

Prepared for the AECB by David Olivier

See: <http://www.energyadvisoryassociates.co.uk/services-provided/track-record/>

## Questions and Answers

Q

Why have previous approaches to energy efficiency failed to deliver significant results?

A

The design and implementation of some policies and programmes was inept, or worse.

They never had any political will behind them. Compare this to the official determination to build some 'infrastructural-type' projects.

Example one is the rapid construction of an LNG terminal and large diameter gas pipeline from Milford Haven, Wales to the trunk gas pipeline network in the English Midlands. LNG now accounts for a significant percentage of the UK's piped gas supplies, which in turn are 30% of its delivered energy. Incidentally, so rapid was its construction timescale that many energy efficiency measures were omitted from the LNG plant.

Example two is the ongoing debate over a proposed new nuclear power station 'C' at Hinkley Point, Somerset ('Hinkley C'). Hinkley C is projected to cost £24.5 billion to generate 7% of UK electricity; i.e., 1.5% of delivered energy. Such is the pressure to build Hinkley C that it will be sub-contracted to a foreign government(s) and electricity consumers will be charged a high and index-linked price for the subsequent 35 years. 'Market forces' have apparently been abolished for this project, in contrast to the attitude towards hundreds of energy efficiency measures.

There have been some exceptions to the poor design of energy efficiency initiatives. Some schemes worked spectacularly well in their own field; e.g., the scheme to subsidise half a day or a day's free design advice from an outside expert on a new building development of 500 m<sup>2</sup> floor area or more (EDAS).

Successful initiatives reportedly 'leveraged' up to £10s or £100s of private expenditure on energy efficiency measures from each £1 of public expenditure. That, surely, is one test of a successful government programme?

But EDAS was an exception. Worse, EDAS was periodically 're-organised' and/or 're-tendered'. These seemed to be code for 'take a scheme which is operating quite successfully, intervene and make it worse'.

EDAS was closed down well over a decade ago. The government gave a clear indication that funding was at an end and that in order to continue, it should be 'privatised'.

As an observer could have anticipated, all benefits were terminated. Clients and designers no doubt went back to commissioning less energy-efficient buildings which were within their experience and knowledge; i.e., met the letter of the absolute bare minimum in the Building Regulations.

To consider what the Committee's predecessor thought, here are two quotes from the House of Commons Energy Committee in its 1981 report:

'It remains quite extraordinary that the government still has no idea whether investing £1,300 M in a single nuclear plant is as cost-effective as spending a similar sum to promote energy [efficiency]'

and

It is our considered opinion that there are many [energy] conservations measures which are so which are so much more cost-effective than most energy supply investment that the caveats expressed by the Dept. of Energy appear mere quibbles.'

To what extent has the fundamental awareness and understanding moved forward in those three decades? Apparently not very far, if we are still debating a point raised by the Committee's predecessors 34 years ago.

It is arguable that the UK has tended to copy what does not work, as opposed to what empirically does work more effectively. One example is the Green Deal.

With this experience of 're-invention of square wheels', there should probably be a rule that no more public money is spent on energy efficiency schemes unless they have empirically 'delivered' before in the UK, another country, or in a state or region of another country.

If the government wishes to implement a different policy; i.e., one which has not been previously tried and tested abroad, it can. But it must first commission a pilot project.

Q

What lessons can be learnt from current and previous schemes including Green Deal, Green Deal Home Improvement Fund, and ECO?

A

We draw to the Committee's attention these predictions on the outcome of the Green Deal. This analysis of the proposals was made in 2011 and these words were written in February 2012:

'The draft Green Deal (GD) is at grave risk of not delivering. The 'Golden Rule' is wrongly defined. The maximum budget cited is insufficient for many dwellings, given the rough costings which we have carried out and which we report on in Appendix 3.

Key technologies are excluded. Loans are set to be charged to the wrong bill. The likely interest rate exceeds utility borrowing costs or mortgage rates. The organisations charged with delivering it are experts on retailing, not on domestic energy use.

... We consider that the details need to change radically before the GD can be considered a promising way forward.'

In short, in our view, the GD as set up was almost doomed to fail.

Germany's retrofit programme may have had somewhat more success, although it is not without its difficulties. It has more of the characteristics which we think a successful programme needs.

A consequence of the narrow and non-expert UK approach is that it excludes many available retrofit energy efficiency measures. The programme focusses on standardised 'top-down' measures and highly simplified advice based on lists of 'approved' measures. The hypothesis is that a dwelling either 'has' or 'does not have' each of these measures and that a 'box-ticking' exercise can fully cope with the installation of measures in any dwelling which the programme encounters.

But experience makes clear that at least a small minority of dwellings are *highly* non-standard. They are 'non-standard' to an extent which renders any simplified advice *wrong* and possibly dangerously inadequate.

Also, the over-simplified approach and inadequate methodology appears to have led to

savings being markedly less than the predictions which were made and implicitly offered to householders. This is highly damaging to the programme's reputation. The risk of such an outcome could have been avoided / sidestepped by taking much more care when the programme was being designed.

The author has some experience of this from the 1980s. In the Open University Energy Matters course, which was partly funded by the then Energy Efficiency Office of the Department of Energy, it was thought that 90-95% of dwellings were simple enough to give the owners reasonably good advice using an automated 'expert system'. In those days, it was operated on a mainframe computer.

But at least 5-10% of the applications and completed forms came from owners of buildings whose construction was clearly too complex. It needed manual intervention by an expert to read a householder's completed questionnaire and seek to understand the situation better and give the householder correct advice, albeit without a site visit.

30 years later, the author has never surveyed a dwelling whose construction was simpler than the verbal account given to him by the householder in a telephone conversation beforehand. He has often encountered buildings which were more complex and contained details which a survey form would have missed. He thinks that the 5-10% of dwellings classified in the Energy Matters Course as needing manual intervention may have been a substantial underestimate.

Q

How does the UK's performance on home energy efficiency compare with other countries?

A

This answer is in two parts.

1) *Heat consumption*

The UK has always underperformed versus 'the usual suspects'; i.e., Canada, the USA, Norway, Sweden, Finland, Denmark, Netherlands, Germany, Switzerland and Austria. In terms of use of CHP systems and heat networks, the UK has always badly underperformed versus Denmark, Finland and Austria in particular.

Full international comparisons are complicated by the differences in climate, dwelling floor area, occupancy density and internal temperatures. But if we take a dwelling in Denmark of a given size and age; e.g., a 1980 detached bungalow, it would be likely to consume 50% less heat in kWh/year to maintain a given comfort standard than a 1980 detached bungalow consumes in a cold part of the UK.

The UK average whole house temperature in the heating season, thought to be around 17°C, would be considered too cold in North America, mainland Europe or Scandinavia. If

UK homes were kept as warm as homes in Denmark and Sweden; i.e., near 22°C, we estimate that domestic energy consumption for space heating would double.

It seems fair to say that the challenge in reducing emissions is greater than the UK authorities realise. The UK could reduce the heat loss of existing dwellings by 40-50% and still find that average heat consumption does not decrease. In our view, energy efficiency programmes need to allow for, *and value*, peoples' desire for greater comfort.

## 2) *Electricity consumption.*

This relates to the efficiency of domestic electricity usage for lights, appliances and heating system pumps/fans (and sometimes also domestic gas usage for cooking and clothes drying). Here the UK probably comes closer to the performance of other developed countries.

Many electricity-consuming products are internationally manufactured and traded. They automatically tend to meet common energy efficiency standards; e.g., those set by the EU.

A long-standing issue, though, is that it is difficult or impossible to obtain some highly-rated electrical appliances, such as A+++ 'white goods', in the UK. Even if the same product is available in some other EU countries, it is not always on sale here. This can also be true for smaller products.

Q

What lessons can be learned from these countries on energy efficiency?

A

There is no room or time to list them all but they include these:

1) Dwelling owner-occupiers, tenants, leaseholders and/or management companies of a block of flats must be able to get energy efficiency measures installed a) *without trouble or effort on their part* and b) without disastrous technical faults developing.

All experiences to the contrary put people off, sometimes permanently. This applies if it is too much hassle and if faults develop.

Faults can develop if building work has been designed and/or specified in a less than optimal way. Today, the installers' liability insurance would be assumed to be available to compensate homeowners if things go wrong. But dealing with an insurance claim is a major hassle. If we want to reduce the risk of reputational damage to the whole programme, a better idea would be a no fault compensation scheme.

Probably the only workable route, *in the limited time we have*, is to give the task to energy suppliers. This needs the task to be specified in detail.

In this scenario, it would become mandatory for utilities to invest in energy efficiency in those circumstances where it costs less than new electricity or gas supply. They would, in effect, change from energy supply to energy service companies.

Suppliers would need to be incentivised to give preference to energy efficiency over supply; i.e., via a small increase in allowable profits. This is likely to be a necessary step to 'kick start' the initiative.

Such a move is, however, only practicable if we also re-regulate the suppliers. Then we can require them to offer to install cost-effective energy efficiency measures on their customers' premises.

This move entails a return to the type of retail regulation that England and Wales still have for mains water. Gas and electricity were regulated in this same way; i.e., like water, for about 13 years after the nationalised industries were privatised in the late 1980s. In 2002, prices of generation and of energy supply to all consumers, including retail, were de-regulated, although the UK still regulates the underground pipes and cables.

Under retail regulation, there is one supplier in a given region and one tariff. In return for granting the supplier a monopoly concession, the regulator exercises stringent price



and/or profit controls. This is needed because, with retail deregulation, a supplier will never have the incentive to invest to this extent. We have argued this point elsewhere and do not have space to do so here <sup>i</sup>.

2) Policies only succeed fully if we persist with them for a long time. Even sound schemes can under-deliver in the early years before they 'bed in'. The UK tendency to need to be 'seen to be doing something' is potentially fatal.

Success via such an approach means being prepared to consider the truly long term. A policy might be envisaged as lasting through ten parliaments and five changes of government. It poses political challenges. One of them is how to stop a new minister meddling 'for the sake of it' and risking making a good programme worse. This means accepting that some things are so important that they cross party lines.

But here, if the Committee is interested, are two examples from Europe and North America:

a) In California, Professor Arthur Rosenfeld first proposed investing in 'negawatts' in 1975, citing the need to exploit 'the cheap oilfields in our buildings'. His proposals were discussed at length by the state's private gas and electricity utilities, the state's Public [i.e., private] Utility Commission <sup>ii</sup> and the California Energy Commission. In due course, California began to impose 'integrated resource planning' on its regulated private utilities, learning as time went on.

This activity reached a peak of effectiveness in 1993. By then, the state's main utilities were regularly commissioning or building 'conservation power plants'. Progress was slowed by the US 'fashion' for 'de-regulation' from the late 1990s to the 2000s. It revived later in the 2000s as the state decided to 're-regulate'.

The state's per capita electricity consumption is about the same now as it was in 1975. Possibly no other region of the developed world can make this claim.

b) In Denmark, heat planning was made mandatory in 1979, followed up by a further Heat Supply Act in 2000. Fossil fuel consumption has successfully been reduced since the 1970s by a twin-track approach:

i) heat networks and CHP (plus other renewable sources of heat) in urban and especially suburban areas (65% of detached houses have a mains heat supply);

ii) improved insulation standards, reaching a level some way beyond Part L of the UK Building Regulations.

We think that the effectiveness and thoroughness of the Committee's enquiries on 'energy efficiency' could benefit if it would look at the efficiency of energy distribution and end use efficiency in combination. They may be seen as distinct but they interact in a major way.

In Denmark's case, from the late 1970s its national objective was to improve its balance of payments and improve energy security by reducing imports of expensive fossil fuels from unstable regions of the world. The main stress was on reducing oil consumption.

By the early 1990s, natural gas had been discovered in the Danish sector of the North Sea and Denmark had become virtually self-sufficient in gas. The main objective had changed from reducing expensive imports to reducing CO<sub>2</sub> emissions.

In meeting these changing goals, route i); i.e., lower-carbon heat, was as significant as route ii); i.e., reduced heat consumption. Integrating the two reduced overall consumer costs compared to pursuing one of these routes and not the other. We think that the UK is at risk of pursuing a single one of them in isolation.

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<sup>i</sup> *LESS IS MORE: Energy Security After Oil*. February 2012.

<sup>ii</sup> It regulates privately owned utilities only. The state's municipal and cooperative electric utilities are regulated by democratically elected local governments or by electricity consumers respectively.