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Britain's renewable energy targets are quite unrealistic

Britain's energy mix

Britain currently has a diverse mix of energy sources for generating electricity. As the table below shows, 18% comes from nuclear power, whilst gas-fired and coal-fired power stations each account for 36-37%. Hydro and other "renewables" account for 5% and oil for just 1%. 2% of electricity is currently imported.

Electricity supplied by type of fuel, 1980-2006, Terawatt hours (TWh)[1]

	1980 (TWh)	1990 (TWh)	2000 (TWh)	2006 (TWh)	2006 (% of total)
Coal	190.0	208.0	114.7	142.7	37.3
Oil	33.9	21.1	5.9	4.3	1.1
Gas	1.6	1.6	145.0	138.3	36.2
Nuclear	32.3	58.7	78.3	69.2	18.1
Hydro	7.3	7.9	4.2	3.4	0.9
Other fuels	-	-	9.2	17.0	4.4
Net imports	-	11.9	14.2	7.5	2.0
Total electricity available for supply	265.1	309.4	371.5	382.4	100.0

BERR, *UK energy in brief*, July 2007, available from www.berr.gov.uk. The data include energy industry use.

The BERR (the Department of Business, Enterprise and Regulatory Reform, formerly the DTI) expects this mix to change significantly over the next 10-15 years.[2,3,4]

Current nuclear generating capacity is expected to decline despite the Government's recent acceptance that Britain must renew its nuclear capacity. [5] Planning and construction of new plant inevitably take several years to complete. Less widely appreciated is the expected decline of coal-fired electricity generation capacity over the next decade. If retirement goes ahead as planned, much will be in response to the EU's 1988 Large Combustion Plant Directive (LCPD), modified in 2001, that mandates the reduction in acid gas emissions, primarily SO_2 and NO_x, from large combustion units.

The 2003 DTI Energy White Paper suggested that the total loss could be about a third of electricity generating capacity, allowing for the possible reductions in both nuclear and coal-fired generating capacity. The gap would be made up by a combination of renewables and gas-fired generating capacity. (In 2006, net gas imports accounted for just 13% of Britain's total gas consumption, though this will increase substantially as Britain's natural gas reserves continue to fall, making us dependent on imported gas for much of our electricity.)

The White Paper mentioned targets for the renewables' share of electricity supply of 10% by 2010 and 20% by 2020 (the latter was an "aspiration"). Much of the increase in renewable supply was to come from wind, both offshore and onshore. Suffice to say, the Government is currently pressing on with its policy of promoting and subsidizing renewable energy sources at considerable cost.

The British Government's enthusiasm for renewables is partly driven by its belief that man-made carbon dioxide emissions are the main "cause" of dangerous "global warming".[6,7] Man-made carbon emissions must, therefore, be reduced in order to "control" or "mitigate" the said "global warming".[8]

The need to curb carbon emissions is also the reason for the UK's Climate Change Bill, released in March 2007, which contains even more draconian measures than the 1997 Kyoto agreement. They include:

- a series of clear targets for reducing carbon dioxide emissions - including making the UK's targets for a 60% reduction by 2050 and a 26 to 32% reduction by 2020 legally binding.
- a new system of legally binding five year "carbon budgets", set at least 15 years ahead, to provide clarity on the UK's pathway towards its key targets and increase the certainty that businesses and individuals need to invest in low-carbon technologies.

These targets are eye-wateringly tight – if not completely unfeasible - and risk undermining Britain's competitiveness by raising business's electricity costs and damaging people's living standards.

The EU's renewables policy

Britain must also comply with the EU's very demanding requirements (for the UK) on renewables. But Britain has been one of the EU's most passionate advocates for these hair-shirt policies. It is notable that "renewables" include biomass, solar power, wind, wave and tide, and hydroelectricity. Nuclear power is excluded on the grounds it is not strictly "renewable", even though electricity generation using nuclear power stations does not produce manmade carbon emissions and thus is and could be a major contributor to hitting carbon emissions reduction targets.

The EU's first Renewables Directive was agreed in 2001 and required each member state to commit to specific targets for renewable energy. The indicative target set for the UK was for 10% of electricity by 2010, as in the 2003 White Paper. Britain's share will have to double, compared with 2006's 5% (see table above).

In the March 2007 European Council made commitments to specific targets for renewables by 2020. Subsequently a draft new Renewables Directive was released in January 2008.[8] The Directive's main features are:

- The share of renewable energy in the EU final energy consumption (defined by the EU as including energy for electricity and transport) should reach at least 20% by 2020.
- National overall targets for each member state were specified, under the so-called "burden sharing" agreements.
- The share of renewable energy in the final energy consumption of transport should reach at least 10% by 2020 in each member state. (Note that Britain's transport sector is currently very dependent on oil – see table 1 in the annex.)
- Trading of permits will be allowed between member states, so that those with excess renewables "brownie points" can sell them to countries, of which the UK is likely to be the most disadvantaged, with too few.

The national targets for the EU27 countries differ widely, as shown in table 2 in the annex. The table shows that, with the exception of Malta and Luxembourg, the UK is faced with by far the greatest challenge in reaching its 2020 target of 15%. Because Britain's share of renewables was only 1.3% in 2005 (as defined by the EU and with the exception of Malta and Luxembourg), it will have to increase its renewables share by over eleven-fold by 2020. By contrast several EU countries are well-placed including Austria, Finland and Sweden and many of the central and eastern European countries.

Britain's impossible renewables targets

Britain is facing an insuperable task in hitting its 2020 renewables targets. However, the British government will try to hit them – probably at great cost. Inevitably a very large part of the cost burden will be pushed onto the electricity sector because it presents an easy regulatory target. BERR has already estimated that the EU targets for final energy consumption (excluding energy industry use) would require 30% to 45% of electricity supplied (approximately 100 TWh-150TWh) to come from renewables. It is currently around 5%. There are just 12 years to hit these 2020 targets.

This demand on the electricity industry will require a very large installed capacity of renewable generation. Most of the planned extra capacity is either tidal or wind (specifically offshore). BERR is hoping that a "second round" of offshore wind farms, agreed in 2003, may be able to provide about 8 gigawatts (GW) of capacity by 2014. (The "first round" of offshore wind farms, in 2001, comprised a number of small demonstration projects.) In addition, John Hutton recently announced

a proposal for a possible "third round", and further regular rounds, of offshore wind development, which would allow for up to a further 25GW of offshore capacity on top of the planned 8GW – making 33GW in all.[9] Given that the UK has 2GW of wind power, mostly onshore, the probability that these extra wind turbines will be functioning by 2020 must be vanishingly small.

In addition, there is the problem that because wind-power is unreliable and intermittent, conventional power stations will have to maintained in order to provide the back-up power, when the wind farms fail to produce. If this is not done, the country will be vulnerable to black-outs. The potential costs of, firstly, installing the required renewables capacity and, secondly, maintaining full back-up conventional capacity will inevitably be very substantial indeed.

References

1. Please note: Kilowatt hour (KWh) = 10^3 watt hours; Megawatt hour (MWh) = 10^6 watt hours; Gigawatt hour (GWh) = 10^9 watt hours; Terawatt hour (TWh) = 10^{12} watt hours
2. DTI White Paper, *Our energy future – creating a low-carbon economy*, Cm 5761, February 2003, DTI.
3. HM Government, *The Energy Challenge*, DTI, Energy Review, July 2006.
4. DTI, Meeting the energy challenge: A White Paper on energy, May 2007, TSO, available from www.berr.gov.uk
5. BERR, *Meeting the energy challenge: a white paper on nuclear power*, BERR, January 2008.
6. Global temperatures have, however, not risen over the last decade. In addition, it has recently been claimed that "global warming" has been postponed for 10 years. See Charles Clover, "Global warming 'to stop for 10 years'", *Daily Telegraph*, 1 May 2008.
7. It should also be noted that the "warmist" advocates have mainly replaced the relatively specific term "global warming" by "climate change" which could presumably encompass a return of an Ice Age.
8. The 1997 UN Kyoto Protocol was the first international agreement that advocated the cutting of anthropogenic greenhouse gas emissions to control global warming.
9. Commission of the European Communities, *Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources*, January 2008.
10. BERR, **"**Plans for a major expansion of offshore wind – Hutton", 10 December 2007. John Hutton is the Secretary of State for BERR.

Annex tables

Table 1: Energy, final energy consumption, 2006, million tones of oil equivalent (Mtoes)

	Industry	Domestic	Transport	Services*	Total
Coal & manufactures fuels	1.9	0.6	-	0	2.6
Gas	12.4	31.3	-	9.0	52.8
Oil	7.2	3.3	59.0	1.5	71.0
Electricity	10.0	10.0	0.7	8.7	29.5
Renewables & heat	1.0	0.3	-	0.6	1.9
Total	32.6	45.6	59.6	19.9	157.8

BERR, *UK energy in brief*, July 2007, available from www.berr.gov.uk.
NB: Mtoe = 11.63 terawatt hours (TWh)
* Including agriculture

Table 2: National overall targets for the share of energy from renewable sources in final consumption (including electricity and transport) of energy in 2020 (%)

	Share of energy from renewable sources in final consumption of energy, 2005	Target for share of energy from renewable sources in final consumption of energy, 2020	Arithmetic increase in share required	Ratio of 2020 target share over 2005 share
Austria	23.3%	34%	10.7%	1.46
Belgium	2.25%	13%	10.8%	5.78
Bulgaria	9.4%	16%	6.6%	1.70
Cyprus	2.9%	13%	10.1%	4.48
Czech Republic	6.1%	13%	6.9%	2.13
Denmark	17.0%	30%	13%	1.76
Estonia	18.0%	25%	7%	1.39
Finland	28.5%	38%	9.5%	1.33
France	10.3%	23%	12.7%	2.23
Germany	5.8%	18%	12.2%	3.10
Greece	6.9%	18%	11.1%	2.61
Hungary	4.3%	13%	8.7%	3.02
Ireland	3.1%	16%	12.9%	5.16
Italy	5.2%	17%	11.8%	3.27
Latvia	34.9%	42%	7.1%	1.20
Lithuania	15.0%	23%	8%	1.53
Luxembourg	0.9%	11%	10.1%	12.22
Malta	0%	10%	10%	Infinite
Netherlands	2.4%	14%	11.6%	5.83
Poland	7.2%	15%	7.8%	2.08
Portugal	20.5%	31%	10.5%	1.51
Romania	17.8%	24%	6.2%	1.35
Slovakia	6.7%	14%	7.3%	2.09
Slovenia	16.0%	25%	9%	1.56
Spain	8.7%	20%	11.3%	2.30
Sweden	39.8%	49%	9.2%	1.23
UK	1.3%	15%	13.7%	11.54

Source: Commission of the European Communities, *Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources*, January 2008, annex 1.

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