REF
RENEWABLE ENERGY FOUNDATION
21 JOHN ADAM STREET, LONDON, WC2N 6JG
020 7930 3636 www.ref.org.uk

Information Note

20.06.11

The Probable Cost of UK Renewable Electricity Subsidies 2002 to 2030

Introduction

As part of its research program REF has carried out a study of the costs and implied oncosts of the UK Renewable Electricity subsidies, the results of which indicate that the total cost of the subsidies to renewable electricity generators would be in the region of £100bn by 2030.[1] Following a request for information, this figure was cited in the *Sunday Telegraph* on the 12th of June.[2] In the same article the Department of Energy and Climate described our calculation as 'speculative', though they did not provide any alternative figure.

In view of this interest, and the Department's response, we feel it would be helpful to provide an explanation of the reasoning underpinning the estimate, and in the following note we will show that the £100bn figure is a reasoned estimate grounded both in actual costs to date and in government's own projections of the levels of renewable electricity needed to meet the 2020 targets. Furthermore, we will show that it is consistent with the estimates of the Government's own independent advisor, the Committee on Climate Change.

The Costs and On-costs of Subsidising Renewable Electricity

The principle instrument for encouraging renewable energy development since 2002 has been the Renewables Obligation, a complex system of indirect subsidy that places an

---

[1] This work will be published in: John Constable, *The Green Mirage: Why a low carbon economy may be further off than we think* (London: Civitas, Forthcoming, 2011)

[2] Robert Mendick, Edward Malnick, Andrew Cave, "Businesses hit by cost of green energy", *Sunday Telegraph* (12 June 2011), 13. http://www.telegraph.co.uk/finance/newsbysector/energy/8570141/UK-faces-job-losses-as-businesses-threaten-to-flee-abroad-to-escape-green-energy-levies.html

obligation on suppliers to purchase from renewable generators a set percentage of the electricity they sell to customers. Compliance is demonstrated by the presentation of Renewable Obligation Certificates, which are often purchased from the generator with the electricity, but can be traded separately. Failure to comply results in a fine, which is paid into a fund managed by the regulator, Ofgem, with this fund then being distributed proportionally to those suppliers who have demonstrated compliance. The value of the Renewables Obligation Certificate is thus twofold: the value of the fine avoided, and the expected share of the fines paid by others. The approximate total value of the certificate during the life of the scheme so far has varied little, and is expected to remain stable, with £50 often being used in industry calculations.[3] This may be compared with a wholesale electricity price that has varied over the life of the scheme from approximately £25 to over £40 at present. Thus a renewable generator may be expected to receive £75 – £100/MWh generated, a premium of approximately 50 per cent over the wholesale price. Suppliers recover this additional cost from their customers; in other words, from the supplier's perspective, the Renewables Obligation is simply a pass-through cost to consumers. The Treasury understandably classifies the Renewables Obligation as a tax, and the transfer of monies to renewable generators as public expenditure.[4]

These generous returns have encouraged considerable and rapid deployment up to 2010, as can be seen in the following chart generated from the Renewable Energy Foundation database, which is based on Ofgem's Renewables Obligation records.[5] The chart also graphs projected growth assuming the current UK government ambitions are realised for the installed capacities of wind power needed to meet targets (growth in other sectors is expected to be relatively small).[6]

---

[3] ROCs are traded bilaterally, so no detailed records are kept of all prices paid, but some traders publish useful data giving insight into approximate prices: http://www.e-roc.co.uk/trackrecord.htm

[4] See: http://www.hm-treasury.gov.uk/pespub_index.htm

[5] The REF database is provided free of charge, is fully searchable, and provides monthly output figures for all industrial scale generators registered under the Renewables Obligation: http://www.ref.org.uk/roc-generators/search.php.

[6] For example, the response of Mr Hendry, Minister of State for Energy, to a Parliamentary Question from Mr Philip Hollobone MP on 10 February 2011: http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm110210/debtext/110210-0001.htm#qn_o6. Mr Hendry reports departmental expectations of 14 GW of onshore wind and 13 GW of offshore wind by 2020.

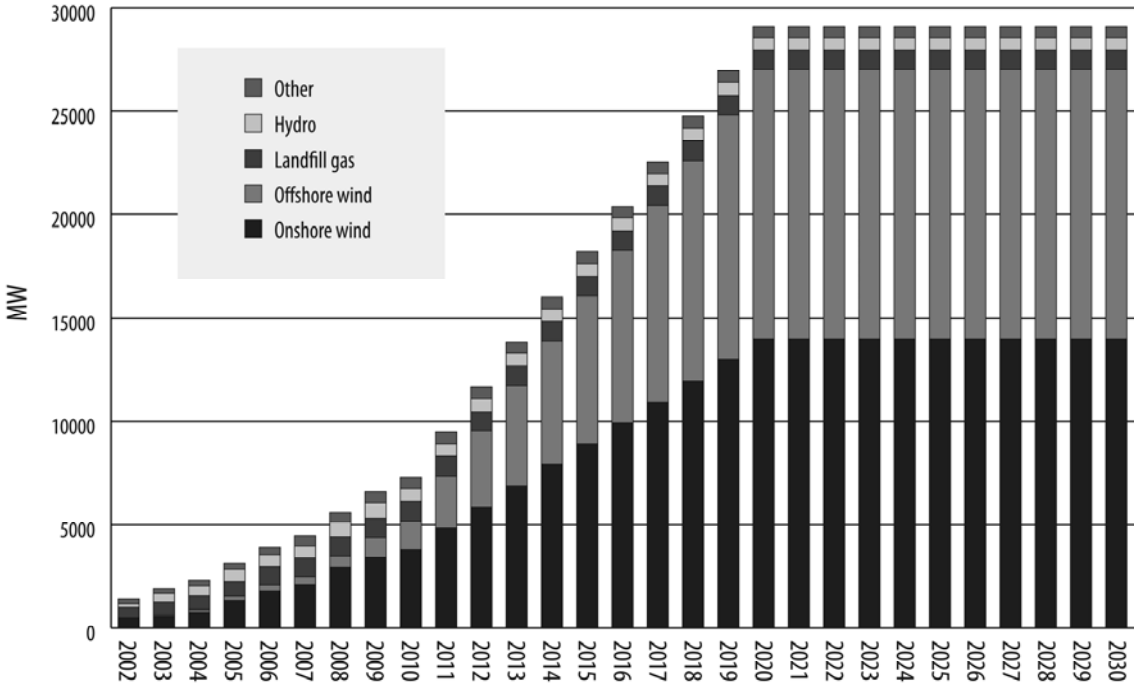

Figure 1: Installed, and projected renewables capacity in the United Kingdom (excluding conventional capacity used for co-firing). Source: REF calculations from Ofgem empirical data and Department of Energy and Climate Change Projections.

The empirical portion of the chart, up to 2010, shows fairly rapid growth from a low base. A very rapid increase is required to meet the 2020 targets. The scenario covered in Figure 1 entails the generation of approximately 75 TWhs in 2020, whereas meeting the 2020 target requires, on government estimates, about 117 TWh of electricity overall.[7]

Use of historical ROC prices enables us to calculate the subsidy cost to consumers of the dedicated renewables capacity (i.e. excluding co-firing, which use existing coal plants) since the beginning of the scheme, and to assess the likely future cost of plant constructed for the scheme:

[7] See DECC, *Renewable Energy Strategy* (2009), 26, Table 2.1, and DECC National Renewable Energy Action Plan (2010), Table 10(b).

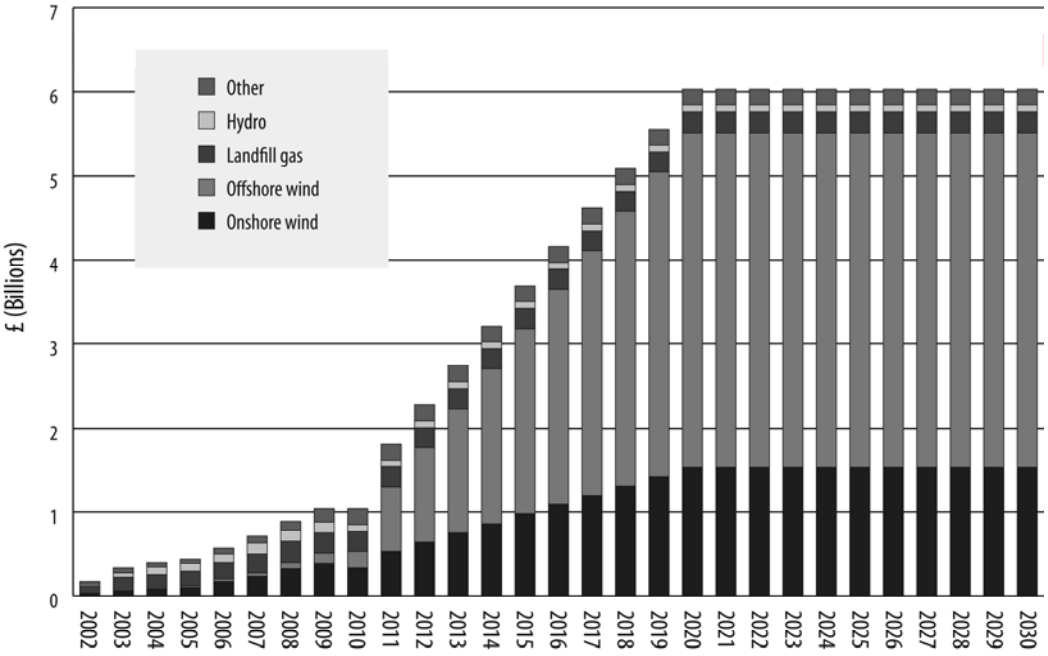

Figure 2: Cost and projected cost of the Renewables Obligation to UK consumers. Source: REF calculations from empirical Ofgem data. Projected costs assume a ROC price of £50.

The empirical portion of the chart shows that the cost to date, from 2002 to 2010, amounts to approximately £5 billion. The annual costs follow an upwards trend towards £6bn a year in 2020, with the total cost 2011 to 2020 being £39 billion.

These figures are consistent with estimates given by the Department of Energy and Climate Change in their response to the Treasury's recent *Control Framework for DECC Levy-funded Spending*.[8] DECC observed that the costs of the Renewables Obligation would be nearly £1.8bn a year in 2011 to 2012, rising to £3.2bn a year in 2014 to 2015, as summarized in the following table.

Table 1: DECC Estimates of Renewables Obligation costs 2011-2015. Source: DECC, *Control Framework for DECC levy-funded spending: Questions and Answers* (2011), 4.[9]

Year	**2011-2012 (£m)**	**2012-2013 (£m)**	**2013-2014 (£m)**	**2014-2015 (£m)**
Renewables Obligation costs	1,764	2,191	2,615	3,203

[8] HMT, *Control Framework for DECC Levy-funded Spending* (2011). See http://www.hm-treasury.gov.uk/psr_controlframework_decc.htm.

[9] http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/1691-qa-info-levy-funded-spending.pdf

Even if we assume that after 2020 no further efforts are made to expand capacity, but that, as is reasonable and expected by the industry, subsidies are maintained for capacity already installed under the RO, the annual cost is around £6bn a year, and consequently a further £60bn cost is incurred over that decade. Thus the total cost of the scheme from 2002 to 2030 would amount to approximately £100 billion.

While these are estimates, they are grounded in reasonable assumptions and on the government's own projections. Since, for the purposes of this estimate, we make the assumption that renewables capacity will cease to grow in 2020, and that no further attempt will be made to attain higher reneawbles targets, the cost figure of £100bn to 2030 can be regarded as conservative.

Furthermore, we note that our annual cost figure of £6bn a year post 2020 is consistent with the estimates of the government's own independent advisor, the Committee on Climate Change, which we discuss below.

The Estimates of the Climate Change Committee

In May 2011 the Committee on Climate Change (CCC) published its *Renewable Energy Review*, an important study that discusses the scale of renewables development needed to meet emissions reduction targets and the likely cost impacts of the policies needed to deliver such levels of growth.[10]

The CCC estimates that the cost of the renewables policies will put approximately 2p/kWh extra on the United Kingdom's electricity bill in 2020.[11] To be precise, the CCC estimates the cost range being from an extra 1.1p/kWh in the low case to an extra 2.2p/kWh in the CCC's high case (see *Renewable Energy Review*, Table 5.1).

Since the UK would, on the CCC's own rough estimates, consume somewhere around 325,000,000,000 kWh of electricity (see Table 3.5 of *The Fourth Carbon Budget* published in December 2010),[12] this implies an additional cost of approximately £6.5bn a year, with the range being £3.6bn to £7.2bn.

---

[10] http://www.theccc.org.uk/reports/renewable-energy-review

[11] See, Climate Change Committee, *Renewable Energy Review* (May 2011), p. 36, and also Lord Turner's launch presentation, slide 35.

[12] http://www.theccc.org.uk/reports/fourth-carbon-budget

As will be immediately appreciated, the CCC's estimate of the costs of renewable electricity policies in 2020 is consistent with our own.

Conclusion

While we appreciate that any estimate of complex policy costs involving large numbers of variables must be subject to a degree of uncertainty, the suggestion that consumer subsidies to renewable electricity generators between 2002 and 2030 will total approximately £100bn is defensible on currently reasonable assumptions, and gives a fair understanding of the order of magnitude involved.

John Constable
Lee Moroney
20.06.11