agreement encouraged national governments to use a portion of their revenue from auctioning ETS allowances as a subsidy to CCS. With governments loath to make any immediate pledges of taxpayers' money for CCS, a future raid on the larder of ETS allowances seemed a very convenient solution. In theory, now there is legislation enshrining this subsidy in law, potential CCS operators can go to a bank and raise finance on the back of it. In practice, bankers will have to weigh carefully the future value of ETS permits as collateral for their loans, and they may not be reassured by the uncertain impact of the December 2008 deal on the ETS market.

Nevertheless this arrangement could mark the opening up of a new channel of funding for energy R&D in Europe. At their December 2008 summit EU leaders issued a declaration noting 'their willingness to use at least half' of ETS allowance auction revenue for climate control purposes, including R&D into low-carbon energy. Such a declaration is far from a binding commitment, but nor is it necessarily meaningless for the future.

CHAPTER 15

DOING WITHOUT

Negajoules represent the biggest energy source in Europe – ahead of oil, gas, coal and nuclear.

European Parliament, 2006

The EU has given itself a target to improve energy efficiency by 20 percent by 2020. But that does not mean an aim of using 20 percent less energy in *absolute* terms by 2020 – if it did, meeting it would almost automatically fulfil, and make redundant, the other target of cutting emissions by 20 percent. Instead, the energy efficiency goal is to save 20 percent of energy consumption *relative* to what the EU's energy is projected to be by that date if Europe just continued with its business as usual.

In other words, it is a pretty soft target. It differs from the 20 percent targets for cutting emissions and raising renewables in three ways. It is not binding. Its contribution is harder to gauge because it is measured not against a past base year but a future estimate. And its fulfilment depends on a wider range of actors, on the actions and reactions of virtually all of Europe's 500m citizens.

But progress in energy efficiency is very important because reduction in energy consumption, even if relative, will exert downward pressure on energy prices, and cut both imports and pollution – the three totemic goals of EU energy policy. Progress towards the energy efficiency target will also influence progress towards the other two targets. As regards the ETS, the higher the energy saving, the lower the demand to buy carbon permits and the lower the carbon price. The knock-on effect of that on, say, nuclear power may not be good. But the lower energy demand, the easier it becomes to meet it by renewable means.

But if the importance of energy efficiency is evident, the EU dimension is less obviously relevant to this aspect of energy

policy than to other areas already discussed. It is axiomatic that design of the EU's internal energy market must be decided at the level of that market; it is only natural that countries seeking greater energy security should band together; and it is clear that global problems like climate change require the widest possible response, with a regional bloc of 27 countries merely a starting point. But energy saving is often seen as something done within the privacy of one's home or within the confines of one's state.

Brussels' usefulness, or otherwise, in energy saving policy is underrated, partly because energy saving or efficiency gets little attention in general. Deciding to save energy is not a process that brings EU member states into conflict with each other or creates press headlines. And actually saving energy, in the absence of some revolutionary gadget, is usually unglamorous. This is why, in the words of one EU official, 'there is a feeling that [energy saving] is so unconflictual that it will get done automatically, with a little help from oil prices.'[1]

Unfortunately, the rise in the oil prices since 2000 has not been that much help. Certainly overall energy use in the EU is fairly flat, amounting to 1,637m tonnes of oil equivalent in 2005 and showing no increase on 2004. And overall energy intensity – the amount of energy needed to generate a given unit of national wealth – continues to fall for the EU as a whole, to an average in 2005 of 208 kgs of oil equivalent for a 1,000 euros of gross domestic product (compared to 236 kgs of oil equivalent in 1995).[2]

But this average bridges an enormous gap. On the one hand, there is world-beating Denmark, whose energy intensity on the above measure is a miserly 114 kgs of oil equivalent, and at the other extreme, Bulgaria, a brand new EU member still with a Soviet industrial legacy, which uses energy 10 times more intensely than Denmark, at 1,582 kgs of oil equivalent. Yet even before Bulgaria's entry into the EU, the Commission was estimating in 2005 that the EU could save 'at least 20 percent of its present energy consumption in a cost-effective manner',

1 Author interview, 2007.
2 Eurostat, 2007.

which is where the 20 percent target sprung from.[3]

The business of energy saving is, moreover, complicated by the perverse effect of efficiency on demand – the more energy you save, the more you have to use for something else, and the more efficiently energy can be produced and the cheaper it becomes, the greater the incentive to use more of it. This perversity, known as the 'rebound effect', has been recognised for a long time, since indeed the 19th-century invention of the steam engine enormously improved energy efficiency but also increased energy consumption.

It is also what is happening with electricity today. Electricity consumption in the EU rose between 1999 and 2004 at 10.8 percent, almost exactly in line with GDP.[4] Now, there are reasons to favour a continuation of the historic trend of progressively electrifying the European economy into areas such as transport that might otherwise be hard to decarbonize. It could, for instance, enable electric cars to recharge with low carbon energy by plugging into a renewable or nuclear-generated grid. Therefore transport is a sector where an increase in *electricity* intensity might be good. But there are many examples of increased efficiencies in the generation or use of electricity that have simply stimulated consumers' appetite for more of the magic electrons.

On the generation side, there is the success of combined cycle gas turbines (CCGTs) bringing down the cost, and in most instances the price, of electricity in a way that encourages consumption. Far more numerous are the improved efficiencies in the amount of electricity used by household appliances such as refrigerators and washing machines. These efficiencies go hand in hand with a rise in household consumption of electricity, because of the increased penetration of appliances such as air conditioners, dishwashers and tumble driers. These developments constitute real welfare gains for people who can now afford to buy useful household goods that compared to the past, use relatively smaller amounts of electricity made relatively cheaper by CCGTs.

3 Green Paper on Energy efficiency, European Commission, 2005.
4 Joint Research Centre, 2007, *http://ies.jrc.ec.europa.eu*

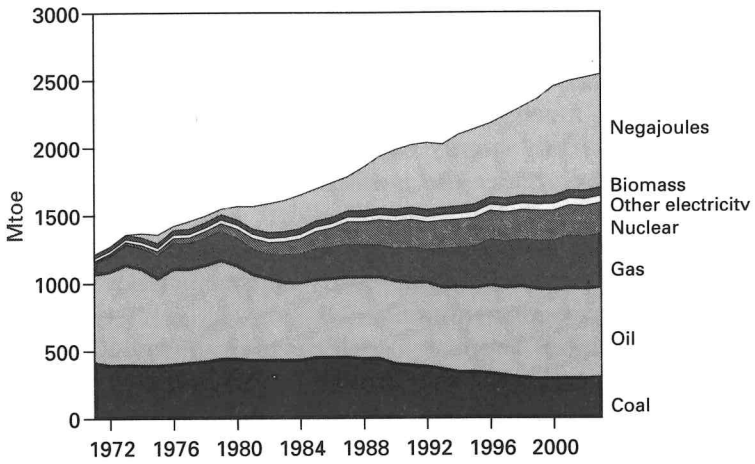

Figure 8: Energy Saving in Europe

Source: European Commission Green Paper on energy efficiency COM (2005) 265, p. 10

Less positive is the increase in standby electricity consumption from entertainment electronics, computer equipment and modern versions of traditional white goods that are fitted with special displays and microprocessors. Nor, in households, do these modern gadgets replace older ones as they would in businesses; older TVs are often shifted to children's bedrooms rather than thrown out. Newer appliances use less standby electricity. But the simple number of appliances with standby power mode continues to increase, and so therefore does overall consumption.

So is the energy conservationist on the hopeless treadmill encapsulated in the Red Queen's warning to Alice that in Wonderland 'you have to run as fast as you can just to stand still, if you want to get anywhere else you must run twice as fast as that'? Not quite. A recent UK study of the 'rebound effect' confirmed that the phenomenon certainly exists in both direct and indirect forms, and in total 'the evidence suggests that economy-wide rebound effects will be at least 10 percent and often higher of the energy saved.'[5] The direct rebound effect is

5 'The Rebound Effect', UK Energy Research Centre, 2007, pp. vii–xi.

where people use the money they save on energy to consume somewhat more of the same energy. This is likely to be higher in poorer countries or among poorer people because their demand for energy is less satiated. In developed countries, this same UK study suggests that the direct rebound effect for household heating and cooling and for personal transport 'is likely to be less than 30 percent and may be closer to 10 percent for transport'. The direct rebound effect may be somewhat larger when producers, rather than consumers, adopt energy efficiency technologies such as the steam engine in the 19th century or the electric engine in the 20th, because producers' appetite for energy will not be limited by their personal needs. An indirect rebound effect can occur where people (usually richer people) use the money they save on one kind of energy, say, electricity for heating and lighting, and spend it on another, say, kerosene to jet them away on another holiday.

Yet none of these effects really matters as long as energy efficiency improvements do not so stimulate demand that overall energy use actually increases. Energy economists term this counter-productive effect 'backfire', and it did occur when steam and electric engines arrived on the scene. The UK study underlines 'there is no a priori reason to believe that "backfire" is an inevitable outcome in all cases.' Even where an energy saving technology results in a rebound effect of 30 percent, 70 percent of the energy saving is still preserved. But this UK report suggests caution in estimating the actual energy savings from energy efficiency technology. It is also a reminder of the importance of carbon and energy pricing in reducing rebound effects, by keeping the cost of energy constant while efficiency in producing it improves. And with the issue of energy pricing, on which the EU has some agreements, the EU enters the picture.

What role, then, for Brussels and policy-making at the EU level? There is some ground to think that EU institutions – meaning the Commission and Parliament – are more inclined towards action on energy saving than national governments. Although Brussels is often considered as putting producers' interests above those of consumers (the most famous example being the Common Agricultural Policy), this is not so evident in energy. Indeed, arguably, the locomotive that has driven

EU energy policy forward for some time has been Brussels' competition directorate with its anti-trust investigations, usually launched on complaints from energy users. By contrast, national energy ministries in the member states tend to be more influenced by energy producers, which, everything else being equal, are interested in customers buying more not less of their product. 'Because of "agency capture" by energy interests of the department of trade and industry', claims Andrew Warren of the UK Association for the Conservation of Energy, 'almost nothing would happen in UK energy saving if it were not for Brussels.'[6]

Of the two main instruments available to encourage people to do the unnatural thing of saving energy – regulation and taxation – the EU has so far overwhelmingly relied on regulation.

Products

The EU's main recent actions are the 2003 energy labelling directive and the 2005 Eco-design directive. The first required manufacturers to put clear information about energy use on labels on their products. It also set some minimum energy efficiency standards for products, but these did not go far enough. So the Eco-design directive was passed to set energy efficiency requirements for a wide range of consumer goods ranging from water heaters to TV set up boxes. In July 2008, the Commission proposed extending this directive to all energy-related products – those that do not consume energy during use but have an indirect impact on energy consumption, such as (hot) water-devices or windows.

The first concrete measure taken under the Eco-design directive was agreement in July 2008 to cut the electricity consumption of standby devices in offices and homes by nearly 75 percent by 2020. Another decision under this directive is to phase out incandescent light bulbs by the end of 2012, replacing them with more efficient fluorescent light bulbs.

6 Author interview, 2008.

Transport

In this sector, the EU has a role of Union-wide dimension, in the air and on the ground, which has already been explored in Chapter 10. Legislation is agreed to put the emissions from all aircraft using EU airports (including non-EU airlines) into the ETS in 2012. At the same time, the Commission is helping Eurocontrol to try to create a coordinated air traffic system with the Single European Sky programme that could, by reducing aerial congestion and stacking over Europe's airports, cut aviation fuel consumption by an estimated 11 percent.

Partly because cars, or their drivers, are not, like airlines, conveniently organized into fleets that could be slotted into the ETS, legislation has been directly imposed on the car industry to reduce vehicle emissions. The approach is similar to the Corporate Automobile Fuel Efficiency (Café) standards in the US, only tougher.

Buildings

Some 40 percent of all the energy in the EU is used in buildings and the potential savings on this energy is considerable, as much as 28 percent by 2020, according to Commission estimates. In 2002, the energy performance in buildings directive was passed, though it only came into force in 2006. Even then it only required member states to have an energy performance standard of their own for large new buildings of more than 1,000 square metres or similarly sized existing buildings undergoing renovation. This, however, was progress because most of the new Central European states had no such standard, until their entry into the EU. The most important change would be to require the retrofitting of energy saving equipment to existing buildings not undergoing major renovation. Imposing standards on buildings does not deal with the fact the stock of buildings takes far longer to 'turn over' than that of products.

Public procurement

The EU institutions and the central governments of member states have amended the legislation on their public procurement – amounting to 16 percent of EU gdp – to make energy efficiency a criterion for choice when they buy goods and services. In this way Brussels has adapted one of its more powerful internal market instruments to the cause of energy efficiency.

This public procurement legislation has been used to thwart the natural tendency of national governments to award contracts to their own national companies, so segmenting the market. The legislation requires all government contracts over a certain value to be advertised electronically across the EU. In the past, it has generally required that, if all conditions such as quality and safety are equal, contracts should go to the cheapest bidder, as a safeguard against protectionism and corruption (inflated price contracts can conceal kick-backs). Such an approach can, however, discourage innovation and new energy-saving technology that is often, at least in the short run, more expensive than what it replaces.

In 2004, 'green public procurement' guidelines were introduced to encourage local authorities to factor into the costing the life-cycle costs (such as emissions escaping during the production process or the running cost of a building) of products they were tendering for. However, only a few member states – only seven according to a 2006 study – appear to have embraced this. The Commission announced in mid-2008 further efforts to promote green public procurement.

Trade

So far trade policy has not figured much in the EU's quest for energy saving or emission reduction, with the minor exception of the 2007 EU – US agreement to highlight the energy efficiency saving merits or demerits of office technology, through labelling. But trade policy will play an increasing role in policing energy inefficient imports that would undermine product standards in the EU. Sometimes external trade issues have pushed internal regulation along.

An example of this has occurred in the greater light bulb switchover, which will eventually see Thomas Edison's incandescent light bulbs phased out and replaced by fluorescent light bulbs. The EU's Eco-design of Energy-using Products of 2005 gave the Commission the choice of either accepting industry promises of self-regulation or tabling mandatory legislation. Somewhat counter-intuitively, the industry represented by the European Lamp Companies Federation (ELC) quickly opted to have compulsion imposed on it, and crucially on its foreign competitors. ELC's secretary general, Gerald Strickland, said, 'we decided that the voluntary route would offer no control over, or sanction on, importers continuing to undermine our efficiency efforts with inefficient products.'[7] Of course the great majority of new energy-saving bulbs will come from China, mainly from ELC company subsidiaries there.

The hard part of trade policy will be to ensure that legitimate policing of imports for observance of EU standards stops short of protectionism. Moreover, it would probably overstrain trade policy if, in a bid to equalise carbon controls, the EU were to start evaluating the emissions not just of foreign products, but also of the process by which these products were made. For instance, what if import into the EU of fluorescent light bulbs from China were blocked or penalized because the EU judged there was insufficient control on the carbon emitted during the manufacture of those bulbs?

Tax

While trade is an area of coming involvement for Europe's energy policy makers, energy taxation is one of EU member states' older battlefields – and one that may soon have to be revisited. EU governments accept the need for some harmonization of indirect tax rates on motor fuels in order to prevent serious distortions in the markets for these valuable, mobile and

7 Author interview, April 2008

generally highly taxed commodities. So there is an EU system of minimum tax rates on petrol, diesel and other mineral oils, and the 2003 Energy Taxation Directive extended these floor rates to other energy sources such as coal, gas and electricity.

But the EU only taxes energy when it is used as fuel or for heating, and not as raw materials in industrial processes, or as input in the making of other energy products (in refineries) or even as inputs for electricity generation. The European Commission tried to remedy this back in 1991, in the run-up to the United Nations conference in Rio de Janeiro that put climate change on the political map. It proposed a wide-ranging energy tax, calculated on both energy content and on proportion of carbon emissions. The proposal foundered, mainly on opposition from the UK (on the political grounds of fiscal sovereignty) and from Spain (arguing such a tax would cramp its development).

Yet, very tentatively, the Commission is trying to return to the issue. In spring 2007 it ventured the thought in a green paper that 'the explicit identification of an environmental element in the minimum levels of taxation (differentiating between greenhouse gas and non-greenhouse gas emissions) would enable energy taxation to complement other market-based instruments at EU level.'[8] And there is a good argument for doing so, particularly to reach parts of the economy that the emissions trading scheme (ETS) itself cannot easily reach.

As the main framework for controlling climate change, the quantity allocation method is peculiarly apt, for both technical and political reasons. Technically, because the science has given us a ballpark figure of the amount of greenhouse gases we want to take out of the atmosphere, or rather the level of so many parts per million that we want to limit greenhouse gases to. So the ETS works on the basis of the authorities setting the quantity of carbon to be reduced, and letting the market set the price of doing that.

Politically, too, this has several advantages. One is simply that while the ETS is effectively a tax, it is not called one. This enables it to be swallowed in the EU context by the UK, and

8 Green Paper on market-based instruments for environment and related policy purposes, COM (2007) 140 final, p. 8.

perhaps one day in the context of an extended post-Kyoto system by the US, a country even more jealous of its fiscal sovereignty. The other political plus is the opportunity to smoothly phase in schemes like the ETS by initially giving out some pollution permits for free, though eventually most or all permits must be auctioned if they are to have a real cost that changes the polluter's behaviour.

However, an ETS involves calculating, and controlling, individual permit levels for individual polluters or energy users, and this becomes quite impractical for the likes of small businesses, households and car drivers. So there is a case for reviving the idea of a carbon tax (from which sectors/companies covered by the ETS might be exempt). It would also keep the cost of energy services constant despite any efficiency improvements, and would therefore minimize 'rebound' effects.

Returning to an old theme it first raised in 1993, the Commission likened such a carbon tax to 'an environmental tax reform shifting the tax burden from welfare-negative taxes (e.g. on labour) to welfare-positive taxes (e.g. on environmentally damaging activities such as resource use or pollution)', and therefore producing 'a win-win option to address environmental and employment issues'.[9] Taxing environmentally damaging consumption might also help governments replace revenue from taxes that, in the era of globalization, are getting harder to levy on capital. Environmental taxes would be regressive (because higher energy charges would take more out of the pocket of the poor than of the rich). But this effect could be offset if governments cut labour and social security charges at the lower end of the income scale.

While an EU-wide carbon tax complementing the ETS would have many advantages, the requirement of unanimity among the EU's 27 governments on tax issues is not one of them. Some governments, notably the UK and France, are showing interest in reshaping EU level taxation in a green way. At their March 2008 summit, EU leaders invited the Commission to 'examine areas where economic instruments, including VAT rates, can

9 White Paper on Growth, Competitiveness and Employment, COM (93) 700 Chapter 10.

have a role to play to increase the use of energy-efficient goods and energy-saving materials'. But reducing VAT on some energy efficient products or services – which might get the required government unanimity – would not create the widespread change that an economy-wide carbon tax would bring.

National action

Part of the 20 percent efficiency improvement – a saving only compared to what energy use would otherwise be – is supposed to come from national programmes. This is in addition to whatever energy and emissions saving are made as a result of the ETS or other EU-wide measures. Under the 2006 Energy End-Use and Energy Services directive (which like every directive, of course, had to have governments' agreement), member states have been required to file national strategies on how they planned to achieve a (non-binding) goal of reducing energy consumption by nine percent over nine years.

The lackadaisical way in which many member states have implemented this directive gives the impression that they do not care much about energy saving, or, if they do, that they do not regard the EU as very relevant to this task. The National Energy Efficiency Actions Plans (NEEAPs) were all supposed to be filed by July 2007. But Commission had to chivvy governments with threats of court action, and it was July 2008 before the last (from Greece) of the 27 plans straggled in.

These plans may be of some use to the Commission as an information exercise of what is or what is not being done at national level. This directive could, in the words of a Commission official, 'provide us with the means to look into member states' backyards in terms of energy saving and to see what more could be done at EU level'.[10] But in mid-2008 the Commission still had 16 infringement proceedings against member states for failing to transpose the directive, correctly or at all, onto their statute books. For the most part the national plans are distinctly unimpressive in their ambition, though the Commission has

10 Author interview, 2008

been gentle in its public assessment of them. In January 2008, it reported on the 17 plans it had received by then. The nearest it got to any criticism was to say that, while 'several present comprehensive strategies and plans are likely to deliver savings beyond the required nine percent, many seem to present a business-as-usual approach.[11] This was hardly the naming-and-shaming tactics that Brussels uses against member states that drag their feet on single market legislation.

Yet, while the Commission should get tougher in prodding member states into energy conservation, decisions on what measures to take must very often be made at national level, taking advantage of simpler local procedures and better local knowledge. Acts of individual leadership, such as the decision of Ken Livingstone to run for mayor of London virtually on the single issue of a traffic congestion charge for the UK capital and to carry it through, are hard to envisage in the more complex, collective context of EU policy-making. The same could be said of the Irish government's decision to place a green tax on plastic shopping bags. The wisdom of devolving decisions downwards wherever possible, and only taking them at the EU level where necessary, got formal recognition when the subsidiarity principle was enshrined in the 1992 Maastricht Treaty.

Despite the increasing degree of compulsion applied to it, energy saving remains something of a cultural issue (and as regards climate change, a moral issue in the sense of a moral obligation to future generations). Attitudes towards energy conservation will therefore evolve in the way they have towards smoking. There is no collective European conscience about energy saving, as there is against the death penalty that every European government has repealed. Some countries care more than others about energy saving. It would be tempting to generalize that northern Europe cares more than southern Europe, which generally sees itself as more in a catch-up phase of energy-driven development. But inside the northern belt of EU countries, indeed inside Germany, there is an odd contradiction. Germans are model recyclers of household and consumer product waste and have led the way in

11 'Moving Forward Together on Energy Efficiency', Commission communication, COM (2008) 11 final, p. 12.

renewable energy. But they are apparently addicted to conspicuous energy consumption in the shape of big, therefore heavy, and therefore CO_2-emitting, cars – and to the freedom to drive these cars as fast as they like on their autobahns.

Kicking the energy waste habit is likely to evolve unevenly across Europe. Only gradually may climate change concerns permeate into a common consciousness about energy wastefulness. Ironically, one factor promoting a common consciousness in general among Europeans has been their ability to fly all over their continent on budget airlines, a phenomenon created by EU aviation liberalization but which now, awkwardly, adds to global warming.

However, because of the urgency of climate change, regulation of energy waste will have to run ahead of social attitudes to it. This will be tricky for politicians at the EU and national level. They will dare not get too far ahead of voters. Leadership in energy policy is especially difficult, because energy policy changes entail lifestyle changes, and usually an element of personal sacrifice.

CHAPTER 16

CONCLUSION

The last few chapters have not been a stellar advertisement for energy policy at the EU level. EU research in nuclear power has focused too much on the ever-distant prospect of nuclear fusion and too little on the here-and-now problem of disposing of nuclear fission's radioactive waste. EU research has been inadequately funded, particularly in view of the need to get carbon capture and storage demonstration technology going in time to make a difference to the climate. The Commission has preached the merits of energy saving to member states, but has been unable to get their agreement to an EU-wide energy/carbon tax that would now be a useful complement to the ETS. And the EU has yet to establish itself in the eyes of its member states as a direct provider of security for their energy imports.

Yet the Commission's hard slog to integrate Europe's energy market is paying off, if not in terms of lower gas and electricity prices (which fluctuate up and down with the oil price), then in terms of indirect energy security. Better inter-connections between the EU's 27 national electricity and gas markets will increase the ability to move supplies around in time of shortage, and improve the Union's resilience to withstand supply shocks. The jury is still out on how effective the EU's climate change policies will prove in practice for cutting emissions. The proposed post-2012 reform of the ETS is an improvement, but there are still doubts about the design of the renewables and biofuels parts of the new climate change programme. However, the principle and value of collective EU action on global warming is, rightly, unquestioned throughout Europe.

This book has argued that the EU offers high potential for collective action in energy (especially on climate change), and has complained where this potential has not been realized (especially in nuclear power). It has also highlighted a few ways in which the EU tries to prevent member states from making bad