Energy Policy 39 (2011) 2228–2244

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

# What lessons have been learned in reforming the Renewables Obligation? An analysis of internal and external failures in UK renewable energy policy

Geoffrey Wood [a,b,*], Stephen Dow [a]

[a] Centre for Energy Petroleum and Mineral Law and Policy, University of Dundee, Dundee DD1 4HN, UK
[b] Centre for Environmental Change and Human Resilience, University of Dundee, Dundee DD1 4HN, UK

ARTICLE INFO

*Article history:*
Received 4 March 2010
Accepted 3 November 2010
Available online 3 March 2011

*Keywords:*
RO reform
Internal and external failures
UK renewable energy policy

ABSTRACT

Despite operating a delivery programme for RES-E since 1990, UK targets and policy goals have not been achieved. In response, the Government reformed the RO. This article re-examines UK renewable energy policy by analysing the internal and external failures of the various mechanisms to determine if Government has learnt from previous experience in reforming the RO. Government did not learn from their own actions during the NFFO/RO transition, evidenced by high-levels of similarity in internal/external failures. The reformed-RO is expected to significantly increase deployment, has provided a 'renewables package' by comprehensively addressing both internal/external failures but major internal failures (price/financial risk) still remain, resulting in contiguous failures over two decades and two mechanism changes (NFFO, RO, RO/reformed-RO). Success will again be heavily dependent on a select few technologies and new/untested measures to combat external failures. Mechanism-extension to 2037 is probably the single most important factor underlying potential deployment increases. However, introducing a FIT-like system via the sheer number of 'bolt-on' reforms to counter policy failures indicates loss of direction and clarity. Overall, although Government appears to have learnt some of its lessons from the past two-decades, significant doubt remains whether renewable energy policy objectives will be met via the latest mechanism change.



## 1. Introduction

The United Kingdom (UK) Government has committed itself to moving towards a low carbon economy, evidenced by strong policies towards the promotion of renewable energy and reducing greenhouse gas (GHG) emissions. In particular, there are three main drivers towards a low carbon economy – security of supply, fossil fuel depletion and climate change. In addition, other benefits for the UK include the full economic exploitation of alternative energy sources, to encourage UK industry to develop capabilities for both domestic and export markets with resultant employment growth in a developing renewables sector and to assist the UK to meet increasingly ambitious renewable energy deployment and greenhouse gas (GHG) emission reduction targets. These policy objectives are clearly stated in a number of UK Energy White Papers during the last two decades and form the current basis for policy (Department of Energy, 1988; Department of Trade and Industry [DTI], 1994, 2003, 2007a).

The UK has had a specific delivery programme for the generation of electricity from renewable energy sources (RES-E) since 1990. There have been two main policy instruments: the Non-Fossil Fuel Order (NFFO), a centralised bidding system that ran from 1990 to 1998, and the Renewables Obligation (RO), a variant of the Renewable Portfolio Standard (RPS) – a tradable green certificate (TGC)/quota system that came into effect in April 2002 (Mitchell et al., 2006).

The 2007 'White Paper on Energy: Meeting the Energy Challenge' (Department of Trade and Industry, 2007a) detailed the government's intentions with regard to reforming the RO: primarily this includes introducing banding to provide differentiated levels of support for different technologies. The reasoning behind reforming the RO is that the UK Government, based primarily on modelling by Oxford Energy Research Associates OXERA (2007) and Ernst and Young (2007), indicate that leaving the RO unchanged means that the 2010 (10%), 2015 (15%) and 2020 (proposed 30–35%) targets will not be achieved (Department of Business and Enterprise and Regulatory Reform (BERR), 2008a). Historically, the UK has failed to meet RES-E targets: for 2009, RES-E contributed 6.6% of electricity generated against the yearly target of 9.1% whilst all renewables (electricity, heat and transport) accounted for only 3% of UK total primary energy requirements (Department of Energy and Climate Change (DECC),

* Corresponding author at: Centre for Energy Petroleum and Mineral Law and Policy, University of Dundee, Dundee DD1 4HN, UK. Tel.: +44 7772126233; fax: +44 1382 385854.
*E-mail addresses:* gcwood@dundee.ac.uk, gcw25@hotmail.com (G. Wood).

0301-4215/$ - see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.enpol.2010.11.012

2010a). OXERA (2007) modelling indicates that the non-reformed RO would only attain 7.9% in 2010, 11.4% in 2015 and 12% in 2020. In contrast, it is anticipated that a banded RO will increase renewables deployment by over 40% for the period 2009–2015 compared to the existing RO (DTI, 2006).

Currently, the NFFO and RO have not delivered deployment at expected levels, created mentors nor promoted energy diversity/security. Of significance, UK policy objectives have not been met and overall this will negatively impact GHG emission reduction targets – including a legally binding target of cutting carbon dioxide emissions by at least 80% in 2050 (DECC (Department of Energy and Climate Change), 2009a).

This paper is concerned with whether or not the UK Government has learned from the past performance, mistakes and difficulties of renewable energy policy with particular regard to reforming the RO (hereafter termed the 'reformed RO'). This will be attempted by analysing the internal and external failures of the NFFO, RO and reformed RO. Internal (or structural) failures are failures (barriers) due to the design of the mechanism itself, whereas external failures are those barriers out with the mechanisms direct control. The reasoning behind this is that, by introducing clearly defined variables, it will facilitate a comparison of the different mechanisms employed over the last two decades and help determine the potential of the reformed RO for the near future. In other words, it will show whether or not the Government has been able to learn from the past and understand and successfully incorporate these lessons for UK renewable energy policy and deployment as it evolves to meet the demands of the move to a low carbon economy, primarily through the reformed RO. This research will be of particular relevance given the new Conservative–Liberal Democrat coalition government's proposal to introduce a large-scale feed-in tariff mechanism for renewable electricity generation.

This article will be set out as follows: Section 2 will examine the NFFO and the RO in order to determine the internal and external failures that have affected the performance of these mechanisms. Section 3 provides an overview of the 2009 RO reform process. This section will also examine the additional changes that came into effect in April 2010 in addition to further proposed changes. Section 4 will determine the internal and external failures of the reformed RO. Section 5 will look specifically at the proposals of the new coalition government, and examine the likely impact of these failures on future renewable energy deployment. Finally, Section 6 will analyse the impact of internal and external failures on UK renewable energy policy in order to show whether or not the Government has learned from past experiences in supporting renewable energy.

## 2. Policy instruments in the UK: the NFFO and the RO – 1990–2009

The European Union (EU) recently adopted a new Renewables Directive (2009/28/EC) to substantially increase Europe's use of renewable energy, with legally binding targets for Member States: increasing the overall share of renewables in energy use to 20% by 2020 and reducing overall greenhouse gas emissions (GHG) by at least 20% below 1990 levels by 2020 (Europa, 2009). The UK has been set a target of 15% of total energy consumption from renewables. In line with the sectoral approach, this will require around 30–35% of renewable electricity generation by 2020 with an aspirational target of 15% by 2015 (DECC (Department of Energy and Climate Change), 2009b). Given that the adoption of such targets coincides with the reform of the RO and the increasing urgency of addressing UK renewable energy policy failures, an analysis of this process is both timely and necessary. In order to evaluate the likely impact of the reform on meeting the RES-E targets and hence on renewable energy deployment, it is necessary to establish the wider historical context of the UK's choice of policy instruments to support renewable electricity generation.

The problems of the NFFO and non-reformed RO are well documented (cf. Komor, 2004; Edge, 2006; Lauber, 2004; Lipp, 2007; Mitchell and Connor, 2004; Mitchell et al., 2006; Ringel, 2006; Toke and Lauber, 2007). It is clear from Table 2.1 that both mechanisms have been under-performing, particularly with regard to set targets. Part A shows that only 30% of all NFFO projects actually reached the commissioning stage over a 14-year period, and when individual technologies are examined, except for landfill gas (478 MW: 68% of contracted projects operational) the rate of deployment has consistently and significantly fallen short even for the next two most deployed technologies: wind (219 MW: 19%) and waste (235.5 MW: 17%). Although Part B shows that renewable deployment under the RO has increased in comparison to the NFFO, failure to reach the annual Obligation targets highlights that the mechanism is not working as intended. For the 2010 target of 10% to be reached, RES-E generation will have to increase overall by 3.4% in one year, an unprecedented annual increase.

What is important for the purpose of this article are the reasons why both these mechanisms have not worked as intended. Fig. 2.1 shows that there is a high degree of similarity between the two mechanisms with regard to both internal and external failures: finite and limited duration of subsidies due to limited mechanism lifespan, excessive focus on competition and low costs, mechanism uncertainty, unresolved planning and electricity grid network issues and policy uncertainty/excessive change. Those areas in which the mechanisms differ are also interesting. This is because it reveals that the RO introduced three new failures (two internal and one external) in contrast to removing only one internal failure: subsidy bundling (renewables and nuclear power were included under the NFFO from 1990 to

**Table 2.1**
Set target outcomes for the NFFO and RO.

A. Total numbers and capacity of projects offered in the NFFO by contacts given and commissioning in 2004

| Technology | Contracted projects | | Commissioned projects (March 2004) | |
|---|---|---|---|---|
| | Number | Capacity[a] | Number | Capacity[a] |
| Biomass | 32 | 256.0 | 9 | 10.5 |
| Hydro | 146 | 95.4 | 68 | 47.4 |
| Landfill gas | 329 | 699.7 | 226 | 474.8 |
| Municipal/industrial Waste | 90 | 1398.2 | 20 | 235.5 |
| Sewage gas | 31 | 33.9 | 24 | 25.0 |
| Wave | 3 | 2.0 | 1 | 0.2 |
| Wind | 302 | 1153.7 | 93 | 219.8 |
| **Total** | **933** | **3638.9** | **441** | **1109.2** |

B. Percentages of electricity derived from renewable sources in the United Kingdom

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| Target | – | – | 3.0 | 4.3 | 4.9 | 5.5 | 6.7 | 7.9 | 9.1 |
| Actual RES-E Generation (as %) | 1.6 | 1.9 | 2.4 | 3.58 | 4.23 | 4.55 | 4.96 | 5.5 | 6.6 |

*Notes*: (Part A) Data from Edge (2006). Part (B) Data from BERR (Department of Business and Enterprise and Regulatory Reform) (2008b) and DECC (2010a). Actual RES-E Generation of overall renewables percentage has been revised to the international basis. Targets for the RO commenced one year after the operation of the RO (2003) for the end of the first period (2002–2003).

[a] In MW declared network capacity.