as the feed-in tariff system incentivized households to install rooftop solar panels or participate in energy cooperatives by offering high returns. However, most participants were relatively affluent homeowners with the means to make upfront investments.[89] As a result, these benefits disproportionately accrued to the affluent, while the costs were spread across the general consumer base —including low-income households.[90] For some critics, this led to socially unacceptable outcomes, like pensioners with limited incomes effectively subsidizing wealthier individuals.[91]

It is inherently unavoidable for many public policies to result in some degree of distributive impact as a negative externality. Yet, a major handicap with environmental CFPs is the risk of oversubsidization which caters to the particularistic interests of renewable energy producers at the expense of the broader public good. The CFPs can fuel this problem by generating "a permanent market expectation of subsidies" which entrenches producer interests and reduces policy flexibility.[92] In contrast, when renewable energy is financed through the state budget, this risk is mitigated, as funding is subject to regular approval of the treasury or ministry of finance each fiscal year. Policy-makers also acknowledge the difficulty of getting money from the government.[93] Although sometimes

[84] Trax 028 [Westminster]
[85] Trax 008
[86] Anonymous interviewee data
[87] Anonymous interviewee data
[88] Trax 029 [Bundestag]
[89] Anonymous interviewees data
[90] Anonymous interviewee data
[91] Anonymous interviewee data
[92] Anonymous interviewee data
[93] Trax 030 [Westminster]

viewed negatively, this difficulty actually derives from the built-in accountability itself and associated political liability to spend people's money wisely in the public interest.[94]

V. Improvements

The growing prevalence and political salience of critiques against environmental CFPs led to policy feedback that ultimately shaped their evolution. As noted earlier, the 2001 ruling of the European Court of Justice largely settled the question of whether the CFPs violated EU state aid rules. Later on, a new investigation launched by the European Commission in 2012 also compelled the German government to reach a compromise that narrowed the scope of industrial exemptions, aiming to prevent the CFPs from being used to unfairly favor domestic industries against international competitors.[95] As a result, while most exemptions were retained, the number of German companies benefiting from them was reduced.[96] At the same time, the Commission also reformed its state aid regulations to accommodate limited industrial exemptions within a consistent legal framework.[97] At domestic level, on the other hand, the critiques of the CFPs prompted policy-makers to introduce certain changes in the practice of the CFPs. These changes aimed to enhance transparency, accountability, efficiency, and social equity in the design and administration of the CFPs.

Enhanced transparency and cost consciousness

First, growing public discussions and the increasing political salience of the CFPs have gradually increased awareness of their costs. Even though these policies are not still counted in the formal state budget, there is now a more visible political tendency to treat them as a component of public finance, akin to taxpayer-funded expenditures. The governments have begun keeping meticulous records of CFP-related spending, reflecting a broader shift toward cost-consciousness. In particular, the UK has implemented concrete steps to track the expenditures related to the CFPs more rigorously. Since the foundation of Office for Budget Responsibility (OBR), all the expenses related to environmental CFPs have been documented.[98] In its annual reports, the OBR details the costs incurred through environmental CFPs, such as the Renewables Obligation.[99] Until recently, feed-in tariff schemes were also included in these reports but were later removed due to a disagreement with the Office for National Statistics (ONS).[100] The OBR reporting essentially

[94] Trax 031 [Westminster]
[95] Trax 059
[96] Trax 032
[97] Trax 033
[98] Trax 034
[99] Anonymous interviewee data
[100] *Ibid.*

acknowledges that the costs associated with the CFPs are, in fact, public spending and must be documented accordingly.[101] Here, it is also worth mentioning the Levy Control Framework (LCF), introduced by the UK government in 2011, to oversee the costs related to environmental CFPs. As will be discussed in the following sections, the LCF has served not only as a tool to limit spending related to the CFPs but also as a means of tracking these expenditures.[102]

Likewise, the cost of the CFPs has gained political salience in Germany. Information related to the high costs of the CFPs are kept available to the public. Yet, it is typically provided by the German Federal Network Agency rather than the government itself. Unlike in the UK, the German government's budget plans generally do not include information about the CFPs costs.[103] Some policy-makers in the Bundestag criticized this lack of transparency, noting that the sums related to the CFPs, which exceeded several billion euros in 2010 alone, were not reflected in the federal budget.[104] It was only in 2022 that the German government began to include information on the cost of environmental CFPs in its financial planning, when it decided to meet a portion of renewable subsidies costs from the state budget.[105]

Efforts to improve the transparency of the CFP-related costs also include amendments to increase the public visibility of these costs for consumers. In 2006, for example, the German government required utility companies to disclose and publish information on renewable subsidy costs on electricity bills.[106] During the 2000s and 2010s, a key concern was that the public did not receive sufficient feedback about the CFPs. [107] However, with improved access to information—particularly regarding EEG costs—some argue that transparency is no longer an issue and that the costs of environmental CFPs may now be even more visible to the public than traditional taxes, given the growing political salience of the topic.[108]

Similar efforts were made in the UK to enhance the transparency of environmental CFP costs for electricity consumers. In 2008, Conservative members of parliament supported an amendment to the energy laws aimed at helping consumers make more informed choices: The proposed amendment required energy suppliers to disclose the percentage of electricity bills allocated to environmental CFPs. However, the ruling Labour government opposed the amendment, citing concerns about adding bureaucratic burdens

[101] Anonymous interviewee data, and also see Trax 035.
[102] Trax 036 [Westminster]
[103] Trax 037
[104] Trax 038 [Bundestag]
[105] Trax 060
[106] Trax 039 [Bundestag]
[107] Anonymous interviewee data
[108] Anonymous interviewee data

on energy suppliers.[109] The Conservatives criticized Labour government for obscuring the true costs of the CFPs, arguing that consumers paid for these policies without being properly informed.[110] The Conservatives later pledged that under their government all environmental CFP costs would be clearly itemized on energy bills to show consumers how much they were contributing. [111] Indeed, in line with this commitment, the electricity market reform in the early 2010s introduced significant changes, making it easier for consumers to understand the complex tariff structures on their bills and to compare providers in order to select the cheapest options.[112] However, compared to electricity bills in Germany, those in the UK were ultimately less revealing, particularly regarding policy costs (Table 2).[113]

Table 2. Policy costs in electricity bills

	Component	Introduced	Status*	Transparency
Germany	EEG Levy (EEG Umlage)	1991**	2022	Visible
	Combined Heat and Power (KWK Umlage)	2002	Active	Visible
	Electricity tax (Stromsteuer)***	1999	Active	Visible
	Offshore Grid Levy (Offshore Netzumlage)	2013*†	Active	Visible
	Grid-fee relief for EIIs*†† (StromNEV Umlage)	2012	Active	Visible
UK	Renewables Obligation	2002	Active	Partially Visible††
	Feed-in Tariff	2010	Active	Partially Visible††
	Warm Home Discount	2011	Active	Partially Visible††
	Contracts-for-Difference	2015	Active	Partially Visible††
	Energy Company Obligation (ECO)	1994†	Active	Partially Visible††
	* If there is a year, it indicates the final year of implementation ** Electricity Feed-in Act (Stromeinspeisungsgesetz) until 2000 ***aka Ecotax— Ökosteuer *†Until 2018 Offshore Liability Levy (Offshore-Haftungsumlage/Offshore-Umlage) *†† Energy-intensive industries †Including previous forms such as EESoP, EEC, CERT and CESP †† Not individually visible but grouped under the title of "Standing charge" Source: Own compilation, see Trax 067			

Reining in the costs

In addition to efforts to improve transparency, policy-makers also introduced several reforms to promote more efficient use of the CFPs in public finance. A key objective of

[109] Trax 040 [Westminster]
[110] Trax 041[Westminster]. In 2009, they renewed their call saying that "Consumers want to know what they are paying towards the environmental salvation of this country." See Trax 042 [Westminster]
[111] Trax 043 [Westminster]
[112] Trax 044 [Westminster]
[113] Trax 067

these changes was to demonstrate that the CFPs relied on finite public resources as well.[114] Governments also sought to institutionalize spending limits to contain the financial burden the CFPs could place on the public. In the UK, one such measure was the introduction of the Levy Control Framework (LCF) in 2011, designed to cap the costs of environmental CFPs passed on to consumers.[115] Although the funding did not come directly from the government budget, the LCF operated under a "fixed budget" to limit total expenditures.[116] Some Labour members of parliament criticized the LCF, describing it as a "half-mythical, half-real device" used to crack down on renewable deployments.[117] Nevertheless, the National Audit Office also recognized the framework as a useful tool for managing the costs of the CFPs borne by bill payers.[118]

Germany also saw political calls to limit the financial burden of environmental CFPs on consumers. For example, in 2012, Katherina Reiche, Parliamentary State Secretary for the Ministry of Environment, urged the Bundestag to adopt a resolution that would cap additional costs stemming from these policies.[119] Unlike the UK, however, Germany did not impose strict budgetary caps on its environmental CFPs. German policymakers, including Merkel, occasionally articulated *ad hoc* fiscal targets —like 3.5¢ per kWh— but they were not legally mandated.[120] Instead, the German government put in practice a new policy called “growth corridors” which aimed to regulate the pace of renewable energy installations by setting monthly capacity targets within a specified band based on recent installation trends.[121] Germany’s experience with excessive solar installations between 2009 and 2011 prompted the Merkel government to introduce this policy mechanism. Among its various objectives—such as preventing excessive strain on the grid— one was also to protect electricity consumers by shielding them from the financial burden associated with the rapid expansion of renewable energy.

The introduction of additional policy instruments, such as auctions and tendering, also contributed to cost reductions in environmental CFPs in both Germany and the UK. This served better for the interests of renewable energy consumers. A devout proponent of auctions, the UK was among the first to implement legal changes in 2013 to support a transition to auction-based schemes —specifically through the Contracts for Difference

[114] Trax 045 [Westminster]
[115] Anonymous interviewee data
[116] Trax 046 [Westminster]
[117] Trax 047 [Westminster]
[118] Trax 048 [Westminster]
[119] Trax 049 [Bundestag]
[120] Trax 064
[121] Trax 061

(CfD) mechanism.[122] The implementation of auctions in the ensuing years facilitated substantial cost reductions in the UK, especially for offshore wind, easing the economic burden of environmental CFPs on bill payers.[123] Similarly, in 2014, the European Commission directed its members to award policy support for renewable energy sources through competitive bidding.[124] The shift from feed-in tariff systems to competitive mechanisms across Europe addressed overspending and inefficiency issues in the CFPs to a great extent —Germany included. Even policymakers in Germany who had not previously been a "big fan" of auctions acknowledged their effectiveness.[125] In sum, while both the UK and Germany employed a range of policy tools, the recent transition toward market-based instruments such as auctions has played a key role in addressing the cost challenges associated with environmental CFPs.

Socializing the costs

Certain policy interventions can be instrumental in reducing the costs associated with environmental CFPs, but they cannot eliminate them entirely. As previously noted, these costs—when passed through electricity bills—tend to be regressive. For this reason, both the UK and Germany frequently faced calls to shift the financing of renewable energy support from consumer-funded mechanisms to the state budget. Over time, both countries introduced measures to socialize the costs of environmental CFPs. In the UK, for example, the government opted to fund certain policies—such as the Renewable Heat Incentive—through general taxation rather than electricity bills.[126] At the time, this shift was largely driven by political efforts to ease energy affordability concerns, particularly after electricity prices surged in 2013: To address the issue, the government sought to lower bills by moving some environmental policy costs off electricity bills and into the state budget.[127]

On the other hand, despite their regressive designs, the CFPs can sometimes incorporate policy schemes to help low-income households. This was the case in the UK when the country included "Warm Home Discount" among its CFPs. This targeted policy instrument provided rebates on heating bills to eligible low-income and vulnerable households at risk of fuel poverty.[128] From an equity perspective of the energy transition, this created a somewhat paradoxical situation in which low-income households were key

[122] The relevant part in Kozlov, 2014 mentions the following: "The Energy Act 2013 received royal assent in December 2013. It implements the Feed-in-Tariff Contracts for Difference (the CfD) which is set to become the primary support scheme for low carbon generation in the UK by 2017."
[123] Trax 050
[124] Agora, 2014
[125] Trax 051 [Bundestag]
[126] Trax 052 [Westminster]
[127] Trax 053
[128] Trax 054

beneficiaries of the CFPs, yet were also disproportionately burdened by their regressive designs.[129]

Additionally, as different from Germany, the UK did not grant exemptions to its energy intensive industries at the beginning. Instead, the government provided fiscal relief for its industries directly from the state budget. In this respect, environmental CFPs in the UK were comparatively less regressive, as household and non-exempt commercial electricity consumers were not supposed to cover the tab left by the industry. The UK government's decision not to finance industrial privileges through its CFPs initially served to protect the rights of households and enabled a fairer energy transition. However, maintaining this policy became difficult due to the increasing burden of industrial exemptions on the state budget. Consequently, starting in 2016, the government began offer industrial privileges through its CFPs, similar to Germany's approach. This decision was met with criticism from Labour members of parliament, who raised concerns about its distributional impact on households and other non-privileged electricity consumers: In addition to issues of fairness, they raised concerns about accountability, as the costs of industrial exemptions were shifted from the government's budget to the CFPs, which were less subject to legislative scrutiny.[130] In this way, environmental CFPs in the UK lost some of their progressive elements. This trend was also previously reflected in the replacement of the tax-funded Warm Front scheme with the consumer-funded Warm Home Discount in the 2010.[131]

Due to the fiscal burden, UK governments generally avoided resorting to the state budget to mitigate the regressive impacts of environmental CFPs. An exception occurred in 2022 when electricity prices surged dramatically due to the energy market crisis caused by the Russian-Ukrainian war. The Liz Truss government introduced a relief program to meet the costs of environmental CFPs in electricity bills for two years. Since the funding came from the state budget, this policy was progressive. However, the relief program was conditional on energy market conditions, being triggered only when average electricity bills exceeded £2,000. As the energy market improved, the government paused the relief program in June 2023.[132]

Different from the UK, Germany's CFPs were more regressive due to excessive industrial exemptions. However, in 2020 the German government decided to phase out environmental CFPs in electricity bills. The initial plan was to cover a portion of the environmental levies from the state budget, lessening the burden of the CFPs.[133] Later on, the government decided to eliminate the CFPs entirely by 2023. Here the revenues coming

[129] Anonymous interviewee data
[130] Trax 055 [Westminster]
[131] Anonymous interviewee data
[132] For more specific information in this paragraph see, Trax 062
[133] For more specific information in this paragraph see, Trax 063

from national carbon pricing schemes played a key role, as the government chose to recycle these revenues to ease the economic burden of environmental CFPs (Table 2). As a result, even though Germany maintained regressive environmental CFPs over the years, the changes in the early 2020 enabled the country to better socialize the cost of its environmental CFPs, even relative to the UK.

Table 3. Carbon tax revenues from ETS, in £ billion*

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
UK[†]	0.6	0.5	0.4	0.3[**]	0.3	1.6	1.3	1.0	5.8	6	3.5[††]
Germany	0.7	0.9	0.7	0.9	2.2	2.7	2.2	10.8[#]	11.3[#]	16	15.7
	*Based on both European and UK ETS (Emission Trading Scheme) and German National Emissions Trading System [†] Rounded fiscal year (i.e., 1 April to 31 March) [#]Including national ETS. * *Based on 2019 March outlook, for October 2018 outlook it is 0.4 [††] Forecast Source: Own compilation, see Trax 065										

The political motivations in moving environmental CFPs to taxation were certainly varied, ranging from making electricity cheaper to enhancing electrification and offering more affordable energy for companies and households during the 2022 energy crisis in Europe.[134] In this sense, it can be questionable whether the German government was primarily motivated by a desire to adopt a more progressive financial instrument.[135] Regardless of the political motivations, Germany's current approach to financing renewables has certainly become more socially equitable.

VI. Conclusion

In an effort to contribute to the existing literature on climate finance, this paper analyzed environmental CFPs through the lens of the energy transitions in Germany and the UK. As a convenient source of public finance, environmental CFPs significantly facilitated the promotion of renewable energy without increasing the tax burden on ruling governments. Additionally, the CFPs offered further advantages, such as discouraging inefficient electricity use drawing on carbon-intensive sources and shielding public support for renewable energy from the EU's strict state aid regulations. However, environmental CFPs also faced substantial criticism for a range of reasons. First, unlike conventional tax collection methods, the CFPs lacked transparency and were subject to limited oversight by legislative bodies and the public. Second, although their legal status was open to interpretation, many viewed the CFPs as *de facto* subsidies and argued that they violated

[134] Anonymous interviewee data
[135] Anonymous interviewee data

EU state aid rules. Third, the regressive nature of environmental CFPs undermined the fairness of the green transition, prompting growing calls to fund the energy transition through the state budget rather than through the CFPs.

The widespread criticisms of the CFPs may have undermined their legitimacy as a source of public finance. However, these critiques also played a constructive role in improving the CFP practices within the energy transition. Policymakers took steps to increase the transparency of environmental CFP-related costs to the public and introduced additional regulatory oversight to better monitor and control these expenses. Finally, as alternative funding sources became available, governments began replacing the CFPs with revenues from the state budget, thereby narrowing their scope and reducing the regressive effects associated with these policies.

While the literature on the green energy transition includes numerous studies on policy instruments, it lacks a theoretical framework that examines the political economy dynamics behind them from a public policymaking perspective. This paper has sought to fill that gap by offering such a framework for understanding environmental CFPs. On more practical side, this research also offers several policy implications—particularly concerning the continued relevance of the CFPs, the financing of new green energy initiatives and policy design.

Indeed, despite mounting criticisms and raising questions marks around them, the CFPs have remained relevant as a means of funding environmental policies. Governments continue to rely on these instruments as a practical revenue source that avoids the politically charged debates surrounding taxation and helps circumvent legislative hurdles in fiscal policy. So far, the environmental CFPs have primarily been used to finance renewable energy. Yet, today's energy transition demands far more complex investments—such as high-voltage transmission lines to facilitate clean energy mobility, battery storage to ensure grid reliability, and emerging but still costly technologies like hydrogen fuel.

The fiscal relevance of CFPs is particularly pronounced in countries where fiscal prudence and deficit concerns are more salient. In such countries, where expanding state budgets is politically difficult, CFPs may be especially appealing. The UK offers a clear example: British policy-makers currently consider CFPs as a viable solution to finance their ambitious plans on hydrogen fuel given the budgetary realities the county faces—i.e., by shifting investment costs to gas bills.[136]

One factor that could reduce reliance on CFPs is the rise of carbon revenues. As governments increase carbon pricing to accelerate the transition away from fossil fuels, carbon taxes may gradually replace CFPs as a funding source. For years, low carbon prices

[136] Trax 073, and 068

failed to generate significant public revenue. That has changed. For example, Germany has recently removed EEG subsidy costs from electricity bills with the help of rising carbon tax revenues from its Energy and Climate Fund.

However, the unpredictability of both expenditures and revenues underscores the continued importance of CFPs as they constitute stable revenue resources, also being relatively less vulnerable to political interference compared to carbon taxes. Even in Germany—where they reached more than €18 billion annually—carbon tax revenues could barely fund EEG subsidies in 2024, forcing the government to draw an additional €8 billion from the general budget on top of planned the €10.6 billion.[137] Also in the UK, where such revenues were already modest, they suffered a major blow when the Sunak government lowered carbon prices, reducing projected revenues from ~£6 billion to £3.5 billion.[138]

That said, the continued relevance of CFPs does not mean business as usual. As discussed throughout this paper, mounting criticisms require a more informed and cautious use of CFPs in financing the green transition. Their regressive impacts lead to ethical concerns that demand greater justification for their use—despite their fiscal appeal. Good public policymaking already dictates this, placing an ethical obligation upon policymakers to treat CFPs with the same responsibility as tax revenues, recognizing that they draw directly from citizens' pockets. In this light, environmental policy priorities and trade-offs—particularly involving fairness—must be clearly defined before exhausting relatively comfortable fiscal space provided by the CFP resources. For instance, long-term funding commitments to early solar and wind producers—enabled by 20-year feed-in tariff contracts in Germany and 15-year contracts in the UK—still account for a significant share of the charges financed by CFPs.[139] These legacy commitments leave little room to promote newer, more efficient, and less costly renewable technologies.

At the same time, actors in both the political sphere and civil society have a responsibility to facilitate more informed public debate about CFPs so that they could be used more diligently. Most consumers are unaware of the small, incremental increases in their utility bills—and, being unorganized, they lack the political power to influence CFP design. Efforts to cultivate public awareness and mobilize political preferences about the CFPs are therefore crucial for ensuring that these policy instruments serve the public interest.

The good news is that, beyond normative debates, formal mechanisms have also been introduced to increase the accountability of CFPs. The UK's Levy Control Framework is a prime example. If new challenges emerge, policymakers may increasingly turn to regulatory tools to govern the application of CFPs.

[137] Trax 069
[138] Trax 065
[139] Trax 070 and 074

On the other hand, the CFPs also have a structural weakness that warrants attention from a policymaking perspective: They are vulnerable to political attacks most during energy crises. At least, the experience with 2013 and 2022 crises in international energy markets demonstrate this: When electricity prices spike and public pressure mounts, policymakers tend to target CFPs first in an attempt to lower consumer bills.[140] This dynamic raises questions about the political viability of CFPs under certain circumstances.

One practical strategy to protect the political image of environmental CFPs is to temporarily take them off of bills during crises and put the costs on the state budget—as the UK did in 2022 until global market conditions stabilized by July 2023.[141] If budget support is not feasible, an alternative approach can be to shift costs between other utility bills—such as gas—where cost pressure is lower or the polluters-pay-principle is more directly applicable.[142] Of course, these strategies are not perfect, resulting their own policy dilemmas and equity concerns. Nonetheless, they can be part of a broader toolkit that policymakers can deploy when environmental CFPs come under strain.[143]

[140] Trax 071
[141] Trax 072
[142] Trax 073
[143] Trax 073

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Appendix – List of Interviewees

I would like to specially thank my interviewees for taking their time and sharing their valuable points. Their acknowledgement here does not necessarily mean that they agree with the findings/arguments of this dissertation research.

1. Lisa Grau, *dnr*, November 24, 2020
2. Marlon Nuske, *Bürgerlobby Klimaschutz*, December 1, 2020
3. Arne Fellerman, *BUND,* December 1, 2020
4. Henrik Maatsch, *WWF Deutschland*, December 3, 2020
5. Marco Gutle, *Bündnis Bürgerenergie,* Dec 2, 2020
6. Helena Geißler, *klimaherbst,* December 2, 2020
7. Dr. Joachim Hein, *BDA*, December 7, 2020
8. Milan Elkerbout, *CEPS*, December 4, 2020
9. Dr. Maurizio Vargas, *Greenpeace Germany*, December 11, 2020
10. Prof. Klaus Jacob, *Freie Universität Berlin*, December 7, 2020
11. Dr. Eva Schmid, *German Watch*, December 15, 2020
12. Nils Weil, *Bundesverband Erneuerbare Energie*, December 15, 2020
13. Susanne Jung, *SFV*, December 17, 2020
14. Anna Brehm, *DFWEN*, Dec 17, 2020
15. Mark Wagenhauser, *DFWEN,* Dec 17, 2020
16. Carolin Schenuit, *FÖS,* Dec 17, 2020
17. Malte Kreutzfeldt, *TAZ*, Dec 17, 2020
18. Mirko Moser-Abt, *Bundesverband WindEnergie*, Dec 18, 2020
19. Sandra Weeser, *FDP*, January 4, 2021
20. Sebastian Boie, *Stiftung Offshore-Windenergie*, January 6, 2021
21. Philipp Ellett, *VDA*, Jan 14, 2021
22. Benthe Libner, *CDU*, January 26, 2021
23. Dr. Joachim Pfeiffer, *CDU*, Jan 28, 2021
24. Dr. Lukas Kohler, *FDP*, Feb 3, 2021
25. Marie-Luise Abshagen, *Forum Umwelt & Entwicklung*, February 3, 2021
26. Caterina Brandmayr, *Green Alliance*, May 14, 2021
27. Dr. Simon Evans, *Carbon Brief,* May 12, 2021
28. Ece Ozdemiroglu, *UK Climate Change Committee,* November 26, 2021
29. Ana Musat, *Aldersgate,* September 24, 2021
30. Bob Ward, *Grantham Research Institute on Climate Change and the Environment*, Jun 14, 2021
31. Dr. John Constable, *Renewable Energy Foundation (REF), November 29, 2021*
32. Jon Ferris, *Delta Energy & Environment*, December 1, 2021
33. Peter Smith, *NEA,* Dec 7, 2021
34. Professor Peter Connor, *Exeter University*, December 3, 2021
35. Richard Warren, *MAKEUK*, December 17, 2021
36. Dr. Simon Cran-Mcgreehin, *ECIU*, December 2, 2021
37. Vipran Srivastava, *OFGEM,* December 10, 2021
38. Prof. Dr. Andrew Watkinson, *British Ecological Society*, May 18, 2021

39. Richard Hall, *Citizens Advice*, Jun 16, 2021
40. Liam Stoker, *UK Solar*, May 5, 2023
41. Mike Landy, *UK Solar Trade Association*, May 9, 2023
42. Prof. Dr. David Toke, Univeristy of Aberdeen (formerly), May 10, 2023
43. Joseph Fell, Former MP, *Greens*, May 16 2023
44. Arjan Geveke, *EIUG*, May 23, 2023
45. Andreas Fischer, *German Economic Institute (IW*), May 26, 2023
46. Henning Herbst*, vzbz,* May 30, 2023
47. Charles Hendry, former Minister, *Conservatives*, May 31, 2023
48. Dustin Benton, *Green Alliance*, May 31, 2023
49. Andy Cox, *Howden Group*, May 31, 2023
50. Stephen Thomas, *Wupperal Institute*, June 1, 2023
51. Derek Lickorish, *Fuel Poverty Group*, June 6, 2023
52. Diana Casey, *Mineral Products Association*, July 10, 2023
53. Sandra Enkhardt, *PV Magazine*, June 29, 2023
54. Howard Johns, consultant, June 29, 2023
55. Frank Aaskov, *MakeUK*, June 30, 2023
56. Johannes Lackmann, Westfalenwind. June 30, 2023
57. Sven Egenter, *Clean Energy Wire*, July 3, 2023
58. Craig Morris, *Klimaschutz im Bundestag,* July 5, 2023
59. Gerd Billen, *vzbz, former* MP (SPD), July 10, 2023
60. Dr. Chirstopher Kost, Fraunhofer-Institut für Solare Energiesysteme ISE, July 17, 2023
61. Prof. Matthew Lockwood, *Essex University*, July 17, 2023
62. Klaus Mindrup, *SPD* (former MP), July 21, 2023
63. Steve Freeman, *Confederation of Paper Industries,* August 9, 2023
64. James Fotherby, *Aldersgate Group*, September 11, 2023
65. Johm Parnell, *Lightsource BP,* September 12, 2023