



Foreword

Renewables targets – driving Europe to a leadership position

By Philip Wolfe, Chief Executive, Renewable Energy Association

On March 9, 2007 the European Union signed up to a package of targets on emissions reductions, energy conservation and sustainable energy generation, which should provide the strongest driver yet for accelerating growth in this dynamic sector. One new target is a binding commitment to produce 20% 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%. National governments are now working frantically behind the scenes on ways of meeting these targets. Of all the possible approaches we could adopt, I offer here one way in which the UK can deliver its contribution. Inevitably we will end up with more in some areas, less in others, but this should offer readers the opportunity to identify areas of opportunity in the energy industry, including several that have hitherto been neglected.

The European Council's commitments for 2020

The energy targets summarised in Figure 1 are totals for the EU. These have yet to be divided between individual states.

Figure 1: EU energy targets

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

In renewables, the UK starts from a low base and might aim for a below average commitment. On the other hand, with Europe's best wind, wave and tidal resource we should arguably accept a higher target. As 20% is a tough but achievable ambition here, I hope the UK government maintains a leadership role in the negotiations to come.

The target for renewables in **total energy** is novel. Historically the UK has focussed sustainable energy policy solely on the electricity sector, largely forgetting heat and transport energy. We have a 2020 'aspiration' to achieve 20% of electricity output

from renewables so some observers thought at first that we had the EU commitment already covered. Not so – electricity is less than one third of our total energy, the target is based on primary energy (i.e. the input not the output) and our current generation mix is less than 50% efficient. Therefore we would need to generate the majority of our electricity from renewables to reach 20% of total energy, if we continued to ignore heat and transport fuels.

At the EU level a 'routemap' has been developed to divide the target between these three sectors. The European energy mix too is divided roughly equally between electricity, heat and transport. The EU scenario envisages providing about 12% of our transport energy from renewables; 18% of heat; and some 34% of electricity. This averages out to about 21% overall.

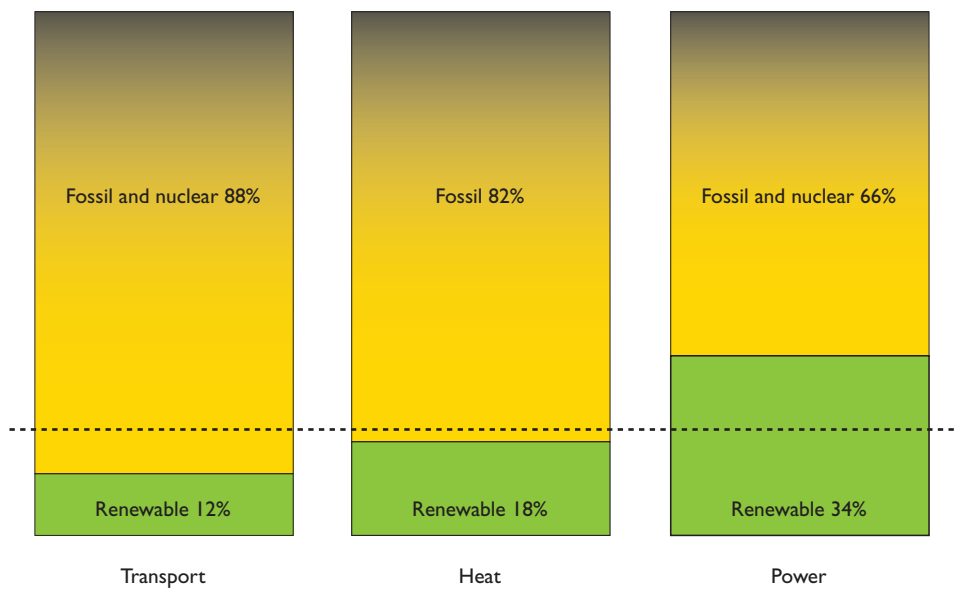
I shall suggest below what the equivalent figures might be for the UK. This is not **the** answer; it is just one possible answer. And doubtless the REA membership will help us to come up with other and better alternatives in the months to come.

Renewable energy measures already in place

Successive Energy Reviews and White Papers have highlighted the need for increased contributions from renewables, and some policy measures have already been implemented. The recent Energy White Paper acknowledges that current measures should take us to perhaps 5% of total energy from renewables by 2020. The main contributors to this are:

1. The Renewables Obligations (a misnomer; it

Figure 2: The European energy mix



should be the Renewable **Electricity** Obligation) sets a requirement for electricity suppliers to meet a part of their sales from renewables or pay a buy-out penalty. The percentage rises each year to 15% by 2015 and the White Paper suggests this will be extended to 20% in 2020. Because of the way the legislation is structured, these quotas act as a ceiling with actual achievement lagging a safe distance behind. The Government's Energy Review seems to show they expect about 13% of electricity (i.e. about 3% of total energy) from this measure.

2. A Renewable Transport Fuels Obligation is to be introduced in 2008 designed to achieve a similar uptake of biofuels in the petrol and diesel markets. The quotas have initially been set at 5% by volume (somewhat less by energy) in 2010 and the government believes it has set the buy-out sufficiently high to reach the quota, equivalent to between 1% and 2% of total energy.
3. Two measures should lead to a small contribution for renewables in the building sector. Firstly the UK government has announced that all new homes must be zero carbon from 2016. This will require any energy they use to be generated from renewable sources. Secondly the Energy Efficiency Commitment is being extended in its third phase (from 2008) to include incentives for renewables. Present government projections optimistically estimate some 140,000 renewable installations in the first three years. The combined effect of these measures would be less than 1% of total energy. So we have about one quarter of the new

commitment covered – and that depends on the White Paper measures actually working to remove barriers such as planning and grid access and to provide effective drivers through the widened Renewables Obligation, extended fuel duty rebates and new building regulations.

Where might the other three-quarters come from?

Fortunately, there are lots of possibilities, as we will need to use a broad portfolio of approaches to achieve the scale of change required. Let no-one convince you there is a single easy answer.

New opportunities in centralised energy generation

There are still several opportunities for large scale power and heat, which are not fully exploited by the present policies.

Because of our historical focus on electricity, heat applications have been neglected – even heat used to drive electricity generation. This means that power stations typically waste perhaps 65% 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% of the UK's heat energy could come from biomass. The government should now bring forward effective policy measures to turn this into reality. I would project that about 40% 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% contributions from both onshore and offshore wind. Even if this is on the optimistic side, the technologies covered by the RO should be able to deliver at least 23.5% of electrical energy when you add the potential of biomass, landfill gas, eligible hydropower, wave and tidal stream energy. This suggests the 2020 quota should be raised from the 20% specified in the Energy White Paper to 25%-30%.

Thirdly, there needs to be better targeted measures to bring forward innovative generation technologies, especially tidal and wave power, where the UK leads the world. Photovoltaics too can provide large-scale generation for industrial and commercial premises, in addition to its contribution to onsite generation described below. The Renewables Obligation was designed to support near commercial sources, and is insufficient, even with the 'multiple certificates' amendment now being proposed, to deliver novel technologies. It is estimated that, with proper support, these emerging renewables can be contributing at least 3% of our electricity.

Furthermore, there are other large scale renewable generation opportunities, which we can no longer afford to dismiss. Potential local environmental impacts have historically inhibited several large scale renewable projects, such as tidal barrages and hydropower stations. Our greater understanding of climate change now enables us to achieve a more informed balance between local and global environmental issues, which means that large-scale renewables potential needs to be reassessed.

The Severn Tidal Barrage project, for example, is said to be capable of delivering an estimated 5% of our electricity with a highly predictable load profile. New approaches such as tidal lagoons might provide an alternative way of harnessing this energy resource. Similarly the residual large hydro potential, mainly in Scotland, also needs to be reassessed.

There is also a major potential for on-site renewable power generation, which I will address below.

New opportunities in renewable transport fuels

The UK is more limited in the likely penetration of biofuels owing to its lower land area in relation to population. Nonetheless we can of course import and should in any case be capable of achieving the EU mandatory target of a 10% 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% in 2010 to 10% by 2020. If the current buyout price proves inadequate to ensure that the quotas are actually met (for example if the fuel duty rebate is phased out), this should be raised accordingly and, if necessary the quotas raised too.

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% bioethanol with 15% gasoline). Flex-fuel vehicles, now offered by an increasing number of vehicle manufacturers, can use both E85 and 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 high-blend pumps.

New opportunities in on-site renewables

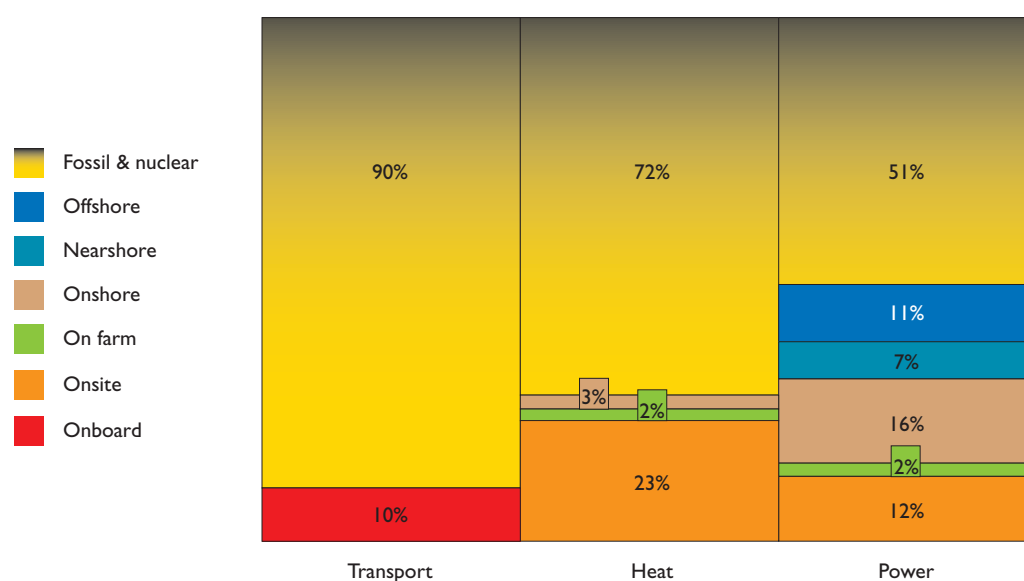
As I see it, the highest contribution to the missing three quarters of new renewables contribution may actually come from today's poor relation – on-site power, especially heat. Our buildings must be made far more energy efficient and can then get most of their energy from on-site renewables such as solar heating, ground- and air-source heat pumps, photovoltaics, biomass and pellet stoves and 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 the majority of power for the surrounding houses.

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

1. The new Code for Sustainable Homes (CSH) needs to be adopted as a mandatory, rather than voluntary standard. The Code sets out various levels of energy sustainability, of which the top is Level 6 – zero carbon. To achieve the government's objective of all new homes being zero carbon by 2016, the Building Regulations will need to be amended then to make CSH Level 6 a requirement.
2. As interim measures to encourage energy efficiency and onsite renewables, the 2010 Building Regulations revision should require CSH Level 4 and the 2013 revision CSH Level 5.
3. But Building Regulations address only new construction and alterations. We need also to improve the 25 million homes already built. I propose an active programme to retrofit these buildings with energy efficiency and renewables,

Figure 3: UK renewable energy target



so they can progressively be raised to zero carbon standards, too. The programme could start in 2010 at 100,000 homes per annum, rising to 1 million annually by 2019 and then continuing at that level. This may sound a lot, but would take about 30 years to complete the existing housing stock. Germany is proposing a similar approach over just 20 years.

4. Similarly we 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.
5. Much can also be achieved by positive planning policies of individual local authorities, such as the pioneering measures first adopted in Merton. These oblige new developments above a certain size to provide at least 10% of their energy from renewables (the Merton Rule). The Department for Communities and Local Government is encouraging a national rollout of such policies and these measures should now be coupled with progressively increasing percentages.

The most radical element within this sector is the retrofit programme (the third bullet above). The annual quota of houses would need to be divided down both regionally and by ownership type. Owner-occupiers could be incentivised to upgrade their properties through fiscal measures such as tax and stamp-duty concessions combined with a feed-in tariff for power generated and a similar rebate for renewable heat.

The social and rented sector would need to be undertaken through local authorities and housing

associations and funded by the government. The quotas in this part should be front-loaded as a contribution to fuel poverty policy.

One major potential contributor to onsite energy, especially on farms, is through the use of biomass residues and wastes, which can be converted by anaerobic digestion (AD) or similar processes to biogas and fertiliser.

The biogas can then be used in a small combined heat and power plant to generate most or all of the heat and electricity used. The installation of AD plant on a significant proportion of our 300,000 farms can make a substantial contribution to the renewable energy target.

So what should the UK renewables target be?

The combination of these proposals enables the UK to achieve 21% of its total energy from renewables, working on the assumption that the energy conservation target would hold total energy consumption broadly where it is today. This would be made up from about 10% of transport fuels, 28% of a reduced heat usage and 49% of electricity output (see Figure 3), though this is just 27% of primary energy used for electricity generation.

Where does the money come from?

Many of these measures will be funded by consumers, through slightly higher energy prices. This is a sensible investment in a sustainable energy future. It also represents an overdue adjustment for the artificially low prices we have enjoyed in recent decades, which has contributed to our damaging

profligacy, and better reflects the value of energy as one of the most fundamental commodities of our civilisation.

Where funding will come from the Treasury, for measures such as energy efficiency improvements for the social, rented and 'fuel poor' sectors, 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 EUETS and air transport duty. It is only right that such 'polluter pays' measures should be redirected to clean energy sources.

The Stern Report showed why any such financial costs need to be seen as comparative rather than absolute, and suggested that the overall cost of

climate change mitigation should be roughly 1% of GDP. The raft of measures I have proposed would require only a small fraction of this.

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