

The UK has adopted the ambitious EU target of getting 20% of its energy from renewables by 2020 • Philip Wolfe suggests how it might be done



Fuel for thought: government initiatives will be needed to promote biofuels

Going greener

In all the media discussion about Tony Blair's elusive legacy, one issue has gone unnoticed, but may yet pass the test of history. On 9 March he entered commitments on behalf of the UK that should change the whole profile of the country's energy system. The European Union signed up to a package of targets on emissions reductions, energy conservation and sustainable energy generation (see box). These have yet to be divided between individual states.

One new target is a binding commitment

The EU package	
Emissions reductions 20% if unilateral, or 30% if other developed nations join in	Binding
Energy conservation 20% below current projections	Non-binding
Renewables 20% of total energy 10% of transport fuels	Binding

to produce 20 per cent of our total energy from renewables. The EU achieves about one-third of this level today and the UK lags well behind even that at about 2 per cent. Last month's Energy White Paper promises policies to get us to 5 per cent and says there will be further measures to deliver the other three-quarters of what is needed. This is my personal view on one way of achieving, and indeed exceeding, the 20 per cent target in the UK.

The target for renewables in total energy is novel. Historically, the UK has focused sustainable energy policy solely on the electricity sector, largely forgetting heat and transport energy. We have a 2020 "aspiration" to achieve 20 per cent of electricity from renewables, so some observers thought at first that we had the EU commitment already covered. Not even close – electricity is less than one-third of our total energy, so we would actually need more than 60 per cent of our electricity to be met by renewables if we continued to ignore heat and transport fuels.

At the EU level a "route map" has been

developed to divide the target between these three sectors. This envisages renewables providing about 12 per cent of our transport energy, 18 per cent of heat and 34 per cent of electricity. This averages out to about 21 per cent overall.

So what of the UK? We already have some renewable energy measures in place. The Energy White Paper says that current measures will take us to 5 per cent renewables by 2020. The main contributors to this are:

- The Renewables Obligation. The white paper suggests its target will be extended to 20 per cent by 2020.
- A Renewable Transport Fuels Obligation is to be introduced in 2008 designed to achieve an uptake of biofuels in the petrol and diesel markets. The quotas have initially been set at 5 per cent in 2010 and the government believes it has set the buyout sufficiently high to reach the quota, equivalent to about 2 per cent of total energy.
- The requirement that all new homes must be zero carbon from 2016.
- The Carbon Emission Reduction Target (formerly Energy Efficiency Commitment) is being extended from 2008 to include incentives for renewables. Present government figures optimistically project 140,000 renewable installations in the first three years. The combined effect of these last two measures would be less than 1 per cent of total energy.

So we have got one-quarter of the new commitment covered – and that depends on the white paper measures working as they are supposed to. Where might the other three-quarters come from? There are lots of possibilities – fortunately. We will need to use a broad portfolio of approaches to achieve the scale of change required. Let no-one convince you that there is a single easy answer.

First, there are still several opportunities for large-scale power and heat, which are not fully exploited by present policies. Because of our historical focus on electricity, heat applications have been neglected – even where heat is used to drive electricity generation. This means that power stations typically waste 65 per cent of their energy as heat. Such inefficiency is unacceptable in an energy-constrained world, so there is a case for obliging new thermal power stations to be located where the heat can be captured and used through combined heat and power (CHP).

The Biomass Task Force concluded that 7 per cent of the UK's heat energy could come from biomass. The government should now bring forward effective policy measures to turn this into reality (and the recently published Biomass Strategy certainly does not do that). I would project that about half could be in the form of larger-scale heat and CHP projects.

Next we can afford to be more ambitious with the Renewables Obligation. The British Wind Energy Association projects 8-9 per cent contributions each from onshore and offshore wind. Even if this is on the optimistic side, the obligation should be able to deliver at least 22 per cent of electrical energy, when you add in hydro, wave, solar, tidal, landfill gas, biomass

and the other eligible technologies. This suggests the quota should be raised to 25 per cent with the headroom factor (due to be introduced in the next revision) set at 3 per cent.

Third, there are other large-scale renewable generation opportunities, such as the Severn Tidal Barrage project (capable of delivering an estimated 5 per cent of our electricity), which we can no longer afford to dismiss.

The UK is more limited in the likely penetration of biofuels owing to our lower land area in relation to population. Nonetheless we can import and should in any case be capable of achieving the EU mandatory target of a 10 per cent penetration of renewable fuels by 2020.

The primary delivery mechanism will be the Renewable Transport Fuels Obligation (RTFO), where the quota should be extended from 5 per cent in 2010 to 10 per cent by 2020. The RTFO will be met primarily by fuel providers "blending" in the required percentage of biofuels into petrol and diesel. At the same time, we should encourage the development of "high blend" fuels such as E85 (a blend of 85 per cent bio-ethanol with 15 per cent petrol). Wider adoption needs ready availability of high-blend fuels and this may need government intervention to encourage or require, say, all larger forecourts to have a high-blend pump.

The highest contribution to the missing three-quarters of new renewables contribution may actually come from today's poor relation – on-site energy, especially heat. Our buildings must be made far more energy efficient and can then get most of their energy from on-site renewables such as solar heating, ground and air-source heat pumps, photovoltaics, biomass boilers, pellet stoves, micro-CHP and wind turbines.

There are more unusual technologies too. This country has well over 100,000 former mill sites, many of which could be fitted with small hydro-generators, each capable of providing most of the power needed by the surrounding houses.

I propose several measures to massively increase the contribution of on-site renewables:

- The new Code for Sustainable Homes (CSH) needs to be adopted as a mandatory, rather than voluntary standard. Building regulations should be amended to specify interim levels of energy sustainability required by 2010 and 2013, and zero carbon by 2016.
- There should be an active programme to retrofit the country's 25 million existing homes with energy-efficiency measures and renewable microgeneration, so they can progressively be raised to zero carbon standards too. The programme could start in 2010 at 50,000 homes a year, rising to 500,000 annually by 2019 and then continuing at that level. This sounds a lot, but would take over 50 years to complete the existing housing stock. Germany is proposing a similar approach over just 20 years.
- We also need to address non-residential buildings. Government should introduce a Code for Sustainable Buildings similar to the CSH and again use this as the basis for Building Regulations.
- Much can also be achieved by positive planning policies of individual local authorities, such as the pioneering measures first

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adopted in Merton. These oblige new developments above a certain size to provide at least 10 per cent of their energy from renewables (the Merton Rule). A national rollout of such policies should be coupled with progressively increasing percentages.

The balance of energy output from biomass mentioned above is likely to be delivered on site. In addition to applications already discussed, there is significant potential for anaerobic digestion and similar processes to

produce biogas, which can be used for heat, power or fuel.

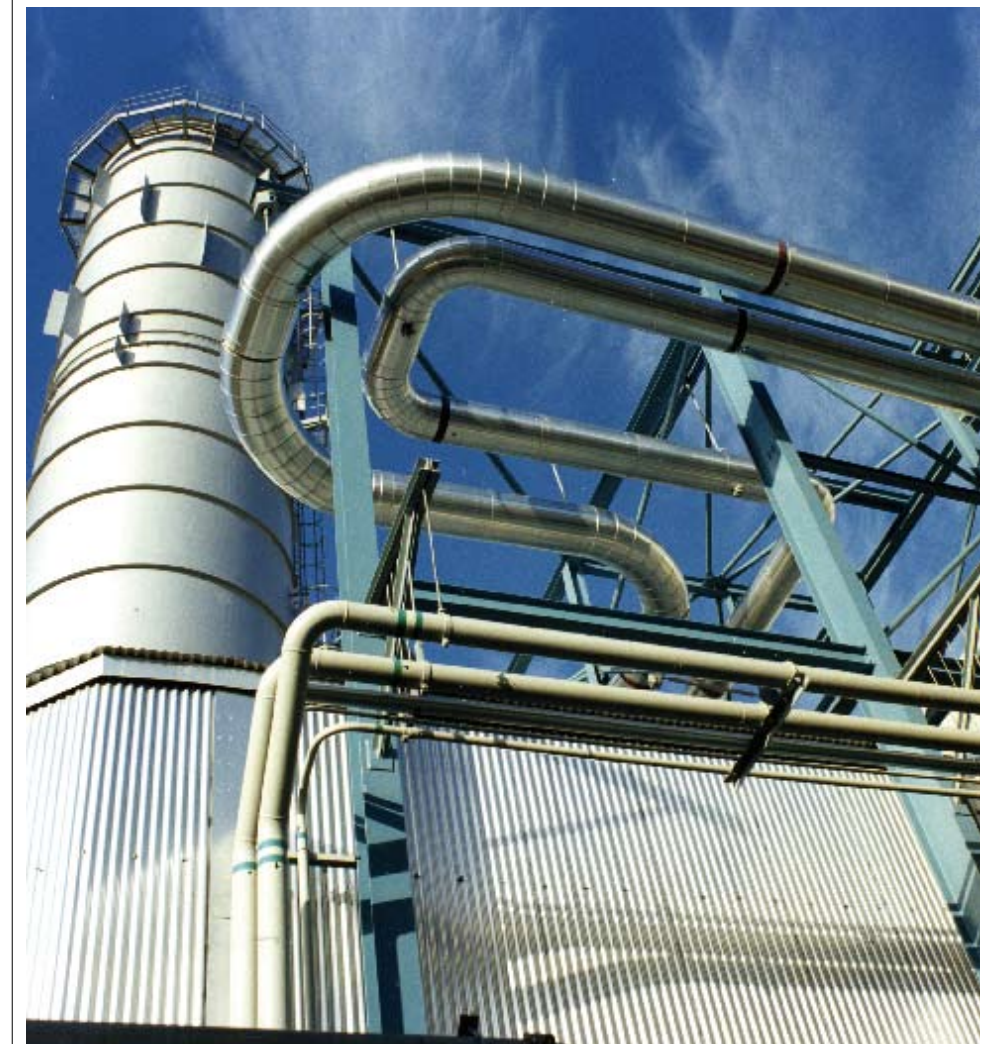
So what should the UK renewables target be? The combination of these proposals enables the UK to achieve 22 per cent of its total energy from renewables. This would be made up from about 10 per cent of transport fuels, 17 per cent of heat and 39 per cent of electricity.

Many of these measures will be funded by consumers, through somewhat higher energy prices. This is an overdue adjustment for the artificially low prices we have enjoyed in recent decades.

Where funding will come from the Treasury for measures such as energy efficiency improvements for the fuel poor, this can comfortably be covered by cash raised from climate change-related taxation, such as the Fossil Fuel Levy surplus, auctions of carbon allowances under the EU Emissions Trading Scheme and air transport duty. It is only right that such polluter-pays measures should be redirected to clean energy sources.

The Stern Report suggests that the overall cost of climate change mitigation should be roughly 1 per cent of Gross Domestic Product. The raft of measures I have proposed would require only a fraction of this.

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Taking the heat: a massive increase in on-site CHP is the only realistic way of meeting targets