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Hybrid renewable energy support policy in the power sector: The contracts for difference and capacity market case study

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HIGHLIGHTS

- The hybrid support policy combines traditional support systems.
- Hybrid policies may drive objectives better than traditional policies.
- The UK's contract for difference and capacity market system is a hybrid policy.
- Environmental protection is foremost in the UK's hybrid policy.
- To thrive, the UK's hybrid policy should address private sector interests.

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ABSTRACT

The article employs qualitative methods in contextualizing and conceptualizing the hybrid renewable energy support policy. It claims that hybrid policies may combine distinct mechanisms to drive desirable objectives better than traditional policies. A policy cycle helps to frame the United Kingdom's Contracts for Difference and Capacity Market (CFD & CM) scheme as a case study. The CFD & CM policy emerged to address environmental and energy challenges through the deployment of renewable energy (RE) in a low-carbon economy, employing liberalization: Environmental protection is foremost in this scheme. The policy combines and improves on the elements of feed-in tariff (FIT) and quota obligation (QO), and strives to solve the problems of these traditional policies. It addresses regulatory uncertainty under FIT by employing private law mechanics to guarantee above-loss reward for low carbon generation, and addresses market uncertainty under QO by incentivizing the capacity to supply future low carbon energy based on projected demand, hence creating a predictable and stable market. It also accommodates other important commitments. Overall, the CFD & CM scheme is a hybrid policy that engages the energy market mainly for advancing the end goal of environmental protection. To thrive however, it needs to meet private sector interests substantially.

1. Introduction

The political pressure to protect the environment emerged in the 1960s, and mounted thereafter, resulting in the consensus of the majority to take environmental protection seriously. The demand for energy has also been increasing as electricity, heat and transportation needs are growing, leading to renewed interests in boosting and stabilizing energy. Boosting energy involves increasing energy availability, and stabilization entails making energy supply predictable and reliable by enlarging and diversifying its sources. Enlargement increases output, and diversification reduces reliance on a single source. Given this background, jurisdictions consider the deployment of renewable energy (RE) and energy efficiency a viable channel for boosting and stabilizing energy while protecting the environment.

Abbreviations: CM, capacity market; CO_2, carbon dioxide; CEM, clean energy ministerial; CFD, contract for difference; CFD & CM, contracts for difference and capacity market; DECC, Department of Energy and Climate Change; DTI, Department of Trade and Industry; EMR, electricity market reform; EU, European Union; FIT, feed-in tariff; GHG, greenhouse gases; HM, Her Majesty's; IFC, International Finance Corporation; IRENA, International Renewable Energy Agency; KP, Kyoto Protocol; LCCC, Low Carbon Contracts Company; NFFO, Non-Fossil Fuel Obligations; Ofgem, Office of Gas and Electricity Markets; QO, Quota obligation; RE, renewable energy; REP, Renewable Energy Policy; RO, Renewables Obligation; UK, United Kingdom; UNCED, United Nations Conference on Environment and Development; UNCHE, United Nations Conference on the Human Environment; UNFCCC, United Nations Framework Convention on Climate Change; USA, United States of America

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RE as a mechanism involves the application of technologies that generate and utilize energy from renewable natural resources while energy efficiency adopts techniques that apply less energy, whether at the input, output or end use stage, to maximize utility. Carbon capture and storage is another evolving mechanism (Stephens, 2006; Stephens et al., 2011; Zheng and Xu, 2014) involving the trapping of carbon dioxide (CO2) produced from fossil fuels and storing it in manners that minimize environmental impacts. Compared to RE and energy efficiency, carbon capture and storage is controversial (Kole, 2015; Stephens, 2015; Viebahn et al., 2007) mostly because it is currently too complex and expensive, has several uncertainties, and remains untested on a large-scale (Elliot, 2015; Widjanarko and Ubaydullaev, 2011). It might also be mitigating less carbon than expected (Balat et al., 2009), and faces peculiar barriers in developing countries (Kulichenko and Ereira, 2012).

Thus, RE is generally the most viable complement to energy efficiency, at the moment, for advancing environmental protection. Further, it boosts and stabilizes energy within environmental constraints as against energy efficiency which mainly maximizes energy utility. For these reasons, stakeholders—state, non-state and economic actors—and scholars have been interested in how to increase its integration into energy streams currently dominated by oil, gas and coal, through suitable support policies.

There are several RE support policies which could be classified. In the earlier period of RE policy research, one could see the influence of commentators' backgrounds on their categorization and emphases more clearly. Social scientists have distinguished command and control and market-based categories with emphases on the issues of cost, price and efficiency, and the overall socio-political environment; physical scientists have categorized policies based on the role of technology and the issues of effectiveness and sustenance; and jurists have emphasized the role of regulation. While backgrounds still influence classifications, some categories have become popular partly due to the rise of interdisciplinarity.

Popular policy categories include direct and indirect (Haas et al., 2011b; Onifade, 2015a), mandatory and voluntary (Haas et al., 2011b; Onifade, 2015a), price-based and quantity-based (Beck and Martinot, 2004; Haas et al., 2011a, 2011b; Jacobs, 2009; Menanteau et al., 2003), investment-focused and production-focused (Haas et al., 2011b; Jacobs, 2009; Onifade, 2015a), and public-run or command and control as against market-based (see Beck and Martinot, 2004; Toke, 2007, 2011). These categories are neither exhaustive nor as distinct since they interact with one another.

Across the categories, specific mechanisms include feed-in tariff (FIT), quota obligation (QO), tendering incentives, taxation incentives, net metering, research and development, public-private partnerships, loan support, government grants, and standards. FIT, QO, tendering incentives, research and development, net metering, and standards appear to be common across developed countries, while taxation incentives, public-private partnerships, loans, and government grants seem to top the list in developing countries. These mechanisms are also not exhaustive, and may overlap in popularity across the board.

One problem this article addresses stems from the disagreement over the suitability of these traditional policy categories and mechanisms. There have been debates on them, for example command and control versus market-based (Toke, 2011), and FIT versus QO (Poputoaia and Fripp, 2008), without much attention given to how they could work together. While these debates still persist, the differences between policies are beginning to blur as hybrids emerge (see Couture et al., 2015; Held et al., 2014; International Renewable Energy Agency [IRENA] and Clean Energy Ministerial [CEM], 2015).

Another problem the article addresses concerns the ambiguity and misdirection that might arise in the development of a RE policy. Whether traditional or hybrid, RE policies generally arise from and depend on jurisdictions' circumstances, hence the importance of their evolution (see also Jacobs, 2009; Onifade, 2015a). As policies move across development phases, power play may misdirect them and obscure the importance of objectives. The analysis of their evolution may contextualize any ambiguity and misdirection, showing the priority of objectives better than what one sees in policy outcomes. This might reveal lessons on how policies are designed to promote desirable objectives.

To address these problems, the article analyses the nascent contracts for difference and capacity market (CFD & CM) scheme in the electricity sector of the United Kingdom (UK). Unlike previous studies, it contextualizes and conceptualizes this scheme as a hybrid RE policy that has emerged to foster environmental protection. It argues that hybrid RE policies may combine distinct support mechanisms to drive desirable objectives better than traditional policies.

Four other sections follow. Two outlines the methodology and data. Three presents the results showing why, how and when CFD & CM emerged. Four discusses CFD & CM as a hybrid. Five concludes, reflecting on the policy implications.

2. Methodology and data

The research applies some qualitative methods used in law (see generally Cane and Kritzer, 2010; Ryan, 2015) and public policy (see generally Fischer et al., 2007; Yanow, 2000): case study, literature review, and descriptive and historical analyses based on a policy cycle developed from the stage theory. It also employs statutory and empirical data from primary and secondary legal and non-legal sources.

2.1. Case study

The article analyses CFD & CM in its context using the case study method (see generally Baxter and Jack, 2008; Zucker, 2009). This reveals the nuances necessary for identifying relevant lessons that could be stimulated for other contexts. However, these are not intended as transplants.

2.2. Literature review

A representative and sometimes pivotal literature review (see generally Cooper, 1988; Randolph, 2009; see also Boote and Beile, 2005) of the methods employed is integrated into this methodology and data section. A similar review of enhanced RE policy and regulation, FIT and QO systems, and CFD & CM is integrated into the introduction, result and discussion sections.

2.3. Descriptive and historical analyses

Descriptive and historical analyses of CFD & CM based on the policy cycle are conducted. These connect the important themes across the policy stages in the result section. Each stage represents a phase in the policy trajectory, but connects to the others through relevant themes. Some of these phases overlap since policy-making is iterative.

More of descriptive analysis and less of historical analysis also feature in the introduction, methodology and data, discussion, and conclusion sections. These depict relevant ideas and scenarios.

2.4. The stage theory

The article briefly shows how the stage theory works. This