Lessons from energy efficiency policy and programmes in the UK 1973 to 2012.

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1 Abstract

The UK is in the process of implementing the Green Deal, a finance-based energy efficiency policy. It is aimed, initially, at the domestic sector, but with plans to extend the scheme to the commercial and public sectors. The Green Deal represents a fundamental reorganisation of policy because it places a considerable reliance on the role of markets to deliver the required energy savings. Support programmes have been curtailed or removed completely and role of government restricted to capacity building, accreditation and compliance monitoring.

Will the Green Deal succeed? This paper reviews the history of energy efficiency policy and programmes in the UK from 1973 to the present day, taking account of the political environment and of the wider context of energy and climate policy development. This information is then analysed to draw out what is generally considered to be effective policy, and applies this to the current policy landscape.

2 Keywords

UK energy and climate policy. Policy implementation. Green Deal. Energy efficiency and conservation.

3 Introduction and Aims

Energy efficiency policy in the UK is at a watershed. The government is in the process of implementing the Green Deal, a market based, demand-led financial mechanism aimed initially at households, and due to start in the autumn of 2012. A new Energy Company Obligation will run alongside the Green Deal to support vulnerable customers. A commercial sector Green Deal is also planned.

The Green Deal takes a deliberately market-led view, with the government expecting the private sector to design and deliver the majority of programmes and services. Funding for support programmes has been withdrawn from the Carbon Trust and Energy Saving Trust, and state intervention is being restricted to some early capacity building and accreditation and providing the regulatory framework for the scheme. Start-up funding of £200m has been announced of which a proportion has been earmarked for financial incentives such as cashback schemes.

The Green Deal is building on a rich history of UK energy efficiency policy. Will it deliver? This paper attempts to answer this question by reviewing and drawing lessons from the UK's experience from the 1970s to the present day.

4 Methodology

A timeline approach was used to describe the evolution of energy efficiency policy. This was done (as opposed to a thematic approach, for example) because it reveals the connections between energy efficiency and the prevailing political environment. This is important for two reasons. Firstly the development of the policy is largely defined by what the government is doing, so it makes sense to tell the story in this context. Second, and most importantly, a key objective of this paper it to help inform the implementation of current policy, and a historical perspective has much more resonance for a non-academic, civil service audience.

For the literature review a number of written information sources were used. First there are government papers and other official publications. These are informative, but inherently biased because they reflect the official government position. Unfortunately there are few academic papers looking at policy implementation in the UK. Those papers that do exist tend to focus on the underlying economic theory. Most reflective discussion is in the "grey" literature such as reports from NGOs, government agencies and international bodies. There are, fortunately a few reference books that specifically deal with the policy.

Because no single information source covers the timeline completely, we were careful to triangulate between the various sources whenever possible so that the material we outline below had more than one corroborating source. We also backed this up and filled any significant gaps using our own recollection (both authors were actively involved in the policy process for a number of years) and interviews with staff from the principle agencies and government departments.

The results section analyses the information set out in the timeline and draws out the features than make up what is generally considered to be effective policy and applies this to the UK situation. We have not attempted to compare different programmes because they have used different impact assessment approaches and metrics. The impact of policy on the whole economy, for example using energy intensity metrics, is also difficult to assess because it is hard to disentangle efficiency from other drivers such as technical innovation, structural change and fuel switching.

The conclusions section compares the current, 2012 policy landscape with the findings of the results section.

5 Results

1973 to 1979

The idea that government had a strategic role in managing energy demand started with the first oil crisis in 1973. OPEC countries raised prices from $3 to over $12 a barrel and instigated an oil embargo on the US and others deemed to be helping Israel during the Yom Kippur war. This caused fuel shortages in many western countries followed by severe economic instability.

In the UK the Conservative government had taken a relatively pro-Arab line and, as a result, escaped a direct embargo. However the price shock caused serious fuel shortages, compounded by a miners' and rail workers' strike raising the price of coal, the main fuel used in electricity generation. On December 13th Prime Minister Edward Heath announced a three-day working week to ration electricity use. Parliament was recalled on January 9th 1974 to hear that that a new Department of Energy was being set up to co-ordinate the government's response. However the crisis brought down the government the following month. The incoming Labour government, under Harold Wilson, settled the miners

dispute and the new Energy Secretary, Eric Varley, ended the three-day week on March 7th 1974.

The crisis prompted a flurry of government activity. Two government reviews recommended that the government develop a strategic role in managing energy demand (CPRS 1974, NEDO 1974, Bending and Eden 1993). However there was virtually no expertise available inside government so the Energy Department set up a new Advisory Council on Energy Conservation (ACEC) in June 1974, chaired by eminent engineer and academic Sir William Hawthorne.

The Department of Energy launched a new energy efficiency programme on December 9th 1974, timed to reduce winter fuel use, but also anticipating a review by the House of Commons Science and Technology Select Committee (Patterson 1978, Anderson 1993). This "12 point plan" as it was called, included:

- A £3m (worth £25m in 2012) loan scheme for industry to ease cash flow problems and a 100% capital allowance scheme.
- A doubling of domestic energy conservation standards in the Building Regulations.
- Cuts of 20% in energy use by the government estate.
- Reductions in vehicle speed limits on single and dual carriageways to 50 and 60mph respectively (but not motorways).
- A compulsory maximum temperature of 20ºC for all non-domestic buildings and restriction on electricity use for daylight advertising.
- The "Save It" advertising campaign launched in January 1975 at a total cost of £7.8m (£65m).

The programme was strongly interventionist, even by 1970s standards. However the Select Committee report (House of Commons 1975) said that they were "deeply concerned at the general lack of urgency". They made 40 recommendations, including a 15%, three-year energy saving target, mandatory heating system controls and insulation standards for offices and shops and pilots for town centre traffic controls. Most of the recommendations were seen as unrealistic and ignored. But the report did force the government to assemble the expertise to be able to respond.

Tony Benn became Energy Secretary in June 1975. He was familiar with the brief (as Minister of Technology in 1969) and enthusiastically supported by Minister of State Jack Cunningham. However the rest of government was not so enthusiastic and the response to the Select Committee report was muted (Department of Energy 1976).

It was the visit of US President Jimmy Carter, in May 1977 that brought matters to a head. Carter had just launched a major energy saving programme and the Prime Minister, James Callaghan, did not want to be outdone. ACEC were asked to design a new programme, and with Prime Ministerial support Benn was able to bang heads together in Whitehall. On December 12th 1977 he announced a £470m, 4-year programme (worth £2.7bn today), with the aim of saving £700m pa and cutting demand by 10%. The highlights were:

- A 10-year programme to bring housing up to a basic level of insulation, supported by the Home Insulation Scheme, coupled to a loan sanction releasing £100m for Local Authority programmes.
- Continuation of the "Save It" campaign.
- £100m (£570m in today's prices) for improving insulation and heating controls in public sector and government buildings.

- More funding for industrial demonstration and energy management schemes, with funding rising to £18m (£70m) pa in 1980.

Technology was driver of these early programmes, run by the Energy Technology Division (ETD) in the Department of Energy. In 1977 Benn renamed it the Energy Conservation Unit, and promoted it so it had the same importance in the hierarchy as energy supply policy. The two main programmes run by the ECU were:

- The Energy Survey Scheme (1976-1989) provided grants to industry for energy surveys, simple advice and energy management support.
- The Energy Conservation Demonstration Project Scheme (1978-1989), later renamed the Energy Efficiency Demonstration Scheme, addressed the UK's poor record of exploiting emerging technologies by providing companies with 25% of the capital cost in return for access to the site and the right to monitor and disseminate the results.

The government outsourced the programmes to the Energy Technology Support Unit (ETSU) set up in April 1974 within the Atomic Energy Authority in Harwell. ETSU focused on renewable energy, industrial process technology and energy management. In 1978 the Department of the Environment set up an equivalent technology unit to ETSU, called the Building Research Establishment Energy Conservation Unit (BRECSU).

The Department of Industry ran two programmes using the National Physical Laboratory in 1976. The Industrial Energy Audit Scheme mapped out energy flows across industry to identify energy saving opportunities. The Industrial Energy Thrift Scheme provided confidential energy surveys to help individual companies realise this potential.

These programmes produced significant amounts of specialist technical information. They also stimulated a new energy conservation market pioneered by new breed of "energy managers" emerging from the ranks of facilities managers. New techniques appeared such as monitoring and targeting and occupancy modelling. The market also began to organise itself through professional bodies like the Institute of Energy, set up in 1979 (now part of the Energy Institute), the Building Services Research and Information Association (BSRIA, 1975) and the Chartered Institute of Building Service Engineers (CIBSE, 1976).

1979 to 1983

In May 1979 the Conservatives under Margaret Thatcher won the general election with a commitment to reducing state interference in markets. Energy Secretaries David Howell and Nigel Lawson, both free-market enthusiasts, advocated the role of energy prices, which were rising following the second oil shock, to reduce energy demand. The argument was industry and householders, as rational economic actors, would install energy conservation measures without subsidy because they were cost effective Unfortunately the same argument was applied in reverse when prices fell in the early 1980s: if energy conservation was no longer cost effective there was no point in government second-guessing the market.

The civil service view was initially somewhat at odds with the new political orthodoxy. Senior officials had become convinced of the value of energy conservation once the impact of the 1977 programme became clear (Bending and Eden 1984). Official reports were produced that argued that energy pricing alone

was not enough to deliver energy conservation and proposed a range of new interventions (Department of Energy 1979, 1983a).

Some, but not all of the Labour government's policies were wound down. Popular schemes like EEDS continued, as did household loft insulation grants. But official advice soon began to swing behind the politics, with the department completely reversing its view:

…the explicit role of market prices in determining energy demand removes the need for a separate allowance for energy conservation" (Department of Energy 1982a).

Advice that contradicted the official line was not welcome especially if came from corporatist structures like ACEC, which was disbanded in 1983. It didn't go quietly, saying in its last report (Department of Energy 1983b):

"Leaving the matter to energy pricing signals and market forces alone is unlikely to have the impact desired because there are too many other constraints - institutional, political, financial and behavioural - that prevent adequate operation of market forces".

1983 to 1989

Following the 1983 General Election Peter Walker was appointed Energy Secretary. Walker was on the left of the party and an energy conservation enthusiast. He was particularly concerned that the UK was falling behind industrial competitors such as Japan and the US. The ECU was remodelled into a new Energy Efficiency Office on October 31st 1983 with a budget of £10.9m (£30m today) and a remit to "provide a focus for the government's energy conservation policies". This was partly a response to one of Whitehall's periodic tidying up exercises (Department of Energy 1982b), which called for energy efficiency to be in one department.

Walker's time at Energy led to what many described as a "golden age" of energy efficiency (Owen 1999). Regional energy efficiency offices (REEOs) were set up. Over 20,000 people came to energy management meetings hosted by Ministers and senior officials: Walker himself hosted a series of business breakfasts around the UK. 1986 was designated Energy Efficiency Year, marked with an £11.8m campaign called "Get More for your Monergy".

The energy efficiency industry became robust enough to take on the energy supply-side lobby that dominated the Energy Department. The Association for the Conservation of Energy (ACE) was set up in 1981 and in 1984 ACE formed the British Energy Efficiency Confederation (BEEC), a trade association group that operated as a semi-independent government/industry advisory committee, jointly chaired by Andrew Warren, the Director of ACE, and a senior EEO official.

Walker also presided over an important shift in emphasis away from "energy conservation" to "energy efficiency" (Patterson 1978, Owen 1999). Conservation meant doing without things, which in a consumer-led economy was bad. Efficiency was good because it meant doing more. It was also easier to sell in Whitehall and to the public because it emphasised the economic and social benefits - warmer homes, lower bills, greater productivity. The downside was that energy efficiency could be delivered when energy demand rose as the economy grew.

In 1987, the Conservative government secured a third term and Cecil Parkinson became Energy Secretary. Parkinson, another free-market enthusiast, cut the EEO's budget from £24.5m to £15m in 1989/90 and started a number of programme reviews (BRECSU & ETSU 1989, Lees & Brown 1989). As a result the ESS and EEDS were cut and the rest of the EEO's programmes were constrained to interventions that didn't interfere with the role of free markets, such as information and advice. In response, on April 1st 1989, the EEO launched the Energy Efficiency Best Practice Programme (EEBPP). The focus was best practice information and benchmarking, with research, development and demonstration retained, in reduced form, as "future" and "new" practice elements.

The privatisation of the electricity industry in 1989 provided an opportunity for energy efficiency. Increased supply-side competition boosted the use of Combined Heat and Power plants for high-energy users (Owen 1999). The less carbon intensive gas was promoted over coal: the so-called "dash for gas". The Electricity Act gave the Director General of Supply to "promote the efficiency use of electricity by consumers" and a rather vague power (but not a duty) to set "standards of performance" for suppliers relating to consumer energy efficiency. This power was to prove to be pivotal particularly for household energy efficiency. Unfortunately the new price control regime set up under the 1989 Act discriminated against energy efficiency. Tariff structures encouraged large-scale users approaching a tariff boundary to consume more.

1989 to 1992 – the Rise of Climate Change

Scientific concerns over global warming were building towards the end of the 1980s. Mrs. Thatcher was persuaded that the problem had to be tackled following a meeting in Downing Street in 1988 with the UK's leading climate scientists. The first outlines of a climate change programme emerged after a Cabinet seminar in 1989 at which ETSU presented the case for energy efficiency (Currie 1989).

On June 15th 1989, in the European Parliament elections, the Green party secured 15% of the vote. The political establishment was severely shaken, and Whitehall scrambled to catch up with the popular mood. On 24th July Chris Patten was made Environment Secretary with a brief to develop a new environmental strategy. The outcome was the UK's first environmental White Paper "This Common Inheritance" (Department of the Environment 1990). At the time it was criticised for being too aspirational. But it embedded environmental policy across government and committed to returning CO2 emissions to 1990 levels by 2005. It also began to position energy efficiency as the central means of delivering emission reductions.

The European Economic Community (EEC) was beginning to exert influence as it gained competencies in environmental policy. Appliance energy labelling, which allows customers to choose between efficient and inefficient products (Weil & McMahon 2003), was initiated in 1989. The Energy department resisted, under pressure from UK manufacturers who felt threatened by more efficient foreign imports.

However in late 1989 the EEO commissioned research that showed that demand for efficient appliances would not increase without regulation (Department of Energy 1990). The UK's EEC negotiating position changed and the Energy Labelling Directive was agreed in 1992 (Council Directive 92/75/EEC). By 1997 sales efficient appliances had increased significantly as a direct result of the legislation (Boardman 1997).

The EEC also introduced the SAVE Directive (Council Directive 93/76/EEC) which required member States to set up and report on energy efficiency programmes covering, *inter alia,* energy audits and certification programmes. However arguably the most effective element was a significant research programme into new policies and benchmarking between member states.

The rising profile of climate policy meant that the EEO budget rose from £26m in 1990 to £59m in 1992. It adopted a new target of generating industry savings of 5 MtC (3% of the UK total) and £800 million per year by 2000. A set of new programmes were launched:

- The Home Energy Efficiency Scheme (HEES) providing insulation and central heating grants for poorer households (April 1991).
- An interdepartmental Ministerial Group on Energy Efficiency to deliver 15% energy savings across the government estate (October 1991).
- Jointly with DoE a £10m advertising campaign aimed at households called "Helping the Earth begins at home" (November 1991).
- Jointly with Department for Trade and Industry (DTI) the "Making a Corporate Commitment" (MACC) campaign aimed at large company directors (October 1991).
- A new Energy Management Assistance Scheme (EMAS) giving advice to smaller businesses (April 1992).

Academic research began to challenge free market orthodoxy at around this time. The task was to explain the "efficiency gap" between what was possible and what was actually delivered (Grubb 1990, Hirst & Brown 1990, Schipper and Meyers 1992, Eyre 1997, Brown 2001). This ranged from 10-30% and was seen in most sectors and most western countries (IPCC 1996). It implied a systematic misallocation of resources in the way energy is used, and, from this, the existence of a number of market barriers or failures that reduce economic efficiency:

- Financial barriers, such as lack of capital, unhelpful discounting rules, or unhelpful energy price subsidies that reduce the value of savings.
- Hidden cost barriers such as senior management time, and also hidden benefits, such as improved comfort and productivity.
- Market misalignment barriers, where the person who makes the investment doesn't benefit from it, such as the famous landlord/tenant split.
- Behavioural barriers where people, both as individuals and in organisations, make choices that militate against energy efficiency.

The fundamental problem was that, in the real world, people do not optimise their investment decisions in response to price signals alone. They are irrational economic players. The new academic discipline of "behavioural economics" showed that context and experience influence how people respond to financial incentives (Pollitt & Shaorshadze 2012). Earlier research shows that decisions are not determined by incentives alone (Stern, 1986) and are taken in social rather than narrowly individual content (Shove 1998). In other words behavioural and social research revealed the central fallacy of the free-market policies of the 1980s and provided the basis for the policies that developed in the late 1990s.

1992 to 1996

The Conservatives, under John Major, won a fourth term in May 1992. The Department of Energy, with the energy market privatised, was no longer needed and mostly absorbed back into the Department of Trade and Industry. However

the EEO was transferred to the Department of the Environment to integrate energy efficiency with climate policy.

Climate change mitigation was also about to become a legal obligation. Under the new Framework Convention on Climate Change, signed in June 1992, the government agreed to return UK CO2 emissions to 1990 levels by 2000, 5 years earlier than planned. This meant finding an additional 10 million tonnes of carbon (MtC), equivalent to 6% of total emissions (Department of Trade and Industry 1992). The government had promised a new Energy Saving Trust (EST) as a central part of its climate change programme. However there was no money to fund it.

The idea of a levy on energy bills to fund utility energy efficiency programmes was first proposed by Sir James McKinnon, the Director of OFGAS, the gas market regulator. Domestic prices were strictly controlled. But the cost of new gas supply capacity could be passed on to the customer. McKinnon wanted energy efficiency to qualify because saving energy was more cost effective than supplying it: the so-called "least-cost planning" investment model pioneered in the US electricity sector. The new levy was announced in June 1992. OFGAS released £2m in start-up funding for the EST and a small team of EEO staff were seconded over to set up the new organisation. It would be set up as a not-for-profit company, jointly owned by British Gas, the Regional Electricity Companies and the government. It started work in April 1993 with four programmes (Owen 1999): condensing boilers grants, a compact fluorescent lamp discount scheme, a Local Energy Advice Centre pilot and residential combined heat and power (CHP) schemes.

In December 1992 the government consulted on a draft Climate Change Programme that assumed the EST would deliver about 25% of the FCCC target costing £150-300m pa (Department of the Environment 1992). However Clare Spottiswoode, who replaced McKinnon at OFGAS, questioned the legality of the levy (House of Commons 1994a, 1994b). She declared it was a tax and outside her remit, and cancelled the EST's pilot schemes.

The government came under pressure to find other sources of funding for the EST. Unfortunately under new projections (DTI 1995) the UK was easily meeting its FCCC target thanks to the recession and increased use of gas for power generation (the "dash for gas"). However the EST survived because of a piece of political opportunism. The 1994 budget imposed an 8% VAT rate on household fuel, rising to 17.5% in 1995, with the twin justification of saving energy and raising revenue. This proved extremely unpopular and threatened to bring down the government, which abandoned the second VAT rise. This lowering the expected CO2 savings, which John Gummer, the Environment secretary, exploited to secure £25m for the EST for 1996/97.

The electricity regulator, OFFER, designed a different system for funding based on the "Standards of Performance" requirement in the Electricity Act. The Director, Professor Stephen Littlechild, approved £100m pa (1994-1998) to fund so-called energy efficiency SOP schemes (EESOPS) as long as they reduced electricity costs. The EST initially managed most of the £25m pa of this funding, although subsequently the utilities delivered programmes to their customers directly. Nonetheless the EST had developed a strong reputation for providing effective, independent advice and continued to receive around £25m pa of government funding until this was withdrawn in 2011 (Eyre *et al* 2011).

In April 1996 the Home Energy Conservation Act (HECA) came into force. HECA originated as a Private Member's Bill and was fiercely resisted by the government. In the end the original proposals were diluted so that there was no legal duty to

deliver savings, only to have a plan based on periodic "guidance" from the government, and the duty to report on measures and their impact. The EST's HECA Action programme provided £14m of support over 3 years, but once this ran out HECA quickly slipped off the agenda for most councils.

1995 saw a tightening of Part L of the Building Regulations, following similar exercises in 1985 and 1990. A new compliance methodology was introduced called the Standard Assessment Procedure (SAP), which allowed energy performance to be measured and compared (see Department of Communities and Local Government (DCLG) 2009a). The English House Condition Survey, a 5 yearly review of the state of the housing stock started in 1967, began to report on the energy efficiency of the stock for the first time in its 1996 report.

1997 to 2001

In 1997 Labour returned to power. The Departments of Environment and Transport were merged to form the Department of the Environment, Transport and the Regions (DETR), with John Prescott as Secretary of State. After 18 years of market-led policies, officials had to be specifically briefed that interventionist measures such as taxes and regulation were back on the agenda.

The Labour Manifesto promised a 20% cut in CO2 emissions by 2010, around twice as stringent as the UK's Kyoto Protocol target, agreed at the end of 1997. This was compounded by official projections that had emissions rising sharply as the economy recovered and a Manifesto commitment to cut VAT on household energy bills. The government consulted on a new climate change programme in October 1998 (DETR 1998).

It wasn't short of advice. A report in June 1997 by the Socialist Environment and Resources Association proposed a tax on business and a levy to fund a major home insulation programme (SERA 1997), a theme echoed by the EST. Most influentially, in June 2000, the Royal Commission on Environmental Pollution (RCEP) published its seminal report on energy policy (RCEP 2000), which argued for a reduction in UK emissions of 60% by 2050 and a key role for energy efficiency. Whilst such a conclusion now seems rather modest, at the time it was very ambitious.

The row over VAT kept the domestic sector out of bounds for new taxes, so the initial focus was on industry. The Advisory Committee on Business and the Environment (ACBE), a joint DTI/DETR body, supported a carbon tax if UK competitiveness was protected and the revenue recycled to business (ACBE 1998). The Treasury supported the proposals and in March 1998 Sir Colin Marshall, Chairman of BA, was asked to review the use of economic instruments on business energy use. He came out in favour (HM Treasury 1998) and a new Climate Change Levy (CCL) was announced in March 1999 (HM Treasury 1999), due to begin in April 2001.

To address ACBE's concerns small businesses below the VAT threshold would be exempt and energy intensive companies would get an 80% rebate if they agreed to energy efficiency targets in a new Climate Change Agreement (CCA). Most of the £1.0bn annual revenue would be recycled to fund a 0.3% cut in employer's National Insurance Contributions (NICs). The rest, around £150m pa, would be spent on two new programmes (DETR 1999):

- £100m for a new scheme of accelerated capital allowances for energy saving technologies, worth around 10% of the cost of the measures.

- A new Carbon Trust to deliver business programmes including RD&D, advice, grants and support for new technologies.

The Carbon Trust was formally announced in the new climate change programme (DETR 2000. Like the EST, the Carbon Trust almost didn't get off the ground. There was growing political pressure for a single Sustainable Energy Agency (SEA) and the EST lobbied hard that it should be given this role. However business, working through ACBE (ACBE 2000), won the argument because they persuaded ministers that the CCL revenues belonged to them, and that the EST did not have the skills to deliver programmes for business. The new company was launched on March 20th 2001 with a similar corporate structure as the EST and start-up funding of around £50m pa.

The CT set up two types of programmes, with funding split equally between them. The first, based on the EEBPP (which the CT inherited from government), was renamed "Action Energy" and reconfigured to deliver services according to the carbon saving potential of the company and the transaction cost of reaching it. Small companies would get information and advice whereas larger companies would get on-site support and consultancy. This approach was revolutionary for government, which felt obliged to provide the same services for everyone.

The second set of programmes was aimed at emerging technologies and technology companies. The Low Carbon Innovation Programme (LCIP) differentiated the support according to need. Some companies needed grants, but others needed less tangible support such as specialist Board expertise. LCIP also developed another innovative intervention: direct equity investment in start-up companies struggling to attract private funding – the so-called "Valley of Death".

2000-2005

The Labour government was re-elected in May 2001. DETR was broken up and environmental policy was transferred to the Ministry of Agriculture Fisheries and Food, creating the Department for Environment, Food and Rural Affairs (DEFRA), with Margaret Beckett as Secretary of State.

The 2001 Blair government was perhaps the busiest in terms of energy efficiency policy. First, the RCEP report had to be responded to. Unwilling to allow either DTI or DETR to take the lead, the Prime Minister asked the Policy and Innovation Unit (PIU) in the Cabinet Office to take this on. The final report (Cabinet Office 2002) confirmed the RCEP conclusions, proposed a big push on renewables and rejected the Prime Minister's preference for nuclear power. Energy efficiency emerged strongly, with a call for stronger policies to double the annual rate of uptake from 1% to 2% pa. However the report didn't advocate specific policies because of strong resistance from the Treasury to expressing a preference between taxes and cap and trade schemes.

The 2003 Energy White Paper "Our Energy Future – creating a Low Carbon Economy" was the first energy policy statement for 20 years. The RCEP target of 60% by 2050 was enshrined as one of four energy policy themes alongside security, affordability and competitive markets. There was strong support for renewables and energy efficiency (Eyre and Staniaszek, 2005), but nuclear power was kept on the sidelines. The White Paper floated the idea of extending domestic EESOP programme to cover the commercial and service sector, which was emerging as an important policy gap.

The government spent the three years after the White Paper trying to pin down energy efficiency policy. The 2004 Energy Efficiency Action Plan (DEFRA 2004a)

attempted, with mixed success, to set out a coherent framework. The Energy Efficiency Innovation Review, published in 2005 (HM Treasury *et al* 2005), set out the business case rather more successfully, finally persuading the Treasury to take energy efficiency policy seriously. This was reinforced in 2006 when the Treasury published the Stern Review on the economics of climate change (HM Treasury 2005). Stern defined three key themes of climate policy: carbon pricing, innovation and, crucially, programmes to correct market failures.

Development of new policies accelerated. For business, in April 2002, a new UK Emissions Trading Scheme was established. The UK ETS was relatively small and ultimately it saved very little carbon. But the rationale was to build capacity in industry, and confidence within the Treasury. It worked. Within months of blocking a similar recommendation in the PIU report, the Treasury allowed the UK to sign up to the EU Emissions Trading Scheme (EU ETS). The first phase started on January 1st 2005 covering 11000 sites with a thermal input of 20MW or more, or about 40% of EU CO2 emissions. The cap was initially relatively weak and the second phase tightened the scheme considerably.

The Energy Performance of Buildings Directive (Council Directive 2002/91/EC) came into force on January 4th 2003. It set minimum energy performance standards for new buildings and major renovations over 1000 m^3 and requires owners or landlords to provide Energy Performance Certificates, showing the modelled energy performance, when the building is sold or rented. Public buildings also have to show Display Energy Certificates (DECs) that show the public the operational energy performance using the EU A to G scale. The intention was to try to close the gap between the predicted and actual energy performance, which can be as much as five times worse (Bordass *et al* 2001). DECs were, however, not applied to commercial buildings and so were very limited in their impact.

The 2004 Energy Efficiency Action Plan had introduced the idea that government and local authority procurement and operations, particularly of their own buildings, could drive market change. This triggered a flurry of “public sector leadership” initiatives of which the most prominent were a commitment to procure “top quartile” energy performing buildings and a tough set of performance targets for central government. On the back of all this, in 2004, the Carbon Trust spun out a new company, Salix Finance, to provide loan capital for public sector energy efficiency projects, attracting £20m of DEFRA funding in 2005.

The 2000 Utilities Act integrated gas and electricity regulation and redefined “competition” as a means of securing consumer benefits rather than an end in itself. The Act placed the duty to set SOPs on ministers to avoid a repeat of the policy confusion of the Spottiswoode era. The government now began to tighten the obligation significantly, with the newly renamed Energy Efficiency Commitment or EEC1, running from 2002 to 2005, delivering 4 times as much carbon as EESOPS3 (Rosenow 2012). Two further 3-year tranches of EEC were planned to continue this trend up to 2012.

In the household sector, towards the end of the 1990s, the fuel poverty lobby was gathering pace, culminating in a Private Members bill passed into law as the Warm Homes and Energy Conservation Act 2000. This required the government to produce a fuel poverty strategy, which was duly published in 2001 (DEFRA 2001). The Home Energy Efficiency Scheme, in 2001, was rebranded as “Warm Front” and given a significant funding increase from around £70m pa to £150m in 2004 rising to £400m pa at its peak in 2008. The Decent Homes Standard, introduced in 2000 as a benchmark for social housing, was tightened in 2006.

Condensing boilers were made mandatory for most applications in 2005, following a commitment in the 2003 White Paper. Delivering this policy change was brokered by the EST and, like the Carbon Trust's work on the CRC scheme, was a good example of joined-up policy-making. It was well known in research circles that the UK lagged behind other European countries primarily because of a lack of skills and awareness by gas fitters (Weber *et* al 2002). The EST recognised this and persuaded government to support an intensive training programme that built capacity sufficiently for the policy to be implemented.

2006-2010

The Labour government was re-elected with a reduced majority in May 2005 and David Miliband was made Environment Secretary. Energy security had become a major policy issue because the UK was moving rapidly to be a net energy importer with the decline in North Sea oil and gas. The 2006 Energy Review (DTI 2006) and the subsequent 2007 Energy White Paper (DTI 2007) reflected this change of emphasis. It also reintroduced nuclear power as a policy option, subject to consultation.

In 2004 the government reviewed the 2000 climate change programme (DEFRA 2004b). The Carbon Trust proposed a new emissions trading scheme to address the commercial sector gap (Carbon Trust 2005). The government consulted on the idea (DEFRA 2006) and, in the 2007 Energy White Paper, announced a new initiative that eventually became the Carbon Reduction Commitment Energy Efficiency Scheme (CRC).

The CRC applies to all organisations with electricity consumption over 6000MWh, covering around 5000 sites and 10% of emissions. Participants have to measure and report emissions and buy allowances from the government equivalent to their previous year's emissions at £12/tC. A cap and trade scheme would follow and a performance league table would be published. The revenue from the sale of allowances would be recycled back to participants, with a bonus or a penalty, rising to 50% of the total, depending on their position in the league table.

The CRC scheme addressed a number of barriers to energy efficiency. Measuring and reporting emissions raised awareness of energy use. Buying allowances elevated the issue to board level through the Finance Director, who suddenly had a set of new financial risks to worry about: typical organisation, with carbon emissions of 50,000 tonnes would have to find £600,000 in the first year. The performance league table allowed companies to be compared to their peers, introducing a strong reputational driver.

In November 2008 the Climate Change Act became law, which for the first time anywhere in the world introduced national, binding greenhouse gas targets. The Act sets a target of 'at least' an 80% reduction by 2050 (compared to 1990) and made provisions for a series of 5-year carbon budgets to ensure sufficient progress is made towards the target.

The Act also established an independent Committee on Climate Change (CCC) to advise on the level of the carbon budgets and to monitor progress towards achieving them. The CCC advised on the first three carbon budgets (2008-12, 2013-17, 2018-22) in 2008 and they were made mandatory in May 2009, requiring emission reductions of 35% by 2020 on a 1990 baseline. In 2010, the CCC produced recommendations on the fourth budget (2023-27), which became law in June 2011, requiring a 50% cut by 2025. The government published the

Low Carbon Transition Plan in July 2009 setting out how it intended to deliver the first three carbon budgets (DECC 2009).

The CCC produces annual progress reports to Parliament, starting in December 2008 (CCC 2008). On energy efficiency the theme of these reports has been consistent: a step change is still needed. Emissions are only falling by 0.6% pa, a rate that needs to accelerate to 2-3% to meet the 2020 target. Energy efficiency in buildings and industry are key areas where new polices were needed.

In October 2008 the energy team from the industry department and the climate policy team from DEFRA were joined together to form a new Department of Energy and Climate Change (DECC). Climate adaptation policy stayed behind in DEFRA. DECC marked the end, at least in machinery of government terms, of the separation between climate and energy policy and brought climate policy, and energy efficiency with it, to the Cabinet table.

In 2006 DCLG published proposals for all new housing to be zero carbon by 2016 (DCLG 2006). In 2009 DCLG announced that non-domestic buildings would need to be zero carbon by 2019 (2018 for public buildings, DCLG 2009b). Both sets of targets were widely criticised as too difficult to meet, partly because they treated each building as an isolated unit. The definition was subsequently diluted to allow off-site renewables and other low carbon schemes to contribute.

In 2008 Carbon Emissions Reduction Targets (CERT) replaced the EEC. The obligations were again were increased significantly, with CERT from 2008 to 2012, raising £1.16bn annually for energy efficiency projects, roughly 3 times EEC2 (Rosenow 2012). A new Community Energy Saving programme (CESP) was launched alongside CERT. CESP is also a supplier obligation programme funded through energy bills, targeted on low-income neighbourhoods.

In May 2009, DECC announced plans to installing smart gas and electricity meters in all 26 million UK homes by 2020 (DECC 2009). DECC calculated that the programme would deliver a net benefit of £7bn given the impact of the meters on householder energy use.

AT EU level the Energy Services Directive was agreed in 2006 (Council Directive 2006/32/EC). It was broadly similar in scope to the SAVE Directive that it replaced, with an indicative energy efficiency target of 9% by 2016 and measures to build market capacity. This time there was a stronger emphasis on public sector leadership including new requirements on public procurement for goods, services and buildings.

In 2010 the EU tightened up (or "recast") the EPBD (Council Directive 2010/31/EU) with a new requirement for near-zero carbon buildings by 2020, stronger public sector leadership requirements and more effective Energy Performance Certificates.

2010-2012

A Conservative/Liberal Democrat coalition won the May 2010 general election, and Chris Huhne was made DECC Secretary of State. David Cameron announced that his would be "the greenest government ever". The coalition published its programme for government on May 20th (Cabinet Office 2010), which set out four main energy efficiency policies:

- A "Green Deal" to improve home energy efficiency improvements paid for by savings from energy bills.

- Measures to improve energy efficiency in businesses and public sector buildings.
- A Green Investment Bank to encourage private investment in green technologies.
- A programme to reduce central government carbon emissions by 10% in 12 months.

As details emerged it was clear that energy efficiency policy was going to be fundamentally overhauled. The Green Deal would initially cover domestic buildings, with businesses to follow. A new Energy Company Obligation (ECO), running alongside the Green Deal, would replace CERT, CESP and Warm Front. To implement all this the government published an Energy Bill in December 2010, which became law in October 2011. A Carbon Plan, setting out policies to deliver all four of the carbon budgets, was published in December 2011. The electricity market would also be reformed, but in a later Bill in 2012, thereby disconnecting energy efficiency policy from discussions about the need for new generating capacity.

The coalition also had a commitment to reducing the number of arms length bodies, partly to save money but also because of a strong desire to bring to bring policy advice and programme management back in house. The RCEP was wound up and funding withdrawn from the CT and EST on April 1st 2012. Both would have to bid for DECC funding, which was now focused on delivering the Green Deal.

A new Office of National Energy Efficiency was set up to co-ordinate energy efficiency delivery and strategy, soon renamed to the Energy Efficiency Deployment Office. EEDO drew on staff from existing teams in DECC and was charged with drawing up a new energy efficiency strategy by the end of 2012.

The domestic sector Green Deal provides for market actors to offer a long-term loan to the householder or landlord to pay for energy efficiency measures. These would be restricted to ensure that the total, estimated energy savings were equal to or greater that the loan repayments (the Golden Rule). The repayments would be guaranteed against the property rather than the occupant on the basis that future householders would benefit from the measures. A number of elements were proposed to deliver all this (DECC 2010).

- A Green Deal Plan carried out by a Green Deal Assessor that sets out the energy saving measures.
- Green Deal Providers who would provide the finance at commercial interest rates and install, or co-ordinate the installation of, the measures.
- Green Deal Installers who will actually install the measures.
- The electricity provider would reclaim the loan in instalments from the monthly electricity bills.
- A Green Deal Oversight Body and Ombudsman to monitor and regulate the scheme.
- A new telephone advice service for householders and, eventually, businesses and the public sector.

A new Energy Company Obligation would operate alongside the Green Deal. The ECO will be roughly the same financial size as CERT (£1.3bn pa) and operate on a similar basis. It has two objectives: to support insulation measures in any household that are too expensive to meet the Golden Rule, such as solid wall insulation, and to provide support for a wider range of measures to vulnerable customers, largely people on benefits who would be expected to be unable to take on Green Deal finance.

The powers needed to implement Green Deal and the ECO were provided by the 2011 Energy Act. The Act also contains provision to ban, from 2018, the rental of inefficient commercial or domestic properties, with "inefficient" likely to be defined as an EPC rating of F or G.

For business the government left the CCL in place. The CRC Energy Efficiency Scheme was simplified in response to concerns from business that it was too expensive to comply with. The number of fuels covered was reduced and the interaction of the scheme with CCAs and the EU ETS was smoothed out. The league table and flat-rate sale of allowances were left in place, although the first sale was delayed until 2012. However, controversially, the cap and trade and revenue recycling elements were removed, with the proceeds going directly to the Treasury. The scheme had become a complex carbon tax.

In 2007 the EU agreed a new climate policy package with 20% targets for renewable energy consumption, energy efficiency and greenhouse gas reductions, all to be delivered by 2020. In 2012 the EU agreed an Energy Efficiency Directive that introduced a non-binding 17% energy efficiency target, a new requirement on the public sector to renovate 3% of its estate each year, and a new utility target to generate efficiency savings worth 1.5% of sales by 2020. Mandatory national targets would be considered in 2014 depending on progress towards the 20% efficiency target.

The negotiation of the new directive was accompanied by call from the Carbon Trust, the CBI and others for Display Energy Certificates to be rolled out to commercial buildings. CLG consulted on the proposal, but plans were derailed by the retail sector, which feared a negative customer reaction if poor energy performance ratings were displayed in stores. There was also a more general concern from business that DECs were expensive and overcomplicated. However the Energy Efficiency Directive has a requirement for large companies to carry out energy audits, which could be used as the basis by which the coverage of DECs is extended.

6 Discussion

Drawing out the lessons for the present day requires a benchmark of "good practice" in policy terms. An ex-post evaluation of UK policies is not possible because different programmes have used different metrics through the years, if they have used them at all. For example, until the 1990s government used "inputs" to measure performance such as total programme spend or number of leaflets produced. Output-based measures, and particularly carbon accounting, only emerged in the late 1990s to measure compliance with the Kyoto Protocol. Even now UK programmes – often the same one - use different metrics to measure different things, for example annual CO2 emission reductions for statutory compliance and lifetime £/tCO2 for policy appraisal.

However, for the purposes of this paper, it is possible to derive a subjective view of good policy practice from the literature based on the effectiveness of an intervention in overcoming barriers to energy efficiency. There are no studies specific to the UK but are a number of international reviews including the UK (see Harmelink 2008 for the EU and Tanaka 2011 for the IEA) that can be used. Taking the findings of these studies and applying them to the UK story reveals five main features of successful policy to consider.

The role of markets and government

Energy efficiency will not happen without market forces. But some ministers, regulators and public officials have periodically claimed that market forces on their own will deliver energy efficiency. This is simply not true. But unfortunately these claims tend to be driven by ideological assumptions rather than by any serious examination of the scientific evidence or established practice.

On the other hand too much, or the wrong type of government intervention can be just as bad. Government advertising campaigns have generally not been very successful. The EEO's early focus on technologies and energy professionals ignored the people who took the investment decisions so that much of the advice they provided didn't get acted upon. CERT programmes resulted in the market being deluged with compact fluorescent light bulbs because the suppliers found that they could deliver their targets most easily by doing so. Condensing boiler programmes prior to 2005 failed to lead to market transformation because gas fitters weren't trained or incentivised to recommend and install them.

In reality the right approach is well-designed policy working with the grain of the market, with the intervention being actively managed so that the policy is withdrawn or adjusted as the market begins to respond. Most rapid improvements in energy efficiency result from programmes like this. Examples in the household sector are condensing boilers after 2005 and appliance labelling and minimum standards in the 1990s. In the business sector examples are the development of benchmarking studies in the 1980s, carbon management programmes in 2003 and product carbon footprinting in 2006-2008.

Linking costs and benefits

Energy efficiency requires capital investment, and lack of up-front capital is a fundamental barrier in all sectors. Unfortunately public spending will always be limited so government has to prioritise. However, unlike other policies, energy efficiency policy does create a return on the investment, which, with creative policy design, can be used to offset the cost.

Some policies are very effective in doing this. Technology standards and labelling schemes are good examples, such as EU energy labelling and standards for domestic goods and the Energy Technology List for industrial process equipment. Costs to government are restricted to compliance monitoring. The evidence (reference) is that, with good policy design, end-user costs are negative as long as the energy saving benefits exceed the costs and industry and householders are given time to adjust.

Labelling commercial buildings, in the form of Display Energy Certificates, has the potential to be very cost effective by exploiting reputational and cost drivers. Similar schemes in the US have been shown to enhance the value of the building to prospective tenants. However this approach has yet to be applied in the UK, partially because the DEC system implemented by the government is seen by business and costly and overcomplicated.

Loan programmes can also be relatively inexpensive, primarily because, unlike grants, the funder gets the money back, less the cost of administration, defaults and interest on the loan. Recycling loans, where the energy savings are reused to provide more finance, such as those offered by Salix Finance to the public sector, are amongst the most cost-effective energy efficiency programmes. The domestic Green Deal is based on this principle, but with market lenders and commercial interest rates.

In contrast, grants are very expensive. However, for people with no disposable income, they can be the only option. The Warm Front programme has been reviewed a number of times (NAO 2009) and found, with some reservations, to be effective. The same applies to CERT and its predecessors, and the signs are that the obligation model is likely to continue for these sectors. The UK is unique amongst the countries that use energy company obligations in restricting these to the household sector. There is a good case for broadening their scope, for example to SMEs.

The main concern about this approach is that obligations programmes are funded out of energy bills. This attracts criticism that they increase energy costs, but this has been shown to be invalid (Committee on Climate Change 2011a) as long as the measures are cost effective. Unfortunately the costs and the benefits do not appear on energy bills so a strong behavioural signal is lost. But the most problematic issue is distributional: cross subsidy from the consumers that do not benefit to those that do. But programmes can be designed (as CERT and its predecessors always have been) to ensure that lower income households receive at least a fair share.

Technology and people

The early energy efficiency programmes focused on technologies. But developments in social and behavioural science show that policies need to address the demand-side as well: energy efficiency is about people as well as products. Information, advice and engagement are the principle tools for influencing people, and the UK has a great deal of experience in this field. People, when faced with a choice of technology options, need unbiased advice on which one to choose and why. This is the role of government; a principle has been accepted by even the most fervent free market ideologues.

Large business face technological complexity, either in the processes they operate or in the buildings they occupy. Different people in the hierarchy need different information: the Finance Director has very different drivers to the facilities manager. The EEBPP produced over 1200 different guides and manuals, but these were focused on energy professionals. One of the successes of the Carbon Trust, when it took this programme over in 2002, was to make energy efficiency a strategic issue for companies through its Carbon Management programme. It did this by targeting information directly at directors and shareholders, highlighting the compliance and reputational risk for the company.

In contrast, for householders, tenants or small businesses, simple, clear information is usually best. The EU energy label has the level of detail needed, and indeed the even simpler Energy Saving Trust “Energy Saving Recommended” approach may be better still. However information also has to be relevant. Energy Performance Certificates, as originally implemented in 2007, were too complex and the information in them had little relevance for most householders (RICS/CLG 2010) because the information they contained didn’t set out what they would get out of improving the energy performance of their homes.

Institutions and delivery bodies

There have been two key institutional trends: the location within government of policy responsibility and the mechanisms for delivering the outcome.

Energy efficiency policy was coupled to mainstream energy policy in the Department of Energy between 1974 and 1992. After that it was relocated to sit alongside climate policy in DETR and its successors. Some view this separation as

a demotion for energy efficiency. But, possibly with the benefit of hindsight, it is possible to argue that the opposite was true: energy policy was diminishing in importance as privatisation took hold and energy efficiency, as a key element of any future climate programme, needed to be protected. Whatever the motivation the policy gradually grew in importance following the 1990 Environment White Paper and once again for the 2000 Climate Change programme. In 2008 energy efficiency was reunited with energy policy with the creation of DECC, although it is still firmly located with the climate side of the department.

Until recently delivery of energy efficiency was gradually been spun out of government. The EEO, part of the Department of Energy, outsourced its programmes to government laboratories under contract, which were replaced by the "arms-length" Energy Saving Trust and Carbon Trust. Why did the government do this? The main reasons were:

- Government administration budgets were reduced if programme management was devolved to the new body.
- Arms length organisations can respond to changing market conditions without the "dead hand of government".
- They could run discretionary programmes on merit rather than political expediency.
- They had the freedom to recruit and pay people with the right skills and experiences to run the programmes.
- They could use techniques not available to government, such as venture capital funding and innovative marketing campaigns.
- Government got a useful source of market intelligence and policy advice from which it could disassociate itself.

The two Trusts grew in size and influence in the boom years up to 2007. However when the recession hit they were encouraged to seek external funding because the government felt that the market should be paying. The coalition government disliked the Trusts' tendency to provide unwelcome policy advice, and in April 2011, core government funding was withdrawn. Now, with the creation of the Energy Efficiency Deployment Office, the cycle has come full circle with responsibility for delivery back in the hands of central government.

The other aspect of institutions that merits some consideration is the need for local delivery. Where the mechanism for delivering policy is national, e.g. for research, awareness raising in industry or the deployment of specific technologies, a national approach is best. However for smaller businesses and households, local delivery can be much more effective. Local businesses, government and community groups are more widely trusted than national government and trans-national energy companies, who are seen as remote, inflexible, and in the latter case, part of the problem especially when energy prices are rising. Effective engagement with the majority of householders remains a critical challenge and there is a growing consensus this will require local action. Most local authorities remain marginal players. The discourse of the 'Big Society' points to a role for the burgeoning number of community groups active on low carbon issues. However, despite some funding, for example under the Low Carbon Communities Challenge and the Local Energy Assessment Fund, their capacity currently is too limited to allow a major role.

The energy efficiency "offer"

Another consideration is how policy is "sold" to the public, business and Whitehall. In the early years there were real concerns that oil would run out so conserving stocks by using less energy was an obvious response. However when

the oil shock wore off people realised that using less energy meant doing less of the activities that energy made possible, this was politically unacceptable so the concept of energy efficiency – doing more with less - took hold.

For business, energy efficiency policy has always been associated with industry policy, unsurprising given the close links between the Energy and Trade Departments. This also kept the Treasury on board, or at least helped to protect the budget line. Reputational drivers became important in the 1990s when the "Triple Bottom Line" approach to business policy became fashionable, conflating environmental, social and economic performance. The EEO began to reflect this in their marketing with the "win-win-win" strap lines. The Carbon Trust refined this approach by appealing to institutional shareholders concerned about the risk to their investment if directors took no action.

Other important, and often overlooked customers for energy efficiency policy are other departments, both to build support for funding and to decarbonise their policies. Unfortunately DECC and its predecessors have not, on the whole, made the case for energy efficiency very effectively to the rest of Whitehall. DECC focuses on carbon savings, which are usually not a priority for other departments, and particularly the Cabinet Office, responsible for cross-Whitehall co-ordination. The obvious approach – to sell energy efficiency as a way of delivering another department's core business more effectively – is not usually DECC's first instinct. Energy efficiency therefore compares unfavourably with other cross-cutting policies like social exclusion that have had more success.

7 Conclusions

In many ways the UK has led the world on energy efficiency policy. The library of technical information we have accumulated is probably the most comprehensive anywhere in the world. In 1994 the UK was the first EU country to use the Standards of Performance model to fund energy efficiency programmes, and the first to try out carbon emissions trading. The Climate Change Act was the first of it's kind anywhere in the world. The EST and Carbon Trust models have been copied around the world. At some point in the last 40 years we have tried every kind of energy efficiency programme that there is. So what has the UK made of this legacy?

With the Green Deal the government is putting a lot of faith in the role of markets. There are a number of genuinely innovative elements, notably a concerted attempt to integrate and stimulate a notoriously fragmented and conservative market that has been dependent on government subsidy for many years. The central financial model, tried and tested in business and the public sector, is a major innovation for the UK domestic market.

But the Green Deal is predicated on overcoming financial barriers using loans. Unfortunately these are not the only barriers constraining demand. For example awareness of the scheme is low but the government is relying on the private sector to promote the scheme. Installing the measures still creates considerable disruption. Even assuming that the costs and benefits even out the financial package is deeply unattractive. The interest on the capital could be as high as 8%, eating into the benefits, which are not guaranteed anyway. The government has also introduced an adjustment to take account of the fact that the real energy savings will be different from the theoretical ones, further lowering the benefit. A significant, long-term risk is placed on the property, which could influence mortgage lending in the future. Finally, the Green Deal is entirely voluntary.

DECC's own Impact Assessment (DECC 2011) predicts that demand for elements of the Green Deal will be so low that only 10-30% of the potential for loft and cavity wall insulation will be realised. The shortfall will not be fully taken up by the Green Deal's sister programme, Energy Company Obligation. The ECO is based on CERT, and so compels energy supplier activity (but not consumer interest). But its primary focus is affordable warmth for the fuel poor and hard-to-treat issues such as solid wall insulation and non-standard cavity wall insulation. There will be a degree of cross-subsidy between the schemes for measures that do not meet the "Golden Rule". But conventional CWI and loft insulation are severely restricted because the government is worried that people who want to insulate their walls and lofts anyway would ignore the Green Deal and "free ride" on the ECO scheme.

This places the government in a curious position. The Green Deal was designed to ease people off subsidy by using the market to exploit financial drivers, but then accepts that a voluntary scheme won't be enough to stimulate demand at anything like the required rate. In economic terms this underpins the case for a subsidy element, but the subsidy programme is designed to largely exclude this option on the basis that potential Green Deal customers would "free ride".

The government's proposals were fiercely criticised, particularly by the Committee on Climate Change (CCC 2011b) but the final Green Deal proposals published in June 2012 (DECC 2012) only made marginal changes. The scheme was launched in October 2012, and the government appears to recognise the problem if faces by setting aside £200m to stimulate take-up of the scheme. Most of this will be in the form of one-off cash-back payments, but it is clear that public expenditure will not allow this to be a sustained approach.

In January 2012 CLG published proposals for changing the Building Regulations to include "consequential improvements" for domestic conversions and extensions. This would require the installation of energy efficiency measures in the whole property and the policy would not be enforced if the measures broke the Golden Rule. The idea was to create demand for the Green Deal. However the Daily Mail orchestrated a campaign against the proposal, calling it a "Conservatory Tax". The Prime Minister was driven to speak out against the policy and currently it is therefore very unlikely to go ahead.

For business there is, as yet, no comprehensive Green Deal on the domestic model. Unlike households there are a number of freestanding policies already in place. The government has announced that the impending Carbon Floor Price will operate only in the power sector. The CCL has a limited impact, but the associated Climate Change Agreements continue to drive savings, again at the more energy intensive end of the market. Companies listed on the London Stock Exchange will have to report their greenhouse gas emissions from April 2013. The Green Investment Bank will fund commercial energy efficiency project as one of its first priorities.

The CRC Energy Efficiency scheme survives, although with the removal of the revenue-recycling element, a strong financial driver has been lost, leaving the measure as little more than a complex carbon tax. Business, through the CBI, is lobbying for a proper carbon tax, or an extension of the CCL, coupled to mandatory carbon reporting. The Treasury is threatening to scrap the scheme if the compliance costs cannot be reduced, which is ironic given that it was the Treasury that caused the problem in the first place. Interestingly early results show that emissions from the scheme participants fell 10% in 2011/12 (Environment Agency 2012), although it is unclear what caused this fall.

For commercial and public buildings, especially those not covered by the CRC scheme, the policy landscape is thin. The evidence is strong that simplifying and extending Display Energy Certificates to cover commercial buildings will drive significant change. This prompted DECC and CLG to insert a commitment to do this in the Draft Carbon Plan in March 2011. However the commitment had been diluted to a voluntary initiative by the time the final Carbon Plan was published in December 2011.

There is a significant policy gap for smaller businesses wanting to invest in energy efficiency. Previously they were able to apply for a Carbon Trust interest free loan, which proved to be one of the most energy efficiency ways of tackling the sector. However the loan scheme was closed down when the government removed the Trust's public funding. In March 2011 the Trust launched a new £550m loan scheme partnering with Siemens, but so far only 4500 companies have received loans, possibly because interest rates are set at 9%, making quite a dent in the energy saving payback.

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In summary, at the time of writing, energy efficiency policy in the UK is, at best, confused, and at worst, in danger of unravelling. This is a great shame, because at the 2010 election there was considerable cross-party support for a new approach to energy efficiency, based on adding the pay-as-you-save approach from new market entrants to the considerable legacy the UK had built over the last 40 years. Under pressure from the Treasury a number of new policy innovations are being shelved or compromised and public funding withdrawn from programmes and services that have proved their value in driving the market effectively over the years. A new energy efficiency strategy is promised, but the signs are not positive.

For example, with the removal of Energy Saving Trust and Carbon Trust funding, there are signs that the information and advice legacy built up over the years is in danger of dissipating. Householders only have access to a phone line. Businesses no longer have access to any free, impartial advice and support. The library of publicly funded information is no longer easily available on the Trust's website, and the government has no plans to take it over, saying in public that the private sector will seek out and provide the information it needs. It is hard to read this in any other way than a signal that the government is returning to the neo-classical economic dogma that the market will deliver energy efficiency without government intervention.

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