

mechanism covers 40 percent of EU emissions. For all its early trials and errors, the ETS looks to be a workable instrument. Let us hope so – for capping and trading allowances to emit carbon has some important inherent advantages over taxing carbon. It allows maximum emission reduction to be achieved at minimum cost within sectors, within countries, within the EU and internationally. It rewards developing countries' climate control efforts by offering a market for their emission reduction credits. This is a necessary transfer of funds to poor countries, which could one day be supplemented with ETS auction revenue and which would be politically easier for rich countries to carry out than transferring their taxpayers' money.

But the weakness of a cap and trade system is that it cannot provide the absolute carbon price and cost certainty of a straight carbon tax. None of the features of the December 2008 compromise – such as the profligate dispensing of free allowances or the import of more external credits – can confidently be said to impact the future carbon price one way or another. However, together, they are a reminder that Europe's carbon market is very much a political creation, and that the level and stability of the carbon price is vulnerable to politicians' intervention. Tinkering with the ETS should therefore be as infrequent and minimal as possible.

But other factors will have a powerful impact on the carbon price. They include the pace at which low-carbon energy – whether renewable or nuclear – can be developed, and the degree to which energy can be used more efficiently or even not used. Such issues are addressed in the remaining chapters of this book.

CHAPTER 11

MAKING GREEN POWER COMPULSORY

If climate change and CO₂ emissions were the sole goal of energy policy, and the renewable energy sector were a mature and well functioning market, then a single CO₂-based target would be appropriate – but this situation is a long way off.

European Commission impact assessment, 2006.

The renewable energy target serves more than just reducing greenhouses gases.

European Renewable Energy Council, 2007.

The revival and development beyond all recognition of some of mankind's most ancient forms of energy, such as wind and water power, has provoked a very modern debate in Europe about policy goals and costs. The debate suddenly acquired a real edge to it after EU leaders surprised many, including perhaps themselves, by agreeing at their March 2007 summit that renewable energy must rise as a share of total energy consumption to 20 percent by 2020. Some leaders, it is said, misunderstood the '20 percent' just to be a share of electricity, a far lesser goal. At all events, they may all have rued this decision when ten months later the Commission handed them its proposals for the binding national renewable energy targets necessary to deliver the EU commitment.

Within a decade, renewable energy has gone from a nice-to-have to a must-have component of Europe's energy mix. It is the only sector (along with its sub-sector, biofuels, see next chapter) to be singled out for such special treatment by the politicians. This special treatment started in 1997, when the Commission proposed 'an indicative objective' for renewable energy to reach 12 percent of energy consumption.¹ At the time, the EU executive was of the view 'that an indicative target is a good policy

tool, giving a clear political signal and impetus for action'. This was to prove optimistic.

Four years later, the EU passed a directive setting a target, indicative again, of 21 percent for the share of electricity to be generated renewably by 2010. By 2007 the Commission judged that the EU was on track to reach a 19 percent share of renewable electricity by 2010, only a couple of points off the target. Outside of electricity, however, renewable energy had made little inroad.

By 2007, abandoning its earlier benign view of the effectiveness of voluntary indicative targets, the Commission was complaining that 'the absence of legally binding targets for renewable energies at the EU level, the relatively weak EU regulatory framework for the use of renewables in the transport sector, and the complete absence of a legal framework in the heating and cooling sector, means that progress is to a large extent the result of the efforts of a few committed member states.'² In wind power, the EU's three leaders are Germany, Spain and Denmark, far ahead of the rest. Finland and Sweden are the biggest burners of biomass for electricity. The photovoltaic sector is dominated by Germany with 86 percent of current installed PV capacity in the EU, a bizarre ratio reflecting subsidy rather than sunshine. So the Commission concluded that only mandatory targets could produce a more even performance for renewables across sectors and across countries.

The main rationale for promoting renewables is to reduce carbon emissions. Hitting the 20 percent target would save 600–900m tonnes in CO₂ emissions a year, the Commission claimed.³ But there are other forms of low-carbon energy, notably nuclear, and cheaper ways of cutting emissions such as energy efficiency and demand reduction measures. So promoters of renewables also vaunt their other merits in providing energy security and employment. The EU will also save money on importing fossil fuels, as much as 200–300m tonnes a year according to the

1 'Energy for the Future: Renewable Sources of Energy', Commission White Paper for a Community Strategy and Action Plan, COM (97) 599, 1997, p.10.

2 Renewable Energy Road Map, COM (2006) 848, p. 5.

3 Comisión Memo/08/33, p. 3.

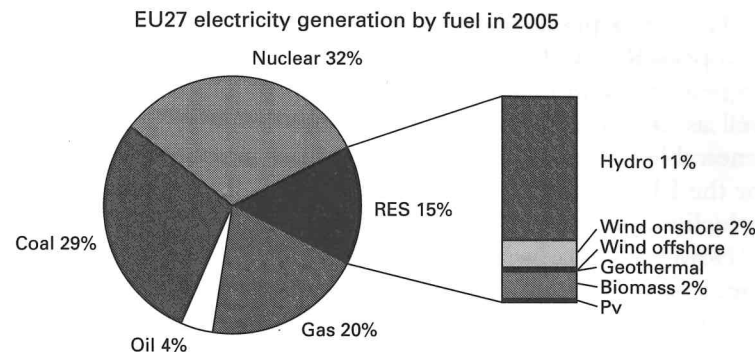


Figure 4: Renewables' Place in the Generation Mix

Source: European Commission document, SEC(2008)57, p.18

Commission, and give itself greater diversity of energy sources, strengthening Europe's resilience in the event of external shocks such as oil interruptions. Another gain would be the boost to Europe's renewable industry that already has a turnover of Euros 30bn a year, employs some 350,000 people, and provides alternative custom for Europe's farmers and foresters.

But there is a price tag on going green. This can be calculated as the total cost of renewable generation minus whatever conventional fossil fuels might cost in the future. The higher the oil price (to which the gas price is mostly linked), the lower the real net cost of renewable. The cost of renewable generating equipment might also vary, but not so dramatically as the oil price, and it could drop. So, at a \$48 oil price the additional annual cost of moving towards the 20 percent renewable target would be \$18bn, but this would sink to \$10.6bn a year if the oil price rose to \$78 per barrel.⁴ It must be said this Commission cost estimate for the whole EU looks understated, if there is any accuracy to the UK's 2008 forecast for its own renewable costs by 2020. This forecasts an extra £5–6bn a year by 2020, on the assumption that oil would be around \$70 a barrel then.⁵

4 Renewable Energy Road Map, COM (2006) 848, p.16.

5 Department for Business, Enterprise and Regulatory Reform, UK renewable energy consultation, June 2008.

This extra price is worth paying if, as the citation from the European Renewable Energy Council at the start of this chapter suggests, a value is put on energy security and employment as well as on the reduction of emissions. Reaching a 20 percent renewable share in Europe's energy mix is not strictly necessary for the EU to hit its over-arching goal of a 20 percent emission reduction, but it could bring these other benefits.

However, there is a risk that meeting the renewable target could, at the margin, hamper progress towards the greenhouse gas reduction goal. This is because of its effect on the ETS carbon price, which is, or should be, a neutral driver pushing forward all low-carbon technologies from nuclear power and carbon capture and storage (CCS) to renewables. The paradox is that if any of these low-carbon technologies is pushed artificially hard – through non-market mechanisms, such as targets, rules or government fiat – the effect will be to depress the carbon price simply by pushing demand for carbon allowances on the ETS artificially low.

Commission economists have run projections showing that, everything else being equal, meeting the twin 20 percent emission and renewables goals simultaneously would produce a carbon price of Euros 39 a tonne of CO₂ by 2020, compared to Euros 49 a tonne if the greenhouse gas target alone were allowed to drive renewables.

Thus, it is possible that the emissions target might not be met if the incentives to develop nuclear and/or CCS were sufficiently undermined by a weaker carbon price. The extent of any undermining would depend on how much carbon prices actually prove to be the deciding factor in nuclear or CCS investment rather than regulatory obstacles and planning delays. And, if the carbon price did prove key, it could be supported by withdrawing some carbon allowances from the market, though such intervention might damage belief in the market's integrity.

In theory, the minimum 10 percent biofuel target (see next chapter) could also weaken the ETS carbon market price, because it is another non-market mechanism being used to boost low-carbon energy. In practice, it will have less effect on the carbon price. This is because the transport sector, where most of the petrol and diesel carbon emissions displaced by biofuels

will occur, is not covered by the ETS, though the process of manufacturing fossil fuels in oil refineries is. Yet the biofuel target does introduce artificiality. For without such a target, biofuels would, as one of the most expensive renewables, be one of the last to be developed. With the target, they may displace some other renewables.

Of course, it is true that the EU carbon market could have been bent more out of shape if EU leaders had followed the European Parliament, which had originally wanted a renewables target of 25 percent of final energy demand by 2020 (and an indicative 40 percent target for 2050). It is also the case that aiming now at a 20 percent renewable target might prove a useful building block if the EU subsequently went for a higher emission cut. For the EU has clearly said that while its 20 percent emission cut (from 1990 levels) is unconditional, irrespective of what the rest of the world does, it would move to a 30 percent cut if this were matched internationally.

National targets

However, EU leaders only did part of the job when they agreed at their March 2007 summit to the 20 percent average target for the Union. The trickier part was to break this down into binding national targets. The leaders gave the following guidance in their summit conclusions:⁶

Differentiated national overall targets should be derived with member states' full involvement with due regard to a fair and adequate allocation taking account of different national starting points and potentials, including the existing level of renewable energies and energy mix, and, subject to meeting the minimum biofuels target in each member states, leaving it to member states to decide on national targets for each specific sector of renewable energies (electricity, heating, cooling, biofuels).

But this left the Commission with guidelines that potentially

6 See http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/93135.pdf

conflict (starting point versus potential, for instance). So Brussels officials looked at various options:

- One was to repeat the classical modelling exercise that Brussels had used to produce the indicative national targets contained in the 2001 directive. The basic technique here was to increase the marginal cost of conventional energies and see at what point on their cost curve renewable energy could begin to compete with them. However, such an approach produced very different results for different countries, in particular high targets for the central and eastern European countries that were not part of the EU in 2001. Modelling brought out these new member states' high renewable potential – they had generally done little to 'go green', yet had considerable biomass to do so – and set them correspondingly high targets. Another difference with 2001 was, of course, that this time the targets were binding, and therefore as one official said, 'member states will always try to out-model us, or quibble with our assumptions, if they don't like the result'.
- Asking every member state to make by 2020 the same 11.5 percent point increase from their actual 2005 renewable share. But it was felt this would be unfair on those states that had done a lot already or had little extra potential to do more. Several countries would fall into both these categories.
- Facing such difficulties about national targets, the Commission even thought briefly of putting targets and constraints on companies rather than governments. So all companies would have a target or supply obligation, such as every oil company would have to make 10 percent of all fuel sold biofuel. But it was quickly realized that while such an approach could be applied to big operators (electricity and oil companies), it would be impossible to apply to the individualised sectors of heating and cooling.

Therefore, the Commission decided to combine some of the options in a way that would respond to the March 2007 summit's call for fairness. The overall goal was to raise renewables' share in final energy demand from 8.5 percent in 2005 to 20 percent by 2020. Half this 11.5 percentage point gap would be closed by an equal increase to every state's renewable target share, and

the other half with increases varied to take account of relative gdp and, to a small extent, states' green energy starting point and potential. At one extreme, this gave Romania only a 6.2 percent point renewable increase in its energy mix. At the other was the UK with a 13.7 percent point increase; Britain lags far behind in renewable development, ahead of only Malta and Luxembourg, but as a windy island has obvious wind and tide power potential. The Commission judged the balance right. The

Table 12: National Renewable Targets

	<i>Share of energy from renewable sources in final consumption of energy, 2005 as a percentage</i>	<i>Target for share of energy from renewable sources in final consumption of energy, 2020 as a percentage</i>
Belgium	2.2	13
Bulgaria	9.4	16
The Czech Republic	6.1	13
Denmark	17.0	30
Germany	5.8	18
Estonia	18.0	25
Ireland	3.1	16
Greece	6.9	18
Spain	8.7	20
France	10.3	23
Italy	5.2	17
Cyprus	2.9	13
Latvia	34.9	42
Lithuania	15.0	23
Luxembourg	0.9	11
Hungary	4.3	13
Malta	0.0	10
The Netherlands	2.4	14
Austria	23.3	34
Poland	7.2	15
Portugal	20.5	31
Romania	17.8	24
Slovenia	16.0	25
The Slovak Republic	6.7	14
Finland	28.5	38
Sweden	39.8	49
United Kingdom	1.3	15

Source: European Commission 2008

targets (see table below) that it proposed in January 2008 were almost exactly what the Council of Ministers and European Parliament agreed in December 2008

Trade in renewables

Differential targets may produce fairness. But since some states have target increases above – and others below – their renewable potential, there is a desire, indeed a need, to correct this imbalance through some cross-border trading of renewable energy or certificates of renewable energy. And satisfying this desire has proved very difficult because of national subsidy schemes for renewables.

Brussels has found designing trade in renewable certificates much harder than trade in emission allowances. It has had to steer around 27 different national renewable schemes, while only two countries – Denmark and the UK – had launched their own emissions schemes before the ETS was created. Moreover, while Denmark and the UK did not mind seeing their emissions schemes being subsumed into an EU-wide scheme, there is deep attachment by many member states to their existing national renewable schemes. These mainly divide into two categories:

- 18 member states operate feed-in tariffs (a guaranteed full price) or premiums (a bonus on top of the electricity market price) paid to producers for the renewable power they feed into the grid. The premium system allows the market more of a role than the feed-in tariffs, but they both provide long-term certainty that is evidently valued by investors. The three biggest developers of renewables – Germany, Spain and Denmark – use feed-in tariffs. These tariffs and premiums can also be set at different levels to stimulate more distantly commercial technology such as solar PV as well as relatively low-cost onshore wind power.
- Seven member states impose quota obligations on suppliers to source a certain percentage of their electricity from renewable sources. This is usually facilitated by a tradeable green certificate (TGC) scheme. So the renewable energy

generators, who are the object of the subsidy, sell their green power for whatever they can get in the electricity market, but they also can sell accompanying ‘green certificates’ to suppliers who need the certificates to show they have fulfilled their quota obligation. This system gives renewable producers less certainty, because their income depends on two fluctuating values, the market price of green certificates and the market price of electricity.

Because of the element of trade built into it, the second scheme can obviously be more easily adapted to cross-border trade. Indeed there already is a cross-border market in the transfer or trade in ‘guarantees of origin’ (GoOs), produced by various issuing bodies to certify that units of electricity have been renewably produced. By contrast, feed-in tariff systems were not designed for their benefits to be traded separately from physical delivery of the electricity. Instead, feed-in tariffs are intended to reward electricity that is actually fed in to the grid of the country offering the tariff.

However, cross-border trade in renewable energy is needed to build up economies of scale across Europe, to move investment where it will produce the best return, and to help countries meet renewables targets that do not match their potential. Because physical flows of electrons cannot be precisely tracked across the multiple borders in the EU, the only way for a pan-European renewable market to operate is on the basis of virtual trading in guarantees of origin, unhooked from the limitations of physical delivery. And this was what, in principle, the Commission proposed. So, as an example, a Greek producer of solar power would be able to present its guarantee of origin in Germany in order to get a much higher solar feed-in tariff (perforce, because Germany has less sun than Greece), even though the Greek solar power might never reach the German grid. Likewise, German renewable energy producers might present their guarantees of origin for sale on the UK Renewable Obligation Certificate market, even though their power would never actually cross the Channel and still be sold on the German market.

This prospect stirred fears in member states, particularly those with feed-in systems, that governments would simply lose

control. As the German environment and Spanish industry minister put it in a joint letter of complaint to the Commission (just before the EU executive unveiled its plans on 23 January 2008), ‘if member states have to achieve a national target, they need to have the means in their hands and they must not lose these means through an EU-wide scheme.’ There were worries about uncontrolled inflows of green power (in the form of GoOs being presented for feed-in payments) that might push a country unnecessarily over its renewable target and at an exorbitant cost. Equally, there were concerns about outflows of green power from countries that would then undershoot their targets.

The major reason, of course, for such inflows and outflows would be to exploit the differences in feed-in tariff or premium levels between various EU states. The effect of uncontrolled trade over time would be to reduce these differences, and to make it hard for governments to set their own tariff levels in the future. This prospect of *de facto* harmonization has been resisted by ‘feed-in’ countries, and the renewable energy industry itself, as fiercely as any formal attempt by Brussels to propose an EU-wide support scheme.

In other sectors of the European economy, the Commission would regard a multiplicity of state aids as dangerously distorting and would use its autonomous powers to rein in these state aids or, at a minimum, harmonize them. It has had to take a different attitude to renewable energy. State aid is accepted as essential because renewable energy is considered an unqualified public good, and because Brussels has no comparable EU money to promote it (see section on carbon capture and storage in Chapter 14).

Some Commission officials would like to harmonize national support schemes. They realize delay merely stores up trouble for the future. Indeed the 2001 renewable directive seemed to offer a chance to end the fragmentation of support schemes. It required the Commission to report in 2005 on the cost effectiveness of the various national support systems, on whether to harmonize them and if so on what model.

But when 2005 came around, the Commission dodged the issue. It said the track record of feed-in and quota obligations were too short to make a proper comparison and gave itself

another two years to answer the question. In 2007 the Commission came off the fence slightly. Its report then found that ‘*well-adapted* [original italics] feed-in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity’, as the chart below indicates. Yet the Commission went on to say that ‘while harmonization of support schemes remains a long term goal on economic efficiency, single market and state aid grounds, harmonization in the short term is not appropriate.’⁷

The figure shows how spectacularly effective feed-in tariffs have been over recent years in Germany, Spain and Denmark.

The Commission’s dilemma is that the system (quota obligations) most apt architecturally for the whole EU appears to be

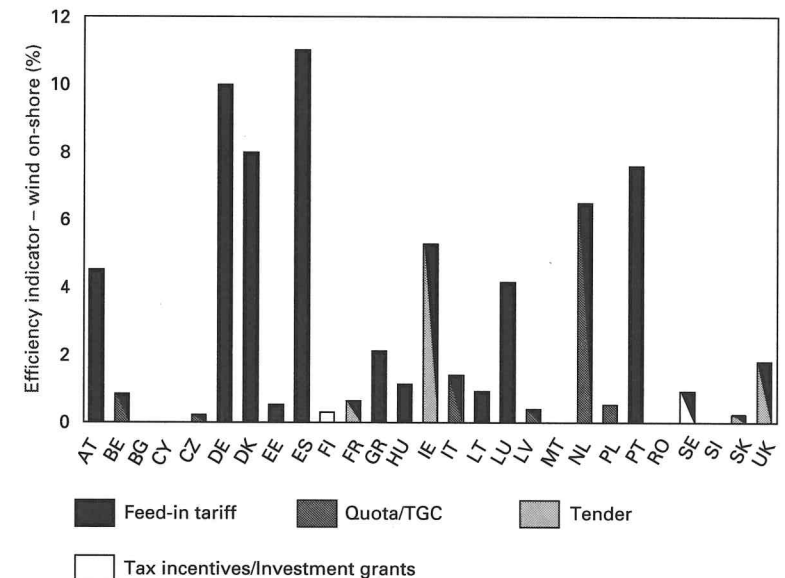


Figure 5: Effectiveness of Renewable Subsidies, 1998–2006

Source: European Commission document, SEC(2008)57, page 26. The effectiveness indicator is the ratio of increased electricity to additional realisable potential over the same period.

7 The support of electricity from renewable energy sources, COM (2008) 19, p. 17.

less effective in actually increasing green power than the system (feed-in tariffs) less suited to the EU scale.

Both systems can be prone to over-paying companies that thereby reap windfall profits. Feed-in tariffs need fine tuning, usually downward adjustment, to take account of technical progress as technology matures, but most tariffs have this degresivity, or downward tapering, built in. In the quota obligation system, it is the most expensive technologies that set the marginal cost of meeting the quota obligation and determine the price of tradable green certificates. So anyone operating more cost-efficient technology, typically onshore wind power, will benefit more. But feed-in tariffs seem to score better on effectiveness, in attracting investment, because they provide financial certainty irrespective of the market.

Such divorce from the market is a weakness from a national or European viewpoint. It is therefore welcome that some countries are moving away from pure feed-in tariffs (which totally supplant the electricity market price) to premiums (which top up the electricity market price). At the same time, the UK has said it will introduce some differentiation in its quota obligation system to encourage technological diversity in the way feed-in tariffs usually do. Such measures should remove the worst features of the two main systems, and represent a slight convergence between them.⁸

It can be argued that fussing about distorted renewable subsidies is relatively unimportant, because even if the overall 20 percent renewable target is met, this will only increase renewables to about a third of the EU electricity market. This is an argument made by the renewable industry, which contends Brussels' first order of business should be to tackle all the structural problems in the conventional two-thirds of the EU electricity market. There is a certain logic to this sequence of events. Removing discrimination in the internal energy market ought to make it easier for renewables to get on the grid, though there are technical, planning and financial issues that can also make that hard.

But the difficulty of general internal market reform should

8 Ibid. p. 15.

not be allowed to become the pretext for indefinitely delaying the creation of a coherent and consistent EU renewable support programme. The Commission finally said as much in the January 2008 launch of its renewable energy policy. 'When the single electricity market becomes competitive and new entrants producing renewable electricity can participate on a level playing field, certain design features of renewable electricity support schemes will have to be reviewed.'⁹

Restrictive trade practices

For the foreseeable future, however, it looks as though trade in green energy will be very restricted, out of deference to the big feed-in tariff countries and the renewable industry. The trade will probably be controlled by governments, as it was between members of Comecon, the Soviet bloc economic organization, which is not a great advertisement for any system.

Under pressure from the start to restrict trade, the Commission originally proposed that governments would be able to set up a system of prior authorization for the transfer in and out of their territory of these GoOs if they were concerned about maintaining their support schemes or hitting future renewable targets. Prior authorization would give the states the ability to vet, and the right to veto, green certificate transactions. Nor would renewable generators become free to go subsidy shopping around Europe. Out would go the current restriction tying a generator to the support scheme of the member state in which it is physically located. But in would come a new 'lock-in' restriction tying a generator to whichever member state it first presents a GoO; this could be another member state, though it would most likely be the generator's home state.

Nonetheless, this was still too 'free trade' for heavyweight renewable states such as Germany, for the renewable industry and, crucially, for Claude Turmes, the Luxembourg Green MEP who was the European parliament's rapporteur on the renewable directive. Mr Turmes' suspicion of the Commission plan was

9 Ibid. p. 13.

increased by the backing it got from the Eurelectric organization of big generators and the European Federation of Energy Traders. 'Creating an EU wide renewables certificate market is not the way forward', Mr Turmes wrote in his report. 'It would undermine the existing national support schemes, but also potentially generate Euros 30bn in windfall profits for traders and generators', on the ground it would favour technology with the lowest marginal costs like onshore wind to the exclusion of other more exotic technologies. This, he concluded, would far exceed the potential Euros 8bn a year saving by 2020 that the Commission had calculated could be gained by having EU-wide trading in green power certificates.¹⁰

By mid-summer 2008, most proponents and opponents of certificate trading had become bogged down in what one Commission official described as '1914–18 trench warfare'. It was at that point the UK, Germany and Poland got together to suggest a compromise. This would allow some trading across borders and even outside the EU. But it would crucially leave governments in charge of any trade of renewable energy, related to fulfilment of their national targets, which could be exchanged on the basis of official statistics.

This proposal preserves some of the Commission's plan for 'virtual' renewable energy trade, but puts it all under governments' control. It could take the form of statistical swaps between member states (which would buy and sell percentage points of green power), or two or more member states combining targets or support schemes, or deals between a couple of member states whereby a renewable project would be built in the first state but some or all of the energy would count towards the goal of the second state. 'We want a single market in renewable energy, but not, at this stage, a single market in renewable energy finance', commented a UK official.¹¹ The UK–German–Polish proposal was the basis for the renewable trading system agreed in December 2008.

In conclusion, the problem is not that the EU – for

10 Claude Turmes, Environment Committee report on the renewable energy directive, 26 September 2008

11 Author Interview 2008

understandable political reasons of solidarity and equity – settled on a system of differentiated national targets. The pity, rather, is that having come up with a system that requires cross-border trade, the EU then did its best to frustrate that trade. Significantly, in its otherwise gently-worded report in 2008 on EU energy policy, the International Energy Agency was sharply critical of EU restraints on renewable energy trading.

Another criticism of the renewable energy targets is that they are impossibly high, certainly for a country such as the UK with a record of target failure; failing to achieve them or achieving them at excessive cost will discredit the whole programme. This is the charge made, among others, by Dieter Helm who has suggested various ways of softening the target (partly by redefining renewable as low carbon to embrace CCS or even nuclear and partly by prolonging the deadline beyond 2020).¹²

Of course there is a psychological point at which, if the bar is set too high, you don't even bother to try to jump. And at 20 percent the renewable bar might prove so high as to be incredible to the wide number of market players needed to create a broad renewable energy base. Yet so-called stretch targets can be good. If targets stretch the abilities or efforts of people, companies or states in a good cause, they are beneficial even if they are not met. However, while ability and effort are not finite and can and should be stretched, natural resources are finite. This is why the one renewable goal under real attack has been the sub-target set for biofuels.

12 Renewables – time for a rethink? June 2008. www.dieterhelm.com.