
WORKING PAPER 354

ENERGY CONSERVATION AS A U.K. GOVERNMENT POLICY
(UP TO MID-1982)

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1. Introduction

In attempting to undertake any analysis of energy conservation as a government policy a problem is encountered - what is being analysed. This problem arises because energy use, whether consumption or conservation, is not an absolute concept. In physics the existence of a solar radiation constant is recognised. Thermodynamics has its laws. As a guide to government policy, however, such concepts are of little consequence.

Energy is inextricably involved with the functioning of society. This has not gone unrecognised by government. The government though, with justification, has refused to designate energy as the overriding factor in its policy formulation. Energy use is a means for achieving other societal objectives. As a result energy issues are only one amongst many competing for government attention.

Even if energy did assume overriding precedence in government policy this would not make the task of analysis any easier. Energy conservation is not necessarily a separately identifiable entity. There is no single path to be followed. Similarly energy conservation is not an end-state. Society will not be qualitatively better, or worse, off simply by consuming more, or less, energy. This makes a straightforward assessment of energy conservation as a government policy difficult, especially as the events that have given rise to the increased concern with energy conservation have also been responsible for other significant changes in society's activities. It also means that there is no right or wrong policy.

In advancing energy conservation policy successive governments have avoided invoking a philosophical altruism, or preaching moral tirades as their rationale. Energy conservation has been pursued in the context that it is 'cost-effective', or that it enables 'the more efficient use of our energy resources' or the 'maintaining of our standards of living for a reduced energy cost'. These may represent attempts to portray energy conservation in a defineable manner, they remain however, 'hooray' phrases - no one can really take exception to them. The definition and measurement of 'efficiency' (economic, social, thermodynamic?), 'standards of living' (whose standards?) and cost effective are very dependent upon one's values and assumptions.

In the end, energy conservation is relative, but the question remains 'relative to what'? The answer must be relative to the circumstances that gave rise to the policies, the responses to those policies and whether they have resulted in any changes that would otherwise not have occurred.

Though energy conservation is a central plank in the government's energy policy, too often energy conservation policy is subsumed within the larger whole. Yet, energy conservation has been pursued as a separate element within energy policy and that is the basis of this paper. It does not attempt to predict potential demand for some future date, but look at the factors that have given rise to the UK's energy conservation policy and whether they are fulfilling their own criteria.

In this paper the nature of energy conservation policy will be examined in the light of events of, as well as prior to, 1973 and during the period 1979. This examination of policy will be concerned, generally, with only 'official' developments, by which I include various select committees, government appointed advisory councils and committees of inquiry. My intention is to be descriptive rather than prescriptive, nor as pointed out predictive, though short-comings in government policy will be pointed out.

In the third section energy conservation measures will be placed in terms of other issues occupying government attention, hopefully to provide insight into why some decisions were taken when they were.

The impact of conservation on the nation's energy consumption will be assessed as regards to changes in system efficiency and the industry and the domestic sectors, in the fourth section. This section will include the use of statistical and mathematical calculations.

The fifth section looks at the coordination of the government's energy conservation policy.

In conclusion, energy conservation policy has been pursued with some effect, but that there are shortcomings in the government policy is unlikely to be any more of a surprise to the reader than it was to the author. After adjusting for various changes, the level of impact of energy conservation may be slightly more surprising.

2. Energy conservation as a government policy

2.1 Pre-1973

Reviews of energy history often take the events of 1973 as their starting point. Yet, through the years, on the few occasions that UK energy policy has been enunciated, it has had, or identified, a number of principles, aims and objectives. Energy conservation, as an aspect of energy policy, is not just a recent phenomenon, despite the impetus it received in 1973.

A parliamentary statement advocating an energy conservation package containing the following seven items would not be out of place today:

- (1) that local authorities incorporate up-to-date standards for space and water heating in their new constructions;
- (2) that incentives are provided to increase the rate of installation of improved heating appliances in both council and private dwellings;
- (3) that inefficient space and water heating appliances be removed from the market;
- (4) the undertaking of a major publicity campaign, in conjunction with local authorities and consumer organisations to reinforce the message of fuel efficiency to the domestic consumer;
- (5) to enlist the assistance of the building industry and architects to improve heating and insulation in houses;
- (6) to set national standards for fuel efficiency;
- (7) to encourage further research.

In fact, many of these measures are incorporated in the present government's energy conservation policy. This package, however, was advocated in the Debate on the Address of the King's Speech in 1951 (1) as one part of a two-pronged attack to mitigate the then-existing coal shortages. The other part was to increase coal production.

In post-war times, energy conservation objectives can be traced back to 1946. The Simon Report (2) identified the need to ensure national fuel economy (defined, somewhat ambiguously, as the most efficient and economical use of fuels) with special

attention to be paid to conserving the nation's coal reserves. Similar sentiments were repeated in 1952, the Ridley Report (3) calling for the promotion of maximum economic efficiency in each use of each fuel.

Such concern, especially with coal, was not unintelligible. Coal then accounted for 75% of the UK's primary energy consumption. During the immediate post-war years the country had been struggling to regain its feet and to regenerate the economy, and though coal production was steadily increasing, until 1952 it was still rationed. With electricity demand growing at 7% pa the Ridley Committee foresaw fuel shortages for years to come. Credence was further lent to this scenario with the peaking of coal production in 1952.

Fuel efficiency, was only one of the objectives cited in the above Reports, and was not necessarily compatible with others, eg. achieving low cost and greater convenience for householders (4) or meeting the community's demands for different fuels in full (5). Its value did not go unrecognised:

"to improve the efficiency of fuel use in the next few years is essential if fuel needs of the country are to be satisfied and in the longer run will always be important as a means to economise the country's resources." (6)

This message was lost however in the wake of the increasingly relative cheapness of oil, its growing availability, and the 'white heat of technology'.

The 1965 White Paper (7) marked a significant shift in energy policy, away from the social welfare concerns of previous formulations to economic criteria. Fuel efficiency had disappeared from amongst the objectives of energy policy. In its place was the aim to ensure that the economy's growth was not restrained by inadequate, or unavailable, energy supplies. The concept of 'consumer sovereignty' had left its impression. Energy demand was now viewed as sacrosanct, to be met whatever level it attained. Growth in energy supply was seen as a prerequisite for the growth in the economy.

While a common link with past formulations did remain - fuel prices were to be kept as low as possible - the beneficiary had changed. For the householder and the community it was now to read industry and the economy. As a result industry would be more

competitive internationally, and indirectly, the community would benefit through the reduced costs of goods and services. The government believed the fuel sector should now make its full contribution to strengthen the economy.

Rapidly changing circumstances, the discovery of North Sea Gas in 1965, coinciding with the growing technological optimism associated with the advent of nuclear power - prompted a quick revision, especially in energy policy terms, of the White Paper. The 1967 White Paper (8) holding the 1965 objectives to be still valid, concentrated on statements about individual fuels and general trends. By 1975, the UK was to be transformed from a two, to a four fuel economy. The White Paper also recognised that risk and uncertainty were elements of any energy planning; notably questions had been raised regarding the security of oil supplies following the 1967 Middle East war. The government judged it right though, to base its planning on the assumption that 'regular and competitively priced supplies of oil will continue to be available to us, as they have been in increasing quantities over the past year' (9). With the government's position 'summarised as cheap energy' (10) the coal industry became to be regarded as a social welfare programme - the cost of burning coal in power stations was to be met by the nation. The object was to run the coal industry down without causing undue social distress.

Ensuing events only seemed to further reinforce the government's position. The discovery of North Sea oil in 1969 represented future security, and occurred just as oil prices had begun to rise. The coal industry began to experience annual bouts of industrial action. North Sea gas was coming onshore and the national conversion programme was going more smoothly than could reasonably have been hoped for. Although the AGR's had run into some technical problems, the MAGNOX stations were performing extremely well. The result was a change in the nature of fuel consumption in the country (see Table 2.1). Oil now accounted for almost half the country's total primary energy consumption compared to the previous dominance of coal.

FUEL	1960	1972
Coal	75%	37%
Oil	25%	48%
Others	negligible	15%

Table 2.1. Percentage of National fuel consumption by fuel (1960 & 1972)

The change of governments in 1970 coincided with emerging ripples in the order of the international oil market, emanating from the Middle East. Rising oil prices and the nationalisation of oil production companies resulted in the re-evaluation of the nation's energy strategy. By 1972, with the ripples becoming increasingly stronger, the government decided 'to pursue the only sensible energy policy available to the country, which was swiftly to increase the supply of energy from every available indigenous resource' (11).

This was also the year coincidentally, that the Club of Rome published their report (12). Briefly, it stated that production could not expand infinitely to satisfy exponential growth in demand in a finite world. Eventually limits would be reached - unless policies to moderate demand were implemented - with dramatic consequences.

2.2 1973

The Limits to Growth could not have received any better publicity than the events of 1973. It was not that absolute resources limits (ie. in total oil production), had been breached, but that relative limits had been (ie. total demand was greater than available supply). First, Middle East oil producers had reduced oil production for their own political purposes, and had then, quadrupled the price.

Political motives had been brought to bear upon the oil market. Despite this departure from free-market economics (if oil production had ever been bound by such theory) and the indignation it aroused in the western world, such interventions were not unimaginable to the UK government. In 1965 the government had declared

"The size and nature of fuel producing industries is such that government is inevitably involved. It is the function of government to ensure national consideration." (emphasis added)
(13)

National considerations had been responsible previously for the nationalisation of the coal, electricity and gas industries, and in the manipulation of fuel prices for the sake of the economy. In 1973 the national considerations of Middle Eastern countries did not coincide with the UK's and oil-importing countries found themselves being squeezed on two sides.

In the UK the oil crisis may actually have been weathered, even without almost 1/3 of its refinery capacity (the Esso-owned Milford Haven and Fauley refineries were temporarily closed, representing a loss of 600,000 of a 2 M barrels per day total) as oil was arriving regularly.

"If coal production were fully maintained and we made use of our existing stocks, I am told by the CEEB that it would be possible for it to save 50% of oil compared to last winter's consumption figures." (14)

Oil deliveries were only about 10% below expected amounts.

The problem was that coal production was not being maintained. An overtime ban by the NUM had resulted in a 25-30% reduction in output. By itself this would not have been disastrous either, when it is considered that the country had only experienced occasional power disruptions the previous winter when the miners' strike had caused a total shutdown of production.

The threat posed by these combined factors culminated in the declaration of a state of emergency on 13th November, 1973, the imposition of the 3-day working week on 31st December, 1973 and the fall of the Heath government in early February 1974. Before its fall the government had introduced a number of measures aimed at reducing energy demand:

- exhortations to 'Switch off, Save Energy', with calls to brush your teeth in the dark and share a bath with a friend
- TV had a 10.30 pm shutdown
- The Fuel and Electricity Control Act 1973 ('a short enabling act to control the production, supply, requisition and use of petrol and any other substance used as a fuel and the production, supply and use of electricity' (15)) was used to in order to reduce the speed limits and in display lighting
- Provisions were made for petrol rationing, but never needed.

The government's actions resulted in an effective 31% reduction on electricity consumption compared to the previous year's consumption.

Structural changes affecting the government's handling of energy issues in general were also introduced. The Department of Energy (DEn) was established in early January 1975, with its own Secretary of State. Under the Ministry of F&P Act 1945 the minister was responsible for the promotion of the economic and efficient supply, distribution, use and consumption of fuel and power (17). Despite the Minister's terms of reference, and the magnitude of the initiating factors, the government's emphasis was still supply orientated. DEn was provided with its own Secretary of State "to concentrate on the development of the coal industry, on nuclear power and on our offshore oil and gas resources" (16). The responsibility for energy conservation was delegated, eventually, to a minor unit within DEn.

First, energy policy was supply orientated. Security of supply became to be seen in the light of the obligation to meet peak demand without supply disruption. Growth in the economy became to be equated with growth in energy. It is also much easier to take policy decisions which need only the compliance of a few nationalised fuel industries, rather than the cooperation of millions of individual consumers. Thus, despite the events of 1973, the overriding concern of DEn on its establishment remained energy supply.

Secondly, energy policy was subservient to macro-economic policy objectives. While this theme appeared initially in the 1965 White Paper on Fuel Policy its tone was set first by the 1965 National Plan, and reiterated in the 1967 White Paper on Nationalised Industries. This Nationalised Industry White Paper had established the principle of basin nationalised industry prices on long-run marginal costs. Between 1967-74 the government blatantly employed the nationalised fuel industries as instruments to control inflation. Fuel price rises were kept to a minimum. This intervention, though not quite what the White Paper had envisaged, was in pursuit of national economic policy objectives.

Thirdly, energy conservation has suffered a continuing association with hardship and doing without. The inability between 1945-52 to meet fuel demand was overcome by rationing and supply interruptions. Prior to 1973 rationing had last occurred in

the UK during the Suez War (1956), and then it was for petrol. The emergency measures adopted in 1973/74 were labelled by the government as energy conservation measures. This association is not necessarily compatible with the message, 'the long term need for the more efficient use of resources'.

In the era that followed the events of 1973 these three themes were to endure to influence government's energy conservation policy.

2.3 1974 to 1982

With the change of government in February 1974 came the end of the State of Emergency, and a shift in strategy as regards energy conservation, from crisis intervention towards the formulation of short, medium and long-term policies. The 1973 events had marked the end of the era of cheap fuel, and it quickly became government policy that fuel prices should reflect a true or economic cost however defined - long-run marginal costing, historic costing or rate of return on investment.

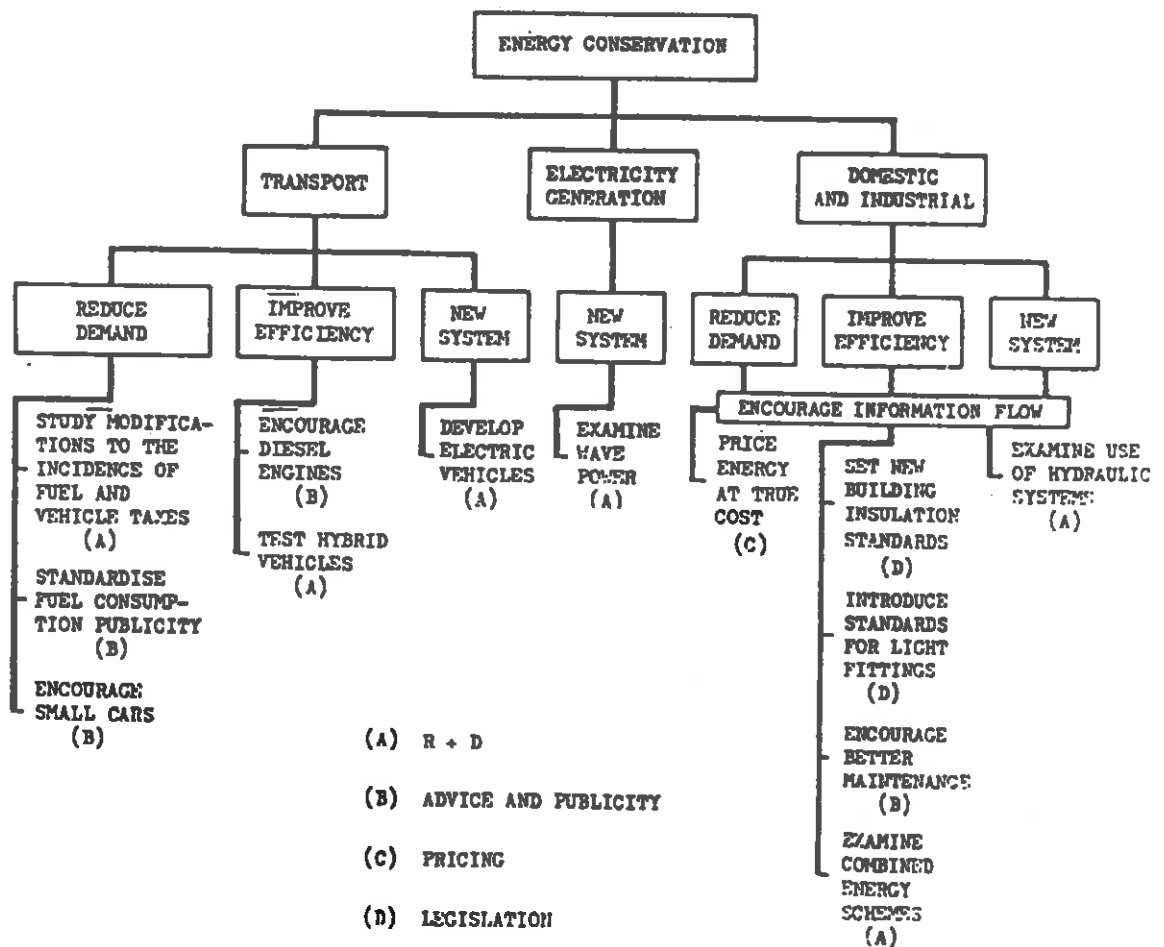
What this meant in actuality was the withdrawal of 'price restraint' subsidies to the nationalised fuel industries by government - compensation for price restraint in 1973/74 had amounted to £176,227,582 for the CEGB and £44,523,000 for British Gas (18) - and increased fuel prices (see Table 2.2). Yet, reliance solely on the price mechanism was seen by government as insufficient to increase the nation's energy efficiency - a broad based policy was needed.

FUEL	INCREASE (approximate)
Petrol (4-star)	80%
DERV	7.5p per gallon (% not known)
Paraffin	2.5p per gallon (% not known)
Gas: Industry	20/21%
Domestic	12%
Coal: Industry	112%
Domestic	55%
Electricity: Industry	50%
Domestic	82%

Table 2.2. Fuel price rises between April 1974 and April 1975

Underlying the government's approach was the belief that "the country needs a long-term campaign...the responsibility for energy conservation does not rest solely with the Department of Energy. It involves every department of government and every individual in the country"(19). Towards this aim, the CPRS were brought to bear on the subject. To encourage energy conservation and further discussion, the CPRS's report (20) was published (an uncommon occurrence) in July 1974. Its recommendations can be classified under four categories - R & D, advice and publicity, pricing and setting standards (see Figure 2.1). While many of these recommendations were acted upon within a short time this did not require a particularly strenuous commitment or effort on the government's behalf. As can be seen, the recommendations did not necessitate a major re-ordering of society or dramatic changes of behaviour, rather, initiating consultation and encouraging others to undertake action.

Figure 2.1. Typology of CPRS energy conservation recommendations



By December 1974 the government's energy conservation policy was reflecting a broad-based approach. Action had been initiated on a number of fronts:

- PRICES - phasing out of fuel subsidies to nationalised energy industries
 - differentiation between PETROL and DERV
 - reduce underpricing of fuels
- LEGISLATION - Health and Safety at Work Act (1974) passed (section 3 allows the Building Regulations to be amended for the purposes of energy conservation; not previously allowed under the Public Health Acts)
 - Fuel and Electricity Control Act (1973) renewed for a further year.
- STANDARDS - Building Regulation's Thermal Standards increased under Public Health Act (1961)
- INCENTIVES - Initial 100% tax allowance for energy conservation measures taken by industry
 - Home improvement grants now required the installation of loft insulation
 - Assistance for 1 day seminars and conferences on industrial energy conservation
- ADMINISTRATION - PSA programme continued
 - government consultation with various 'interested' bodies to organisations
- R & D - ETSU
 - long term research programmes undertaken by BRE and HDD
- INTERNATIONAL PARTICIPATION in EEC, OECD and IEA
- ADVICE AND PROMOTION - ACEC set up
 - CPRS Report published
 - various department publications.

Further reinforcement was provided on 9th December, 1974 with the government's announcement of its 12-point Interim Program (21). This programme was aimed at reducing the oil account deficit (£3,446 M in 1974) by £100 M. It reiterated some of the above measures (eg. PSA programme and consultation with CBI and TUC), but also included further incentives (energy saving loan scheme for industry), legislation (mandatory heating limits to non-domestic buildings)

and the launch of an energy conservation publicity campaign - SAVE IT. Energy conservation however, was not necessarily compatible with other priorities. It was not mere chance that energy conservation and an era of fiscal stridency coincided.

The dramatic increase in oil prices had also sparked an industrial recession, just when increased exports and output were needed to finance the oil debt. Despite the government disclaimer of relying solely on the price mechanism there were few energy conservation incentives for industry, and even fewer for the domestic consumers, except rising fuel prices. Tight public expenditure control meant little money for capital investment in energy conservation or subsidisation.

This was not the only incompatibility. Specific instructions were issued to local authorities directing them not to approve applications for Home Improvement Grants 'which includes works for insulating a dwelling against heat losses' (22). The objectives of the house renovation system were not considered appropriate for energy conservation purposes. It was not surprising therefore that the government's response to queries concerning energy conservation incentives for people who did not need 'a bathroom, kitchen or inside lavatory' (23)-reference to the inclusion of loft insulation's inclusion amongst the list of basic standards to be met to obtain a Home Improvement Grant-was none. This was considered to divert scarce resources away from rectifying bad housing conditions.

The cost of oil and energy conservation clashed with another national programme. This time the balance came down in favour of energy conservation. Planned reductions of the lead content in petrol had begun, the first stage coming into effect on 1st November, 1974. The Interim Programme announced this programme's suspension until a review of all the medical and *economic* implications had been carried out. Though the first stage would not be rescinded, it had been responsible for an additional £10 M per year on the import bill. Meeting the second stage would result in another £50 M, through extra oil imports.

By implication, the describing of the December 1974 announcement as an 'Interim package' indicated that another package was on its way. At least this was the view of two organisations.

The SCST noted

"When we took evidence (on energy conservation) from the Advisory Council (ACEC) to the Secretary of State for Energy ... both we and they expected a second package at any moment". (24)

The impression of the SCST could be attributable to the keenness infecting any committee that takes up an issue. This was not so of the ACEC, which had a direct relationship with the Secretary of State for Energy. Created by the Secretary of State, their terms of reference included the duty

"To advise and assist the Secretary of State for Energy in carrying out his duty of promoting economy and efficiency in the use and consumption of energy." (25)

Whatever reason the ACEC had for expecting an imminent second package, beyond the belief that it was necessary (26)

the second package was not to be quickly forthcoming. Its non-appearance did spur the parliamentary opposition into action, moving a debate that the salary of the Secretary of State for Energy be reduced by the sum of £1,000 (27). They wanted to highlight what they saw as the government's energy policy failures of which 'the first is energy saving' (28). It was not so much a criticism of what had been done, rather, what had been done had not gone far enough. The urgency in the government's programme had departed. "The department has truly lived up to its sobriquet as the department of lethargy' (29).

The Secretary of State's salary survived the motion, but the rebuttal did not silence all the critics. A reason for the complacency creeping into government policy could be seen.

"I suspect that it is because of the feeling that we shall be self-supporting and that we shall have enough of our own resources that there is a lack of urgency in the programme for conservation." (30)

North Sea oil production had begun in 1975.

Against this background of doubts, the SCST published their report on energy conservation. They had set out to address three issues:

1. The scope for energy savings
2. The extent they would be achieved by pricing
3. Whether existing government measures were sufficient.

Noting the government's satisfaction with progress to date, they, themselves, were more sceptical.

"The Department of Energy has launched an advertising campaign. Otherwise very little seems to have happened apart from further price increase due to cost escalation and the government's policy of reducing subsidies to nationalised fuel industries." (31)

They saw the potential for energy conservation to be quite significant, but did not see the government's programme achieving it:

- The reduced speed limits were widely disregarded
- The 20°C heating limit was too high
- Daytime external display was an extremely marginal consumer of electricity
- The energy saving loan scheme was a flop
- The increased Thermal Standards in the Building Regulations, though commendable, were only a long-term measure.

Energy conservation, to be a viable energy policy instrument, needed a positive lead. Towards this end they recommended, amongst other things:

1. Research into investment in energy conservation as opposed to energy supply in meeting increased demand.
2. A central task-force to coordinate overall government policy.
3. Improved consultation, information and advice for industrial, domestic and public sectors.
4. That government to instruct local authorities to consider alternative energy implications in their strategic planning.
5. Specific grants to local authorities and regional health authorities for particular items of energy saving.

If implemented these recommendations would have constituted a significant shift away from the traditional supply bias of energy planning, providing an impetus and a focus for energy conservation activities, as well as incorporating energy issues into strategic planning. Compared to the recommendations of the CPRS, and even the ACEC, these were more fundamental in nature - aimed at the structure of the UK's energy consumption, as opposed to adjustments at the margin.

In all the SCST made 42 recommendations that, the government stated, spanned the range of all its departments. The government reply (32) was over a year in arriving. When it did, it contained only slight modifications to the existing policy (eg. the Energy Saving Loan Scheme was extended to commercial firms), rejecting all the SCST's report's major recommendations, including those listed above.

The reply also seemed to misread one aspect of the report. The SCST, in calling for a more positive lead beyond that involved in a publicity campaign, had stated

"The government's publicity campaign so far seems to be feeble to us in contrast to the need for strong action." (33).

The government, in response, did not see how they could take stronger action through the publicity campaign - the point the Select Committee was trying to make.

The government in the face of this criticism defended its approach as being wholly appropriate

"In 1975, conservation measures including the effects of prices and the government's energy saving publicity campaign, produced savings in primary energy consumption conservatively estimated at about 2%. There are still further worthwhile gains to be pursued in the short term and still more in the long term. The government believes they should be pursued provided this is done in a balanced way as a contribution to efficient use of resources overall. Normally, energy conservation, though an important factor is only one of many factors which have to be taken into account in individual decisions by government, by industry and the consumers." (34)

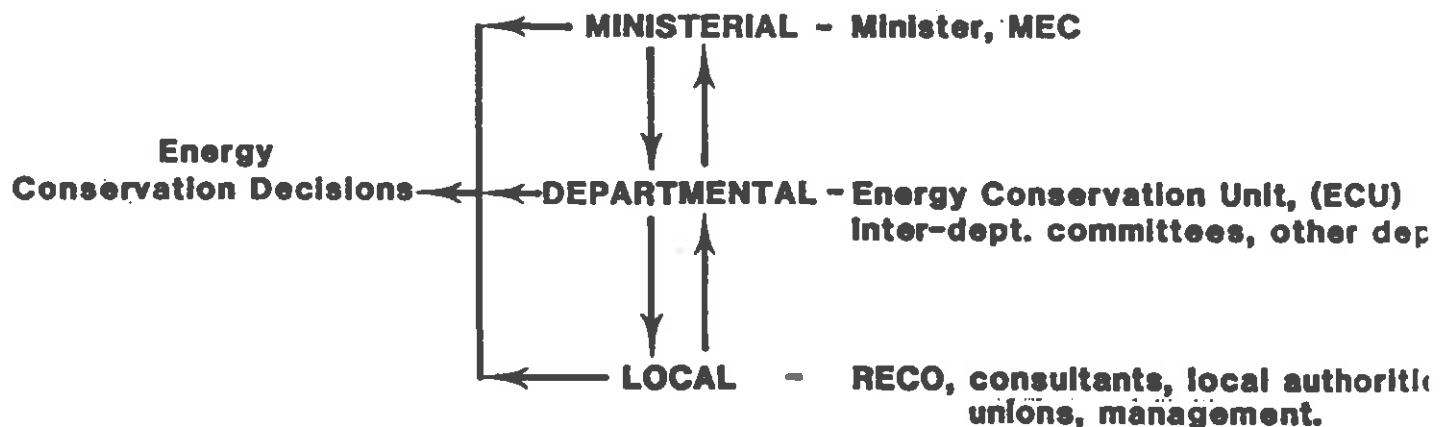
Yet, despite this defiance, the government's actions belied, to a small extent, its own expressed satisfaction. Several changes indicated the government's intention to increase its own focus on energy conservation. Research funds were being increased, a Minister was appointed with special responsibility for energy conservation, while the Queen's Speech, opening the 1975/76 Parliament announced the government's intention to introduce an Energy Conservation Bill.

The ministerial appointment marked a further step in the evolution of the government's energy conservation decision-making process. As has already been noted, a concern for energy conservation was formally vested within DEn. Regional Energy Conservation Officers, responsible to DEn, had also been established within the Department of Industry's Regional Offices, with the general responsibility

to deal with all aspects of energy conservation and to act as a regional focal point for the promotion of energy conservation. The appointment of the minister represented the missing link.

"The structure at Ministerial, departmental and local level is designed to introduce energy conservation as a factor in decision making at all levels of the economy and to ensure that it is given its due weight." (35)

Figure 2.2. Energy conservation decision process



This process was not as comprehensive, or as influential, as the government statement may lead one to believe - the minister was only a junior minister with other responsibilities, the ECU was only a minor unit within DEN, while the RECO (up until 1979) was only a part-time position. Probably, the most serious shortcoming lay within DEN itself:

"The department's statistical effort in relation to energy consumption has been geared mainly to the prediction of demand as a determinant of investment policy and to the management of supply shortages, particularly during emergencies. Information gathered for these purposes does not fulfill all the requirements for energy conservation purposes". (36)

As the SCST had succinctly pointed out 'new government machinery will not, of itself, save a single barrel of oil' (37), but useful in deflecting criticism from the government's strategy, and their slowness in responding to the SCST.

The promised energy conservation bill turned out to be an anticlimax for some.

"Far from being an energy conservation measure and a genuine attempt to deal with the problem and to produce a more national use of our energy it is a hotch-potch of wide-ranging general terms." (38)

During the Bill's second reading concern was expressed by several members over the co-existence of emergency measures and energy conservation measures within the same bill. If energy conservation was to be presented as something more than restraint and restriction this bill would only cause confusion, and further reinforce the image of energy conservation as sacrifice. The Energy Bill would replace the Fuel and Electricity Control Act (1973), as well as enable controls on gas flaring and mandatory fuel consumption testing for automobiles to be introduced. This 'hotch-potch' nature can be attributed to the Bill's *raison d'être* - to meet international obligations, to which miscellaneous provisions were attached. The Energy Act passed into existence, very much unaltered, in October 1976.

Over the next year the only outwardly visible new initiative in the government's programme was the extension of the Job Creation Programme (JCP) to encompass insulating the lofts of all local authority owned property. Initially JCP labour could only be used by local authorities to insulate the lofts of elderly or disabled tenants. Up to March 31st, 1977 the programme was responsible for insulating approximately 67,000 lofts (see Table 2.3). By the end of the JCP (December 1978) approximately 100,000 lofts had been insulated under 103 schemes (39). Compared to the numbers of dwellings later insulated under the public sector energy conservation programmes, this would appear a small total. The JCP had one drawback - local authorities taking advantage of it, still had to find finance for the material costs from their already strained budgets.

This outward lull in government initiative did not go unobserved by the House of Commons. A proper debate, in government time, on energy conservation had not occurred since the government had come into power, nor had there been a debate on the SCST Report. As regards the latter, there never would be. "Unfortunately the attitude still is that the government are prepared to suggest conservation except when, and until, that means doing something about it" (40). Neither had it gone unnoticed that primary and final energy consumption had been rising since 1975, nor that, the real price of oil was declining (a situation that occurred between 1975 and 1978).

Table 2.3. Loft Insulation Schemes submitted by Local Authorities
and approved under the Job Creation Programme as of
31st March, 1977

LOCAL AUTHORITY	No. OF HOUSES	LOCAL AUTHORITY	No. OF HOUSES
Monklands DC	16,000	Mendip DC	867
Eastwood DC	320	Wimborne DC	2,000
East Kilbride & Stonehouse Dev. Corp	113	Norwich CC	1,000
Caithness DC	4,000	Haringey BC	1,500
Dundee DC	500	Welwyn Hatfield DC	700
Edinburgh DC	2,500	Oxford CC	500
Kirkcaldy DC	500+	Great Yarmouth BC	600
Aberdeen DC	763	Ipswich BC	800
Grampian Regional Council	31	Waveney DC	700
Livingstone Dev. Corp	3,500	North Norfolk DC	500
Glenrothes Dev. Corp	500	South Wight BC	400
Sedgefield DC	1,063	Arun DC	500
N. Tyneside MBC	1,100	Watford BC	500
Tyne & Wear CC	1,000	Tendring DC	1,400
Scunthorpe BC	500	Houslow BC	1,000
Sheffield CC	220	Medway BC	200
Richmond DC	220		
Grimsby BC	171		
Craven DC	550		
Fylde BC (2 applications)	312		
S. Ribble BC	629		
Rochdale MCB	1,000		
Manchester CC	1,187		
Rossendale BC	60		
Trafford MBC	50		
Congleton BC	280		
Liverpool CC	400		
Dudley MBC	1,700		
Lichfield DC	230		
E. Lindsay DC	600		
Chesterfield BC	500		
Coventry CC (2 applications)	2,458		
Shrewsbury & Atcham BC	650		
Hereford CC	350		
Salop CC	13		
Redditch Dev. Corp	1,484		
Ogwr BC	326		
Afron BC	114		
Rhondda BC	3,500		
Aberconwy BC	3,000		
Cardiff CC	300		
Gwent CC	20		
Merthyr Tydfil BC	1,000		
		TOTAL	66,681+

The government was engaged in a wide-ranging review of all its energy policy. The Energy Commission, which had recently been set up was to consider the government's overall approach, including energy conservation. At the same time the ACEC had been specifically requested 'to proposed urgently a set of recommendations for early action for inclusion in a package of government measures' (41). This activity culminated in the December 1977, 12-point, 10-year programme (42) and the publishing of the Green Paper on Energy Policy (43) in February 1978.

Together they marked a significant step, and enhanced status, for energy conservation within the government's overall energy policy. Prior to December 1977 the government's energy conservation policy had been aimed at reducing oil demand, while the strategy pursued represented no more than tinkering with the system. Now, the potential of energy conservation in conserving all traditional fuel stocks was recognised as offering the UK the equivalent of a 'fifth fuel' source. To achieve this potential would require more than marginal adjustments. In the long term marginal adjustments could only result in marginal contributions.

The measures contained within the December 1977 package can be grouped into five categories:

- (1) Public Sector Expenditure - financial allocations for energy conservation work by local authorities, the NHS, the PSA and educational authorities on their buildings. (For local authority council houses the intention was to bring the estimated 2 million uninsulated dwellings up to basic minimum standards of thermal insulation over 10 years.)
- (2) Standards - further consultation on fuel consumption targets for new automobiles; increased building regulation on thermal standards for non-domestic buildings.
- (3) R&D - Energy conservation demonstration project scheme set up to be run by ETSU under joint auspices of DEu and DI.
- (4) Advice and Information - new advisory training services for industry set up; expansion of advisory service for industry; publicity aimed at motorists behaviour and maintenance of automobiles.
- (5) Organisation - establishment of the Energy Conservation Division within DG.

The cost of the programme over its first four years was estimated to be £320 M (1977 prices).

The mandatory standards, R&D, and information and advice aspects of the package represented continuations, though advances, on the government's previous energy conservation strategy. The allocation of public expenditure and organisational aspects were significant departures, and even a reversal of the previously held belief that public sector bodies did not need special financial assistance. In establishing the Energy Conservation Division (ECD) the government had elevated conservation to rank with 'the energy producing industries as an essential element in our energy policies' (44). The package was justifiably described as the 'most for reaching of this kind that we have had in this country' (45).

The Green Paper was published two months later. It further emphasised the recently acquired status of energy conservation. Demand estimates adopted for the year 2000 contained a substantial allowance for energy conservation - the equivalent of a 20% reduction in final energy consumption. To achieve this target the need for 'significant further action' (46) beyond rising-price inspired behaviour was foreseen within this paper and echoed by the ACEC:

"There is ample evidence that the response of individual consumers to the price mechanism, even if reinforced by price and advice, will not in practice bring about all the energy conservation investment that is cost-effective."
(47)

Three potential routes were delineated for achieving this aim:

1. Further price increases by taxation or other means
2. Further mandatory measures
3. Further financial incentives, through grants or tax allowances.

Each route was not without its drawbacks. Price increases had social repercussions if not supplemented by social welfare provisions. They also handicapped industry's international competitiveness. Additional mandatory measures that were both effective and enforceable were difficult to devise. Further financial incentives were difficult to reconcile with competing claims on public expenditure and the need for fiscal restraint. Faced with the decision to choose its course of action the government adopted the position to sit and wait. It would review existing measures as circumstances dictated.

Further initiatives were not long coming. The Homes Insulation Bill was introduced in Parliament in May 1978 and would enable the Secretary of State for the Environment to make money available for

insulation schemes. The first scheme would be for lagging hot water cylinders and 80 mm of loft insulation. Though presented as only the first scheme the government made it clear that it had no intention of introducing further schemes at the time. The Bill quickly passed through Parliament so that the first scheme could commence before winter (48). The Homes Insulation Scheme was aimed at the estimated 5 million uninsulated lofts in the private sector, the objective being to insulate 500,000 dwellings a year for 10 years. Though it was to serve in parallel with the public sector scheme (the difference in introduction was attributed to the need for legislation for the private sector scheme) it illustrated a number of anomalies in the government's strategy:

- The installation of 80 mm of loft insulation was necessary to be eligible for the Home Insulation Grant while the Building Regulations only required 50 mm of loft insulation in new buildings.

Scheme

- The Homes Insulation Scheme was only for insulating the loft and hot water cylinder while the public sector scheme included draught-stripping.
- The public sector scheme was for upgrading loft insulation to a basic thermal insulation standard (80 mm) compared to the Home Insulation Grant only being available for uninsulated lofts.
- Both public sector and Home Insulation Schemes were piecemeal rather than comprehensive when compared with the PSA approach on the government estate. The PSA programme included not only insulating lofts and hot water cylinders and draught-stripping but also cavity wall insulation, heating control systems and in certain instances, double glazing.
- VAT was charged on insulation materials for existing houses while the same materials received exemption in new buildings.

The government was not unaware of these anomalies stating that the domestic thermal standards would be reviewed. As for the others, the government's position was that in fiscally stringent times their resources should be concentrated on the most cost-effective measures. This however, did not really explain the anomalies - why, for instance, was an item 'most cost-effective' in one programme and not in another?

Despite these anomalies an inter-departmental review (49) found that there were no significant gaps in the government's programme, though its full potential would only be realised by continuing and sustained government action. It did recommend a number of items but 'these are mainly minor measures to strengthen or develop existing policies or measures which do not require legislation' (50). Before the government could act upon the report it was replaced by a Conservative administration in May 1979.

Two other initiatives, that would have represented a further incorporation of energy conservation into the structure of the country's energy system disappeared with the Labour government. The first was the proposed abolition of vehicle exercise tax (ie. road tax), and its replacement with a further levy on petrol. This would have reflected a 'truer' cost to motorists - the more driving performed, the more road upkeep needed, but also the more fuel consumed, and therefore the greater contribution to road upkeep. Energy conserving behaviour would reap dividends in the form of less road tax.

Secondly, and more importantly, was the proposed restructuring of the electricity supply industry (ESI), on which a draft bill had appeared (51). This bill had been the outcome of the Plowden Committee into the ESI. In its report (52) it stated:

"We have, however, given special consideration to the implication of the industry's functions and structure for its participation in (CHP) which, it is claimed, could offer savings in energy consumption ... great expansion would be impossible without active collaboration of the (ESI). The industry's structure must not impede the economic use of resources." (53)

It therefore recommended:

"At present the industry's statutory duty is to provide 'an efficient, coordinated and economical system of electricity supply'. This duty should be changed to take into account the importance of energy conservation." (54)

and,

"In order to enable the CEB to initiate heat and power schemes its powers to sell heat should no longer be restricted to selling heat which is the by-product of electricity generation." (55)

These recommendations were both incorporated in the draft bill, though the wording of the former 'to cooperate with' and 'to promote' were more ambiguous, and therefore almost legally meaningless, than the

'statutory duty to provide'. The bill was not presented to the House of Commons because of Parliamentary constraints (56), though these were not defined, the Liberal leader, and this was the era of the 'Lib-Lab' pact, was known to be opposed to restructuring the ESI. Notably, a consolidation Bill (57) affecting only the SSEB and NSHEB which received Royal Assent on 22nd March, 1979 and covering much the same ground as the draft bill for England and Wales, did not contain the provisions for energy conservation. The draft bill was not resurrected by the incoming Conservative government.

The Conservative administration had been elected on a manifesto that included the statement 'we attach particular importance to measures to reduce fuel consumption by improving insulation' (58). Its platform had also contained the intention to reduce public expenditure significantly, to reduce government bureaucracy and to reduce both the amount, and the scope, of government regulations and controls. Comparing these intentions with two of the Green Paper's three routes for achieving increased energy conservation, cited earlier, further mandatory measures and further financial incentives - would appear to be ruled out, leaving 'increasing energy prices' the only route open. It is not surprising therefore, that the new government should indicate its belief that

"The main stimulus to energy saving must be the economic pricing of energy backed up by an information and publicity campaign to assist consumers to respond to the price signals by increasing the efficiency with which they use energy." (59)

External assistance to this economic pricing policy came from OPEC in late 1979. They arrested the declining real value of oil that had set in after the 1973 price rises by again doubling the price. Confirmation of the government's intention came in January 1980 with the setting of new financial targets for British Gas and the Electricity supply industry (60). These targets, to be valid until 1983, would increase the price of gas by 10% annually over and above inflation, and electricity, by 5% above costs.

Another question quickly arose. 'How committed to energy conservation could a government be whose expressed its intention to order at least one new power station a year in the decade from 1982' (61). The government dismissed this, seeing no inconsistency in its approach, saying that 'there are risks in under-estimating future electricity demand through the non-achievement of expected energy conservation' (62). As the Green Paper had pointed out 'energy conservation, however vigorously pursued will not prevent a growth in energy needs' (63) while the Conservative government's long-term energy strategy revolved, as it had

done latterly under the previous Labour government, around CoCoNuc (Coal, Conservation and Nuclear) it had to be remembered that energy conservation was only one element in three. The government, in declaring that energy conservation is an essential element of its overall strategy, have reiterated the Green Paper target for energy conservation - the equivalent of a 20% reduction in overall demand by the year 2000.

The government's assurances did not prevent serious doubts about its energy conservation strategy arising within a year of it being in office - during this period the government had scrapped plans for regional energy advice centres, decided not to renew the Energy Conservation Grant scheme for industry, subsumed the specific energy conservation allocation for local authorities within their block grant, and had approximately halved the annual allocation for the Home Insulation scheme. These changes resulted in a number of critical articles appearing in the press (64).

A more damaging critique came from two articles leaked by a DEn official - the minutes of an MEC meeting and an internal letter to the Secretary of State for Energy. These were not only concerned with the cuts in the government programme but also with its general attitude towards energy conservation. At what was apparently the last meeting of the MEC, the

"MEC needed a clear commitment by the prime minister on energy conservation ... MEC could achieve little without evidence of political will from No. 10 and speaking frankly (the Minister responsible for energy conservation) would rather not continue with a weak MEC". (65)

This commitment did not arrive; and the MEC has ceased to exist.

The internal letter, after listing some of the programme's cutbacks, cited above, went on to say that

"Conservation is also well down the list of the priorities of other departments if it is on their list at all. All this represents a sharp and visible contraction in the government's conservation programmes." (66)

The government was not overly moved, and defended the changes as being consistent with its overall strategy. The Block Grant would allow the local authorities more freedom in determining their own priorities. The Home Insulation Scheme allocation represented a more reasonable allocation, in light of the poor take-up during its first two years of existence, and it was augmented by a further £4 M to provide for a higher rate grant for the elderly. The energy conservation grant scheme had only

been provided with a two year life span by Labour (though this was possibly a partial reflection on the similar energy saving loan scheme being a flop). The government did not see its duty as subsidising activities that would have occurred anyway. This would be a waste of scarce resources. Energy conservation was receiving a significant boost from the right signals in the form of increased prices being passed on to consumers.

These arguments have not necessarily been accepted. The energy conservation programme was seen as being manipulated by government in its pursuit of public expenditure cuts.

"The message has come over loud and clear in committee, the government were notable to provide money to do various things in the interest of energy conservation, but they fell over themselves to agree to do anything that was free, or not cost much." (67)

Poignant support for this position was further provided when the government reduced its total energy conservation budget from £163.7 M (1980/81) to £149 M (1981/82) (outturn prices), not accounting for real decline as a result of inflation (68).

The government has not, in fact, totally eschewed the latter two routes, ie. further mandatory measures and further incentives, contained in the Green Paper. It has affected new standards and legislation: the domestic thermal standards of the Building Regulations have been increased and the Energy Conservation Act (1981) provides powers to set energy efficiency standards for all new space and water heating, and gas appliances. The government has even provided some financial incentives for energy conservation. Modification (and increased allocations in 1981 and 1982) have occurred in the Home Insulation Scheme, in attempts to increase its effectiveness. The government has also made money available to encourage the formation of local energy groups and local insulation schemes. But the government does not want the effectiveness of its energy conservation policy judged solely on the amount of money it allocates for it.

"While long catalogues of government spending activities may make some politicians feel that they are 'doing something' they are not the most effective way of achieving energy efficiency." (69)

This gives rise to the question, what is the most effective way of achieving energy efficiency?

In the government's view, the most effective way lies through price realism and a positive information campaign. It has consistently espoused the need for realistic pricing of fuels throughout its term in office, and has stuck very close to this principle - at least for the domestic consumer. The same message to industry has been tempered by fuel pricing concessions in the 1981 and 1982 budgets. For any government this would represent a difficult and unpopular position, and the present government has been recently congratulated by the ACEC for sticking to it (70).

Yet within the same report, the ACEC were not 'convinced that our present national programmes are adequate' (71). This view has been echoed in other recent reports.

"The fact that there were still so many cost-effective measures to be undertaken, such as draught-stripping and loft insulation was thought to be in itself to be an indication of failure." (72)

"The conservation strategy of 'prices plus information' (at the present level) is therefore only effective up to a point. It is clearly not sufficient as it stands to encourage the fullest response by industry." (73)

A fall in final consumption however, of approximately 11% has occurred since 1979, though the government claims that no more than a third of this is the result of its energy conservation policy.

It may be that the present pricing policies are not only inadequate but also counterproductive, working against the government's objective of reducing public expenditure.

"The government was saving money in the current financial year by not supporting investment in energy conservation, but was thereby incurring further increases in expenditure. The estimated annual expenditure on heating allowances of all kinds in 1981/82 is £240 M compared with £110 M in 1979/80." (74)

Since 1979 changes in eligibility for heating supplements have reduced the numbers eligible. With its emphasis on containing public expenditure the government may shortsightedly view this as a small saving compared to the cost of carrying out loft and cavity wall insulation, draught-stripping and double glazing on all dwellings in need of treatment, estimated by government as £18 billion (75).

At the end of the previous section three themes were delineated for their influence on energy conservation - energy policy was supply orientated, that it was subservient to macro-economic policy and thirdly, the association between energy conservation and hardship. While these

three themes have endured there has been a change. Whereas in past policy formulations they were implicit, and this was also generally the case with the Labour government, under the Conservative government the first two have very much become explicit features and in consequence have preserved the existence of the third. One of the declared reasons for the proposed nuclear power expansion programme is the possible non-achievement of energy conservation. The Home Insulation Scheme allocation was reduced expressly by the government in its pursuit of public expenditure reductions. The message that energy costs and energy efficiency are of vital concern to industry in its attempts to regain competitiveness is repeated regularly by government. These views have shaped the central area to the present government's energy conservation policy - energy pricing.

The message of realistic pricing has made an impact on energy consumption behaviour. 'A significant statistical relationship appears to exist between energy consumption and energy prices' (76). The fall in gasoline consumption last year has been attributed to its high price. Lower fuel demand as a result of raising the price may not only be indicative of increased efficiency of use or reducing marginal consumption, as predicted by neo-classical economics, but may also signify an increasing incidence of fuel hardship - self denial, as opposed to decreased wastage, because one's income will not cover the costs of providing the basic standards of living. Being denied an appropriate level of thermal comfort because of an energy conservation policy based on realistic pricing would not fall within the government's definition of energy conservation of maintaining standards, but at a reduced energy input. The principle of realistic pricing is not in dispute. Pricing however, is only one of the competing messages availing itself to the public. UK self-sufficiency, the world oil glut, fluctuating petrol prices, and the high profits recorded by the fuel industries all detract from the need to use energy more efficiently, as does the technological optimism associated with various industries. Whether pricing by itself, or backed by a positive information campaign, will overcome the competing signals and obstacles to conservation is disputed. The present government believes that it will.

3. Energy conservation as an issue

A chronology of the government's energy conservation measures since 1973 (see Appendix 1) shows neither a paucity of initiative nor a lack of diversity in approach. The measures span a range including exploitation, information, advice, incentives, legislation, standards and R&D; involving both voluntary and mandatory actions; and affecting industry, transport and domestic sectors of the economy, and the activities of both, local and central government. An impressive sounding array, but given the magnitude of events in 1973, and their reinforcement in 1979, should this necessarily be unexpected?

A. Downs' issue-attention cycle (77) would argue not.

The issue-attention cycle charts the rise and fall of public concern with an issue through

Pre-problem stage. the issue exists but has not yet captured much public attention. Experts or interest groups though, may already be alarmed by it.

Alarmed discovery. The public's attention is suddenly focussed, and with it, the public's enthusiasm to overcome the problem.

Committees are set up, studies made and programmes initiated.

Realisation of cost. Whether economic, social or political, the cost involved in solving the problem is usually very high.

Decline of public interest. With failure to solve the problem, boredom, discouragement or suppression set in.

Post-problem stage. 'A prolonged limbo - a twilight realm of lesser attention or spasmodic references of interest' (78).

Though the issue-attention cycle is concerned nominally with public interest, government is inextricably involved. Government departments are engaged in research, as well as contracting out research, for the purposes of fulfilling their responsibilities and predicting future trends. The government also provide funds for the research councils, the universities and other organisations. Its philosophy as regards research, backed up by the threat of the withdrawal of funds, can directly influence the areas which may be pursued and encouraged. When an issue leaps into the public eye the cry is invariably for the government (or council) to do something. Parliament is the sole body vested with the power to pass legislation and to change existing laws. Major expenditure incurred in the rectifying of a situation often comes from

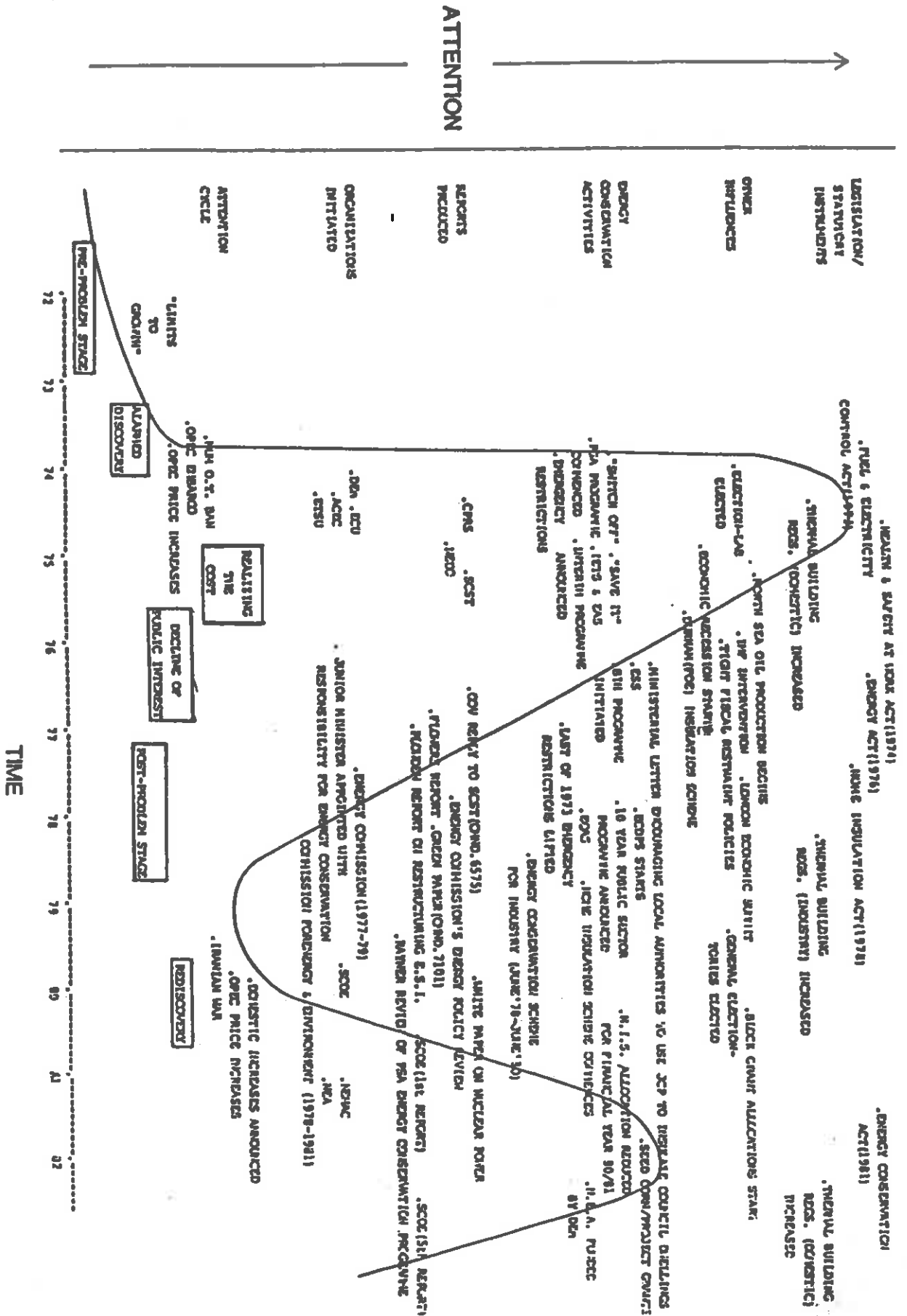
the public purse (ie. the Treasury). The government, itself, may 'pay' the political cost of failing to take appropriate measures, or taking unpopular ones. The 'public' invariably focusses on short-term, if not instant, solutions. Yet, these are not necessarily compatible with the best long-term interests of the country or the individual. Ongoing evaluation and modification of programmes and research, may be needed long after an issue has disappeared from view. While public concern may not directly determine the government's policy response it will have an effect.

It is not inconceivable that the government may also be able to manipulate public reaction for its own purposes. A characteristic of the issue-attention cycle is the lack of a fixed time period for its stages. Rooted as the cycle is 'both in the nature of certain domestic problems and in the way major communications media interact with the public' (79) the stages are variable and open to influence. Undoubtedly the attitude adopted by government will be one such influence. This role has been acknowledged by government in attempting to lead by example with its own PSA programme, by providing the right price signals, and in supporting these with its publicity campaigns.

A chronology of energy conservation and other influences is combined with the issue attention cycle in figure 3.1. Though a subject element must be involved in applying the issue attention cycle to any issue, the government's response cannot be considered inconsistent with that expected by the cycle. Concern with energy consumption had existed prior to 1973 (as seen previously). The government had even been spurred into taking action on its own estate, and increasing indigenous energy production in the face of rising oil prices in the 1970-2 period. No attempt was made however, to implement, or impose, a national campaign involving the behaviour of the general public. This lack of willingness disappeared with the events of 1973.

The circumstances dictated an immediate reaction, thus the emergency measures - eg. the three-day working week, and the Fuel and Electricity Control Act 1973 - to meet the crisis. These measures enabled the situation to be weathered, but the Heath government paid the political cost for the economic and social disruption caused to the country, with its election defeat in February 1974.

Figure 3.1. Energy conservation and the issue attention cycle



The incoming Labour government was to find, despite settling the miners' strike, that business could not return to 'as usual'. The higher price of oil and coal, and as a result, electricity, ensured that. Nor was energy conservation going to provide a cheap alternative. A consensus emerged, arising out of DEN, other newly appointed bodies, and studies instigated by the government and others, that energy conservation offered a significant potential. To be realised, a comprehensive energy conservation programme would require more than several cursory technical adjustments, supported by a few mandatory controls. Energy was too fundamental a component in society for structural changes to occur through superficial remedies.

By the time the 'Interim package' was announced circumstances had changed - the 'oil crisis' had passed, North Sea oil production had begun, natural gas was increasing its market penetration, the nuclear power industry had received a government commitment for the SGHWR, while new money was being invested into the coal industry. Aggregated, these circumstances signalled energy self-sufficiency on the near horizon.

As far as the government was concerned the urgency had disappeared from the issue, and no directly identifiable successor to the 'interim package' was ever forthcoming. On the contrary, measures introduced, and publicly acceptable, during the crisis, were explicitly recognised as not being acceptable in the changed circumstances. Such a decline in public support for energy conservation was cited by government as one of the reasons for the replacement of the Fuel and Electricity Control Act (1973) by the Energy Act (1976). By June 1977 the last of the measures introduced as a result of the events in 1973, the speed limit restrictions, was rescinded.

Short-term measures should give way as a long term programme is developed and implemented. Increasing the thermal building regulations under the Public Health Acts, and the enactment of Section 3 of the Health and Safety at Work Act (1974) (allowing the building regulations to be amended specifically for energy conservation purposes which was not the case under the Public Health Acts) were a part of this long-term strategy, as was the requiring of applicants for Home Improvement Grants to install loft insulation. Yet these measures would be only of marginal significance. New housing, all that is affected by the Building Regulations, only represents an approximate 1% of the total housing stock in any given year - 70% of the dwellings existing in the year 2000 will

have been constructed prior to 1973. Given this, a more effective strategy would be to concentrate on upgrading existing dwellings. While this reasoning was reflected in the inclusion of loft insulation under the Home Improvement grants, lofts represent only 25% of a house's total heat losses, compared to 33% through walls. Further the eligibility requirements of the Home Improvement Grant limited its availability to a small section of the existing housing stock. The government however did not accept, or even recognise, a need to commit itself to funding a major energy conservation investment programme. This was clearly stated in its reply to the SCST's report.

At the time this approach was expedient. The country was facing serious financial problems culminating in 1976 with the intervention of the IMF and its loan to the government. Amongst the conditions attached to the loan was the curtailment on public expenditure. An energy conservation investment programme would have increased public expenditure, at least in the short term. Refusing to accept the need for such a programme made it that much easier for the government to stay within the IMF's conditions, while the North Sea oil bonanza and its attendant publicity defused the public urgency for a major conservation programme.

The funding for energy conservation that was forthcoming in December 1977 represented the kind of programme that the SCST and the ACEC had been calling for in 1975. Its appearance then would have been wholly appropriate with the times, and in keeping with the issue-attention cycle. It was not necessarily out of place in 1977; public interest may wane, but efforts set in motion often continue, possibly to greater effect. DEN, given its establishment only shortly before the 1973/74 crisis had ended, could hardly have been expected to be the country's immediate salvation. By 1977 there had been an easing of the public expenditure constraints. Yet the programme does not appear to have arisen out of the routine activities of DEN - the ACEC had been asked by the Secretary of State in 1977 to prepare urgently a major conservation package for immediate implementation. Their recommendations formed the basis of the 12-point package. But if not from DEN, where did the impetus come? A surmise would be that the government wanted to be seen to be taking a significant lead after its unambiguous commitment at the 1977 London Summit to pursue energy conservation.

In passing through the issue-attention cycle, the decline of 'public interest' and 'post-problem' stages do not represent the eradication of

the problem. Nor do they signal a return to the 'pre-problem' stage. The relationship between the issue and the public may alter; the public may become sensitised. 'Any major problem that once was elevated to national prominence may sporadically recapture the public interest' (80). With the 1979 oil price rises energy returned to the fore, only to meet a new government.

If the government's response was different, so too were the nature of the events encountered. No supply disruptions occurred in the UK (though they did occur elsewhere). If they had, their impact would have only been marginal. Government machinery existed to deal specifically with energy matters, long term programs were in place and most significantly, in 1979 the UK was within a year of being self-sufficient in its oil production. Instead of introducing emergency measures, or further preaching the need for energy conservation (the need had already been established) the government saw its position as reinforcing the message through further price increases backed by information, advice and publicity.

The target for the government's publicity campaign has largely been the domestic consumer (see table 3.1) - domestic space heating accounts for an approximate one-fifth of the UK's delivered energy consumption. The message has largely been one of 'Save it'. If only 10% of someone's behaviour can be directly attributable to his or her beliefs and attitudes (81) then the emphasis in the publicity campaign may be misplaced.

The issue attention cycle would indicate that the public would be most susceptible to exhortation during the 'alarmed discovery' stages. Short-term behavioural changes, whether enforced or voluntary, resulted in electricity demand (the 'fuel' the government was most concerned about) declining by 31% during the 1973/74 crisis, compared with the equivalent data of the previous year. Though this reflected the abnormal circumstances of the period, and could not be maintained, no such dramatic decline took place with the 'rediscovery' of energy in 1979.

As a shift was needed in the type of conservation measures to account for the changing relationship between energy conservation and the public, so too was a shift needed in the type of publicity. Since 1978 exhortation aimed at industry has been backed up by the ECDPS, which not only provides finance for energy conservation projects, but also their monitoring, so that

TABLE 3.1. Energy conservation publicity campaign: 1974-1982 (Outturn prices)

Year	Domestic Consumer	Industrial Consumer	Motorists	Opinion Formers	Education	Total
1974/75	1,025,140	231,360	174,340	-	-	1,430,840
1975/76	2,622,910	541,700	61,000	258,530	-	3,484,140
1976/77	693,900	208,800	-	-	-	902,700
1977/78	1,335,935	413,750	3,280	-	-	1,752,965
1978/79	951,133	522,523	688,118	132,800	-	2,294,574
1979/80	1,245,050	819,000	65,566	-	100,000	2,229,616
1980/81	3,135,700	216,850	112,150	550	21,700	3,531,950
1981/82	3,035,250	467,400	-	7,550	11,100	3,521,300

Table compiled from information provided by DEn in personal correspondence.

the results can be disseminated. While this has begun to feature in the government's publicity campaign with the recent shift in slogans from 'Save it' to 'Make the most of it', it does not provide the consumer with the means to do so.

The problem is that it is not enough just to tell the consumer, or even show him, how to save energy, however cost-effective the measure, if the initial investment is not available. High fuel prices do result in reduced energy consumption, through self-denial and disconnections, as well as encouraging more efficient consumption. Concern with the social consequences of the effects of this aspect of the government's energy conservation policy has been responsible, at least partly, for the growth of the 'Fuel Poverty' movement.

Instead of building upon the December 1977 package, to overcome structural obstacles to energy conservation, the government has been allowing the package to lapse. Much of the package had been allocated funding only for the initial four years and has not been renewed in the government's effort to reduce public expenditure. In this pursuit the government appeared to misjudge the level of public interest for energy conservation in 1980 when it halved the Home Insulation scheme allocation. The government's position was that the 1980 allocation realistically reflected the level of up-take of the grant in its previous years of existence. The grant, however, had not been energetically sold (82), and much adverse publicity and criticism, including some leaked from within DE, resulted. In 1981 the government restored the scheme's allocation and has increased it annually since.

It is a red-herring to compare increased investment on energy conservation directly with expenditure on nuclear power (83). The government though has stated that one of the reasons for its nuclear power expansion programme is as security against the non-achievement of potential savings in energy consumption resulting from conservation. Against this concern the government's lead has been far from unambiguous. Unlike Labour, the Conservative government has admitted its energy conservation policy has been manipulated:

"The allocation of resources to the homes insulation scheme necessarily reflects the government's continuing policy to restrain public policy". (84)

Reduced energy consumption has led to increased fuel prices so that the nationalised fuel industries can meet their government-determined

investment returns. Massive British Gas profits, the result of government-directed fuel price increases, have been recouped through the Gas Levy and set against public expenditure, rather than being reinvested. By not making major investments, or committing public expenditure, or displaying urgency with the issue of energy conservation, the government is ensuring that its potential does go unrealised, and therefore, providing self-justification of its nuclear power programme. It is much easier to state the conservation is one of the three central elements of its energy policy than it is to achieve.

4. The effect of energy conservation policy

With energy conservation 'the real test is the results that are achieved not the scale of government expenditure or activity' (85). The government has quite legitimately pointed this out. Straight-forward comparisons between 1973 and 1981 will allow hollow claims to be made regarding the impact of energy conservation. Primary energy* consumption has fallen from a peak of 88,301 M therms in 1973 to 78,782M in 1981 (an approximate 11% decline). Over 2.8 M dwellings have received loft insulation through government activity and policies. The number of staff working on energy conservation, and its importance within DEn, has increased since 1974. From their inception in 1976 Energy Manager groups now span the country, numbering over 70, and encompassing 5,000 energy managers drawn from industry, commerce and local government. Yet, these comparisons do not present the whole story.

If comparisons are to be made then the similarity between events must be ascertained. This section will examine several changes that have occurred over the past decade. By attempting to adjust for these changes the intention is to arrive at a common basis for comparison so as to examine the impact, if any, that energy conservation policy has had on these sectors. The three areas to be examined will be system efficiency, Industry and domestic sector energy use.

*'Primary energy' in this paper differs slightly from the definition in DUKES. It excludes fuel stocks use for non-energy purposes. This equates with the term 'total inland energy consumption' in DUKES. 'Delivered energy' will be directly comparable with 'total energy supplied to final consumers' in DUKES.

This analysis does not consider changes that have occurred in the GDP/energy ratio. With an unchanging industrial base reductions in this ratio would indicate the economy becoming more efficient through the replacement of out-dated plant and changing practices. The situation over the last decade can hardly be described as unchanging, and as a result, reductions in the ratio may be also indicative of less energy intensive industries replacing more intensive ones, but producing the same level of output.

Energy use will be examined at the sectorial, rather than the end-use level. This is not intended to deny the importance of energy conservation policy on the end-user, but to reflect that government policy is generally aimed at the various sectors rather than individual behaviour. Individual decisions on energy use are considered, by the present government, to be left to the interaction between the individual and the market mechanism, ie. price signals. In this context the government sees its role only as ensuring the correct information is passed to the market. The data emphasis then, will be with aggregated sector totals of delivered energy rather than useful energy. The difference between the two signifies the efficiency by which plant or appliances convert delivered energy into useful work in its performance.

It will be seen that even after the adjustments reductions in energy consumption have occurred, though the calculated figure is dependent upon the base year used.

4.1 Changes in system efficiency

System efficiency represents the percentage of primary energy that is made available as delivered energy to final consumers. In other words, it provides a measure of generation, distribution and conversion losses in the energy system incurred in turning primary energy into a consumable product.

Changes in system efficiency hold one of two consequences when attempting to determine the impact of energy conservation. An increase in the system efficiency would allow primary energy consumption to be reduced without any changes in the consumer's consumption behaviour. With a decrease in the system efficiency primary energy consumption would have to increase to permit the same level of final consumption. In table 4.1 primary energy consumption and delivered

Table 4.1.

Year	(1) Primary Energy Consumption (million therms)	(2) Delivered Energy (million therms)	(3) System efficiency (col 2 + col 1 x 100%) (%)
1971	82,741	57,001	68.9
1972	84,432	58,041	68.7
1973	88,301	61,034	69.1
1974	83,839	58,284	69.5
1975	80,421	55,876	69.5
1976	81,709	57,327	70.2
1977	83,680	58,533	70.0
1978	84,023	59,208	70.5
1979	87,766	61,739	70.3
1980	81,109	56,554	69.7
1981	78,782	54,920	69.7

Cols. 1 and 2 - DUKES, 1981; DEn, HMSO; and DUKES, 1982; DEn, HMSO.

Table 4.2.

Year	(1) Derived Primary Energy Consumption (million therms)	(2) Derived Delivered Energy (million therms)
BASE YEAR 1973		
1974	84,347	58,621
1975	80,862	56,199
1976	82,962	58,239
1977	84,707	59,295
1978	85,685	60,408
1979	89,347	62,811
1980	81,844	57,045
1981	79,479	55,397
BASE YEAR 1979		
1980	80,447	56,071
1981	78,122	53,904

energy, and the corresponding system efficiency, since 1971 are set out. Generally, over the last decade, a gradual increase, resulting mainly from improved electricity generation efficiency, has occurred.

By using the system efficiency of a chosen base year, and working back from the delivered energy figure, it is possible to calculate a derived primary Energy Consumption. Assuming that the percentage of primary energy supplied, as delivered energy remains unchanged from the actual data, then a derived delivered energy total can also be calculated. (The calculations are set out in appendix 2.) Such derived totals have been calculated for two base years (1973 and 1979) and the results shown in table 4.2, and plotted against the actual totals in figure 4.1. If changes in the system efficiency had not occurred, it can be seen that the 1973 peak primary energy consumption would have been surpassed in 1979. For final consumption this had occurred in actuality.

Comparing actual with derived reductions between 1973 and 1981 energy consumption presents a further difference. The reductions in both derived totals are less than the actual ones - the derived primary energy reduction being 10%, compared with 10.8%, and the derived delivered energy reduction being 9.2% compared with 10% (see tables 4.3 & 4.4). These figures will be employed in later calculations determining the overall reduction attributable to energy conservation.

Table 4.3. Reduction in primary energy consumption

Between		Actual Change	% change	Derived Change	Derived % change
Base Year	Year				
1973 and 1981		-9519	-10.8	-8822	-10.0
1979 and 1981		-8984	-10.2	-9644	-11.0

Though these derived reductions indicate that approximately 10% of the reduction in energy consumption is attributable to improved system efficiency, the results are dependent upon the base year considered. When 1979 is used instead of 1973 the result is the opposite. Derived Primary and Delivered energy are greater than the actual figures: 11% compared with 10.2% and 12.6% compared with 11% respectively (see tables 4.3 & 4.4). The system efficiency for both 1980 and 1981 had declined from 1979, whereas they still represent improvements on 1973.

Figure 4.1. U.K. energy consumption (actual and derived) 1971-1981

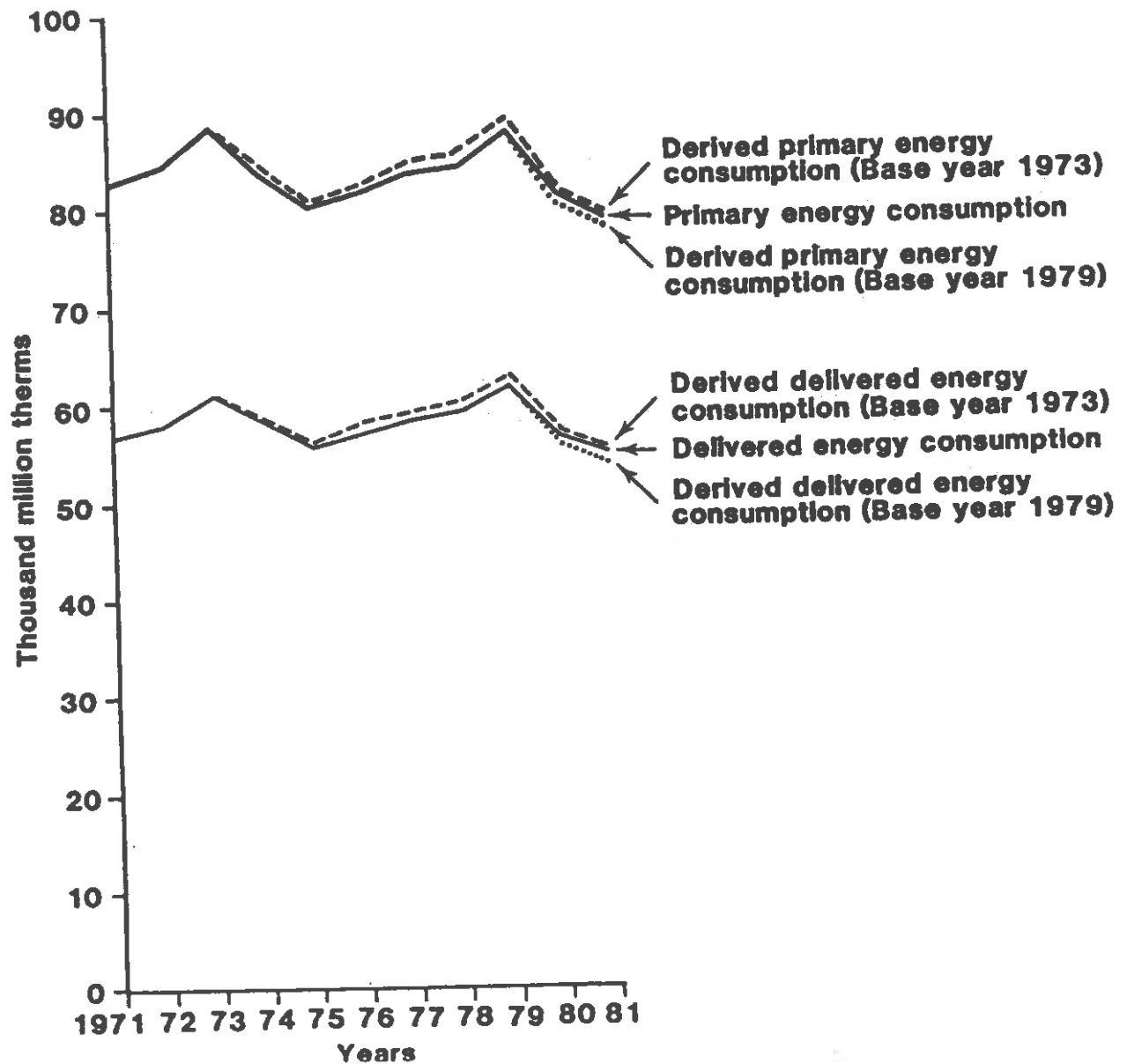


Table 4.4. Reduction in delivered energy

Between (years)		Actual Change (m therms)	% Change (%)	Derived Change (m therms)	Derived % Change (%)
Base Year	Year				
1973 and 1980		-4480	-7.3	-3989	-6.5
1973 and 1981		-6114	-10.0	-5637	-9.2
1979 and 1980		-5185	-8.3	-5668	-9.1
1979 and 1981		-6619	-11.0	-7835	-12.6

These results illustrate one difficulty encountered when attempting to determine the effect of energy conservation. Another difficulty arises with its definition, and the way energy conservation is defined is crucial to the assessment of policy. If energy conservation is equated solely with demand management then system efficiency is an incidental factor. If such policy is concerned with improving the overall efficient use of resources within the energy system then system efficiency is a relevant matter. This distinction between supply-side and demand may be artificial but has had a very tangible outcome. The CEBG, and its predecessor, have concentrated on generating electricity at the lowest cost rather than achieving the highest efficiency of energy resource use, citing their obligation under the 1947 and 1957 Electricity Acts. The commissioning of larger generating units, and the resultant closure of smaller power stations, has been the manifestation of this concern. Continuation of such a trend will prove to be to the detriment of the overall efficiency of energy use as it will exclude CHP becoming a viable option.

4.2 Changes in industry

In 1973 oil price rises sparked an industrial recession throughout the world. In the U.K. industrial output only recovered its 1973 level in 1978 and 1979 when further price rises, and the country's new economic regime, combined to reduce it again. The result has been changes in industry's composition and its energy consumption. As these changes have coincided with industry's increasing concern with energy conservation the impact of the latter has been obscured.

Industry's energy consumption has been falling since 1973 (see figure 4.2), as has its share of final energy consumption (table 4.5 and figure 4.3). It still represents, however, the largest single component in the U.K.'s Final Energy Consumption. Marked changes in industry's consumption therefore are likely to have an appreciable effect on the U.K.'s final consumption. This can be seen in table 4.6 and figure 4.4. The magnitude of industry's reduction has had the nett effect of generally pulling the Index of Total consumption below its 1973 level when the other three sectors have been above their 1973 level. A correlation analysis between changes in industry's energy consumption and the country's final consumption produces a correlation co-efficient of 0.77 and a co-efficient of determination of 0.60. In other words 60% of the change in the U.K.'s final consumption of this period can be accounted for by changes in industry's consumption.

Industry's falling energy consumption has not been reflected as markedly in the Index of Production (see table 4.7). Manufacturing has been particularly hard hit, declining relatively, from accounting for 70.7% of industry's total output in 1974 to 62.5% in 1981, and absolutely by 16% over the same period. Total industrial output has not declined as significantly for two reasons - a shift has been occurring from a manufacturing to a more service orientated economy, and secondly, the dramatic increases in the mining and quarrying sector. The latter reflects the increasing production of North Sea Oil since 1975 (see figure 4.5 and table 4.7). These factors will obscure any conclusions about energy efficiency to be drawn from GDP/energy consumption ratios.

Figure 4.2. Energy consumption (total industry and iron and steel sector) 1971-1981

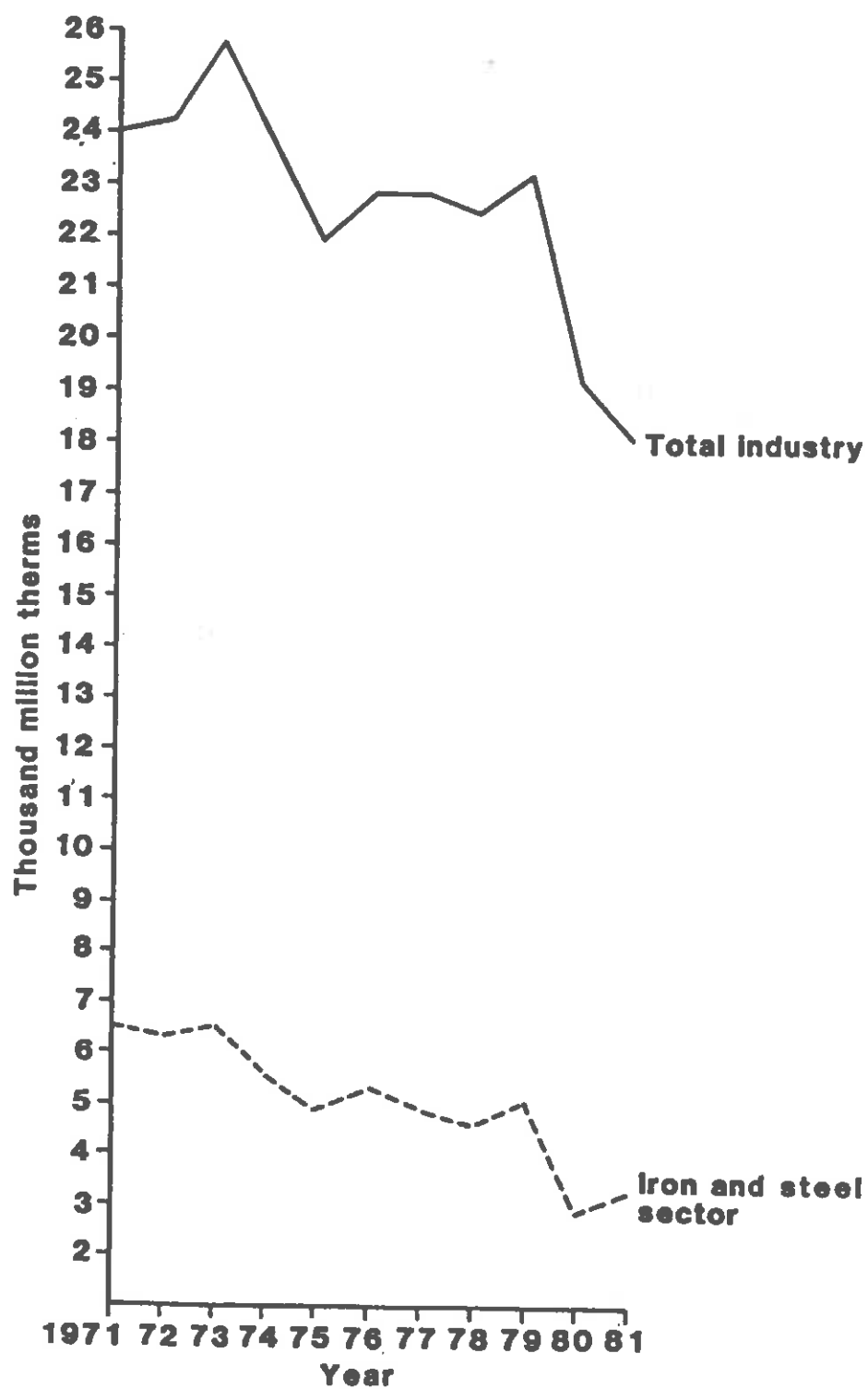


Table 4.5. % of final Energy consumption by sector

Year	Industry	Transport	Domestic	Other
1971	42.2	20.4	24.8	12.6
1972	41.8	20.8	24.8	12.6
1973	42.3	21.1	24.4	12.2
1974	40.8	21.3	25.9	12.0
1975	39.3	21.9	26.3	12.4
1976	39.8	22.3	25.4	12.6
1977	39.0	22.3	25.7	13.0
1978	37.9	23.2	25.9	13.0
1979	37.6	22.8	26.7	12.9
1980	33.9	24.9	28.0	13.2
1981	32.9	24.8	28.8	13.5

Table derived from DUKES, 1982; DEn, HMSO

**Table 4.6. Energy consumption indexes of sectors (1973 = 100)
+ final consumption**

Year	Industry	Transport	Domestic	Other	Final
1971	93.3	90.4	94.8	96.1	93.4
1972	94.1	93.9	96.5	98	95.1
1973	100	100	100	100	100
1974	92.2	96.4	101.1	93.9	95.5
1975	85.1	95.2	98.6	93.3	91.5
1976	88.6	98.8	97.5	97.2	93.9
1977	88.5	101.4	100.9	102.3	95.9
1978	87.1	106.6	103.0	103.0	97.0
1979	89.9	109.0	110.6	107.2	101.1
1980	74.2	109.6	106.0	100.3	92.7
1981	70.2	105.8	105.9	99.5	90.0

Table derived from DUKES, 1982; DEn, HMSO

Figure 4.3. % of final consumption by sectors (1971-1981)

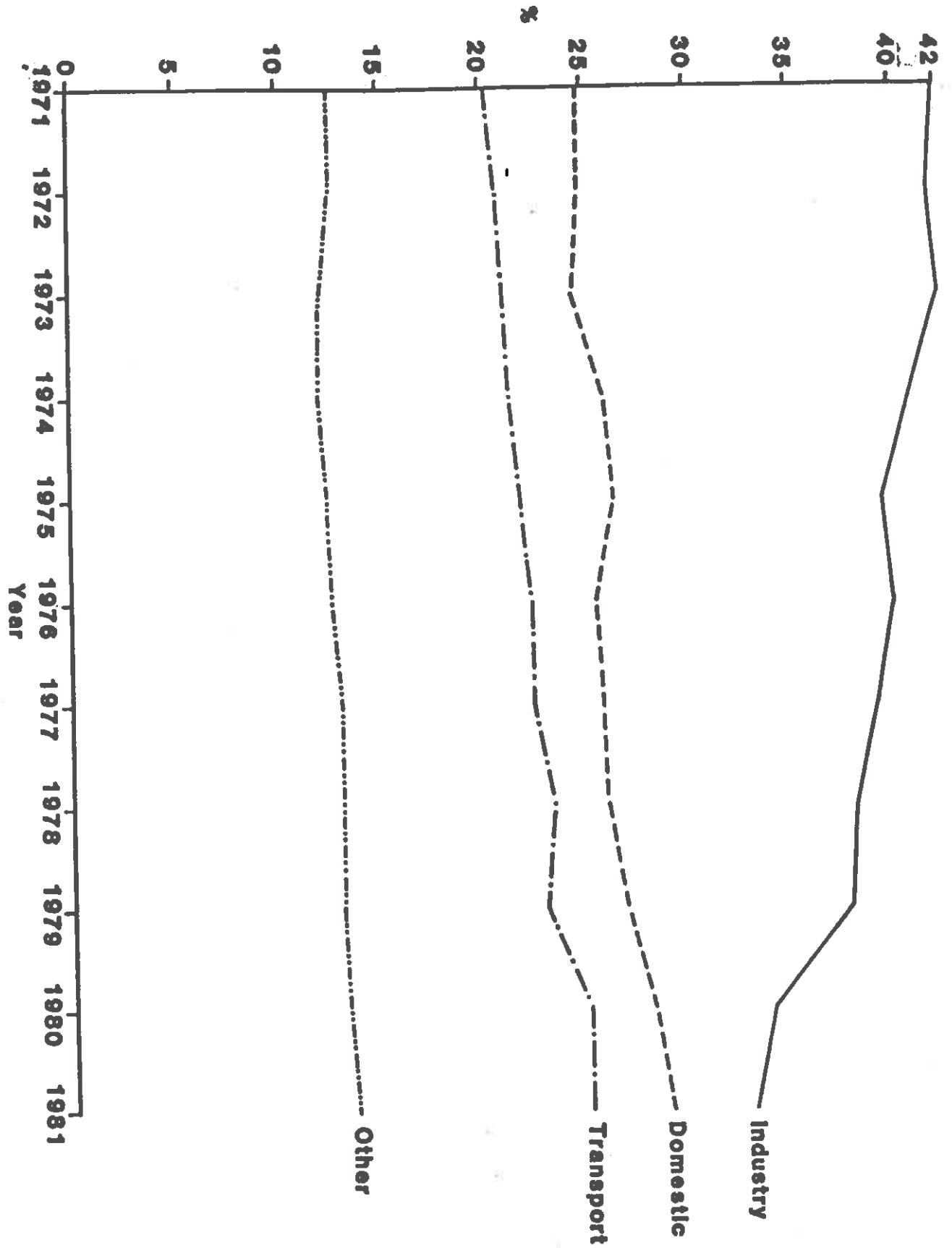


Figure 4.4. Index of energy consumption by sectors (1973 = 100)

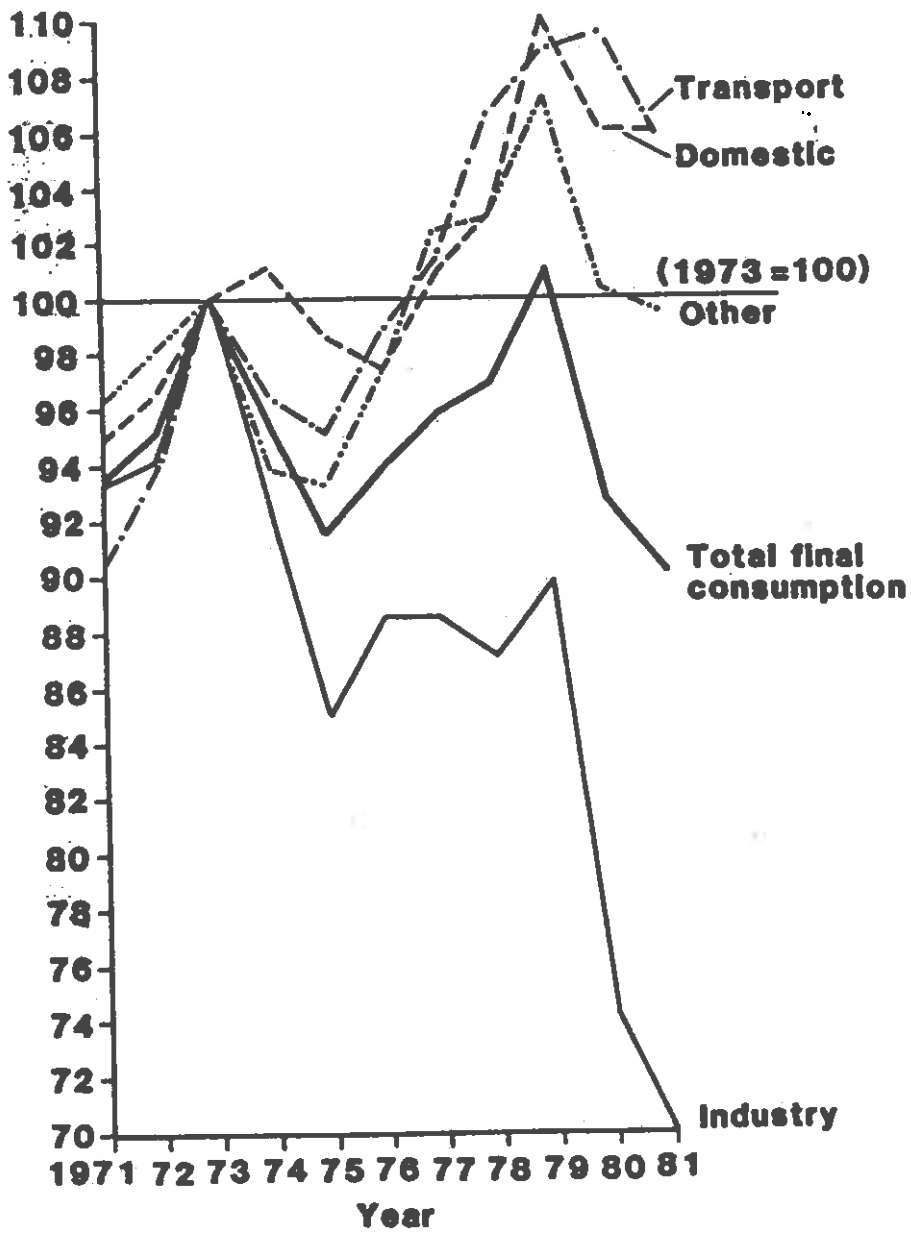
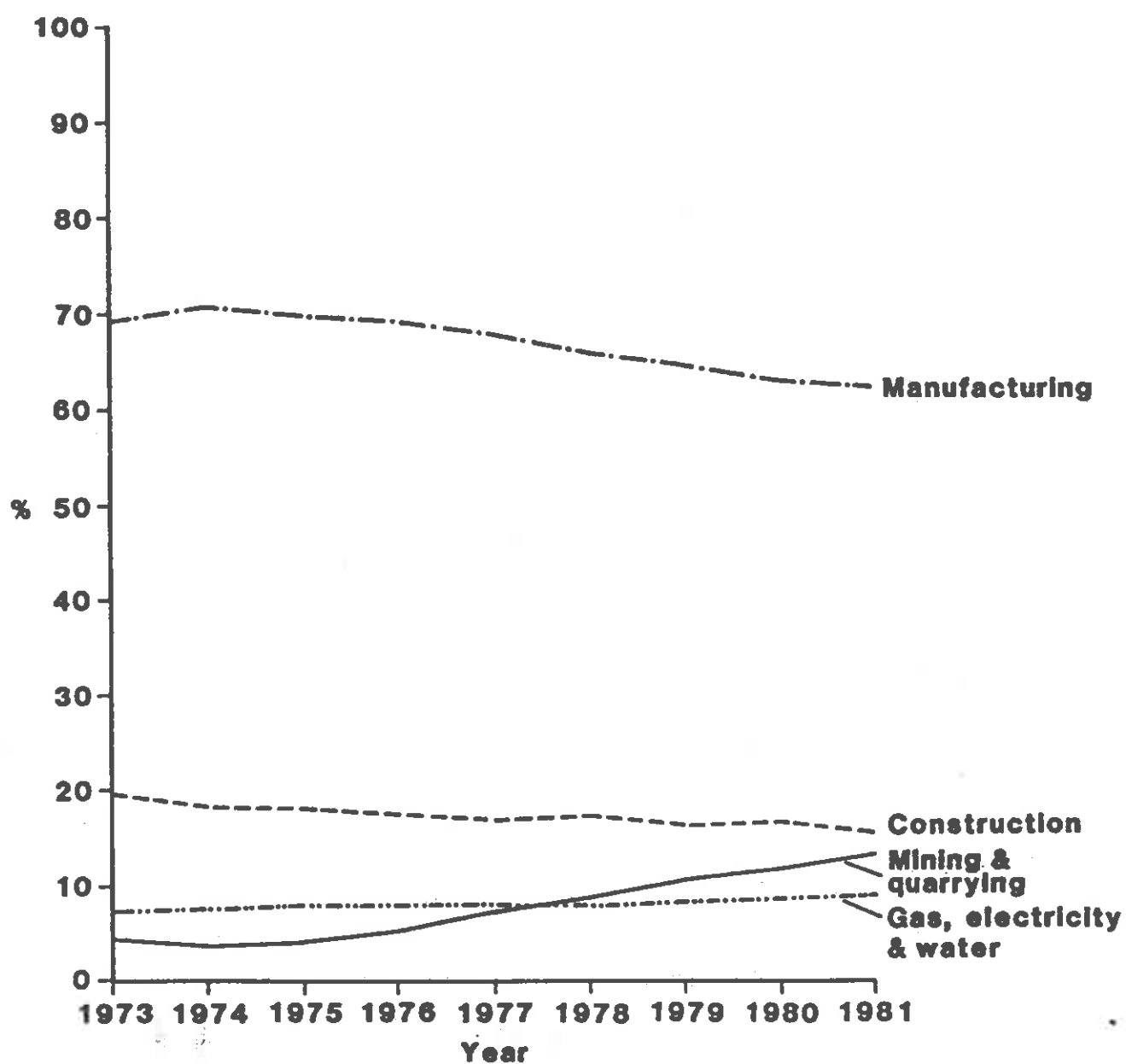


Table 4.7.

1975 weights YEAR	MINING AND QUARRYING (41)			MANUFACTURING (697)			CONSTRUCTION (182)			GAS, ELECTRICITY AND WATER (80)			ALL INDUSTRY (INDEX OF PRODUCTION) (1000)		
	INDEX	% TOTAL		INDEX	% TOTAL		INDEX	% TOTAL		INDEX	% TOTAL		INDEX	% TOTAL	WEIGHTED TOTAL
1973	110.0	4.1		108.4	69.1		117.8	19.6		98.6	7.2		109.4		1094
1974	89.7	3.5		106.6	70.7		105.6	18.3		98.5	7.5		105.1		1051
1975	100	4.1		100	69.7		100	18.2		100	8.0		100		1000
1976	126.1	5.1		101.4	69.3		98.6	17.5		102.3	8.0		102.0		1020
1977	188.4	7.3		103.0	67.8		98.2	16.9		106.4	8.0		105.9		1059
1978	233.1	8.7		104.0	66.0		104.9	17.4		109.7	8.0		109.9		1099
1979	295.7	10.7		104.4	64.7		101.3	16.3		116.1	8.3		112.6		1126
1980	301.3	11.8		95.5	63.2		95.9	16.6		113.0	8.5		105.4		1054
1981	319.7	13.1		89.6	62.5		84.9	15.5		112.9	9.0		100.1		1001

Indexes taken from Economic Trends, July 1982, Central Statistical Office, HMSO, London.

**Figure 4.5. Annual % of industrial output by major sectors
(1973-1981)**



Between 1973 and 1981 industry's total energy consumption has decreased from a peak of 25,781 to 18,094 million therms - a reduction of almost 30%. While not equating the general decline in manufacturing with industry's falling energy consumption there is one significant factor common to both - the Iron and Steel industry. Its Index of Production has declined from 133.1 (in 1973) to 68.4 (in 1981) with 1975 = 100. With its high energy intensity this drop in production has been reflected in its energy consumption. During the 1971 to 1981 period the Iron and Steel industry's energy consumption has halved (figure 4.3). A correlation analysis between Iron and Steel's energy consumption and industry's total consumption (including Iron and Steel) produces a correlation coefficient of 0.948 and a coefficient of determination of 0.90.

The structural changes that industry has undergone prevent direct comparisons between yearly figures of industry's energy consumption, and final energy consumption in assessing the impact of energy conservation. Undoubtedly energy conservation measures have been implemented in the Iron and Steel, but their significance will be minor in the light of reduced consumption through reduced production. This is likely to reflect the situation throughout industry and therefore, an even smaller percentage of final consumption will be the result of conservation. This has been recognised by the government who only attribute one third of the 11% reduction in final consumption between 1979 and 1981 to the combined effect of energy prices and energy conservation.

To compare the reductions in industry and final consumption the differences that exist between 1973 and 1981 consumption data have to be eliminated. A 'derived industry total' has been calculated by taking the percentage of Final Consumption represented by Industry in 1973 (i.e. 42.3%) as a constant and applying this to the annual Final consumption figures.

This does not assume that Industry's consumption remains constant, but, that it fluctuates at the same rate as Final energy consumption. Neither does it allow for conservation that has been initiated specifically within Industry. An allowance for energy conservation

Table 4.8

YEAR	ACTUAL INDUSTRY CONSUMPTION	DERIVED INDUSTRY CONSUMPTION	DIFFERENCE: (DERIVED- ACTUAL) CONSUMPTION	ACTUAL FINAL ENERGY CONSUMPTION	DERIVED FINAL ENERGY CONSUMPTION
1973	25791	25791	0	61034	61034
1974	23791	24654	863	58284	59147
1975	21953	23636	1683	55876	57559
1976	22827	24249	1422	57327	58749
1977	22815	24759	1944	58533	60477
1978	22454	25044	2590	59208	61798
1979	23175	26116	2941	61739	64680
1980	19147	23922	4775	56554	61329
1981	18094	23231	5137	54920	60057

Table 4.9

YEAR	CORRECTED FINAL CONSUMPTION	CORRECTED INDUSTRY CONSUMPTION	ACTUAL INDUSTRY CONSUMPTION	DIFFERENCE CORRECTED- ACTUAL CONSUMPTION	ADJUSTED FINAL ENERGY CONSUMPTION
1973	61034	25791	25791	0	61034
1974	58621	24796	23791	1005	59626
1975	56199	23772	21953	1819	58018
1976	58239	24635	22827	1808	60047
1977	59295	25081	22815	2266	61561
1978	60408	25553	22454	3099	63507
1979	62811	26569	23175	3394	66205
1980	57045	24130	19147	4983	62028
1981	55397	23433	18094	5339	60736

is made though. It assumes that energy conservation has occurred at the same rate as within Final consumption. By adding the difference between the derived industry consumption and actual consumption to the actual final consumption a derived final consumption can be calculated (see table 4.8).

This series of calculations does not incorporate changes in system efficiency. By starting with the data that has been adjusted for the system efficiency (column 2, table 4.2) the above procedure can be repeated. This time the difference added to the corrected final consumption will be that between the newly derived industry consumption and actual consumption (see table 4.9).

This produces an inputted reduction in energy consumption of 0.5% between 1973

$$\frac{60736 - 61034}{61034} \times 100\% = 0.5\%$$

This is a rather insignificant amount considering the number of measures that have been introduced by government over this time period. On the other hand this total actually represents a long term drop in energy consumption, as opposed to the annual increases occurring prior to 1973.

It was seen in connection with the changes in system efficiency that the percentage reductions were subject to the base year chosen. This proves to be the case with industry changes as well. Repeating the calculations, but taking 1979 as the base year, a reduction of 9.2% in energy consumption between 1979 and 1981 is produced. This is even higher than the present government has claimed (see table 4.10).

Table 4.10.

Base Year 1979					
1979	61739	23175	23175	0	61739
1980	56071	21047	19147	1900	57971
1981	53904	20234	18094	2140	56044

$$\frac{56044 - 61739}{61739} \times 100\% = -9.2\%$$

With both base years the reductions would be greater if industry's energy conservation efforts result in greater achievements than the system as a whole. A smaller achievement would result in these reductions being less. Both have, however, shown that reductions in energy conservation have occurred.

The discrepancy in the reduction produced by the different base years has its roots in the state of industry at the various years. By 1979 industry's share of final consumption was 5% less than in 1973, and its actual energy consumption was lower. To adjust the 1979 data requires a smaller increase than does the 1973 data. It has already been noted that the system efficiency declined between 1979 and 1981, as opposed to the rise recorded between 1973 and 1981.

There is also a further possibility that energy conservation has accelerated since 1979. It would be wrong to attribute this solely to the policies of the present government. As with other indicators on performance (e.g. the economy and unemployment). Some of the credit must be accorded to the previous administration's policies that are only working through the system. This will be seen in the examination of Domestic sector energy conservation policy in the next section.

4.3 Changes in the domestic sector

If energy conservation has accelerated since 1979 is there any other evidence? Returning to figure 4.4 it can be seen that energy consumption in both the Domestic and Transport sectors are higher in 1981 than 1973, but lower than 1979. The fuel price rises brought on by both OPEC, and as deliberate government policy, will be partially responsible for this change. In both sectors, 1979 also marked the first full year of operation for several new government initiatives.

In the transport sector this was the compulsory fuel consumption testing of new cars. This would appear to fulfil a need - a recent survey has indicated that fuel economy was the third highest priority looked for in motor cars (behind reliability and durability, and equal

with availability of spares) (86). It remains though, of marginal significance compared to the potential savings of converting to electric or non-petroleum consuming vehicles.

The more significant measures were introduced in the Domestic sector. The Public Sector Energy Conservation Program (P.S.P.) and the Homes Insulation Scheme (H.I.S.) were introduced to upgrade the thermal standards of existing dwellings. New dwellings were already covered by the Building Regulations' Thermal Standards. These programs were aimed at the estimated two million council dwellings and five million private dwellings (200,000 and 500,000 being their respective annual targets) that were uninsulated. Since their inception in 1978 almost three million dwellings have received loft insulation (see table 4.11).

Table 4.11. Houses insulated under Government programs

Year	Public Sector	Homes Insulation Scheme	Total
1978 ¹	143,000	95,000	238,000
1979	630,000	428,000	1,058,000
1980	452,800	334,000	786,800
1981	185,500	372,300	557,800
1982 ²	106,300	110,900	217,200
Total	1,517,600	1,340,200	2,857,800

¹ The public sector scheme ran for only the last three quarters of 1978, while the H.I.S. ran for only the last quarter of 1978.

² First quarter statistics 1982 only (provisional)

(Table compiled from Housing and Construction Statistics (March 1980, part 2 and March 1982, part 2) DOE, HMSO.)

A modified summary (based on the Financial year, and including allocation and expenditure data) (table 4.12) shows a story of mixed

success. The target for the P.S.P. has been exceeded in each of the financial years while the target of the H.I.S. has never been achieved. The lower target of the former may explain part of this discrepancy, but there are fundamental differences between the two programmes. The P.S.P. is an active programme, the insulation being installed by the local authority as part of its annual works programme. The H.I.S. is passive, relying on householders to take the initiative to apply for the grant. The P.S.P. also installs the insulation at no cost to the recipient, compared to an applicant for H.I.S. grant having to meet part of the capital cost. Both programmes peaked as regards the number of dwellings insulated in the 1979/80 financial year. Since then their paths have diverged - the total dwellings insulated under the public sector programme declining annually, while the H.I.S. total has fluctuated. This is in spite of evidence that the H.I.S. has not been sold to the public particularly effectively to the public. (87)

Table 4.12.

Financial Year	Public Sector Scheme			Homes Insulation Scheme		
	Allocation (£M)	Dwellings Insulated	Cost (£M)	Allocation (£M)	Dwellings Insulated	Cost (£M)
1978/79	32.0 ^a	325,000	14.8	26.8 ^a	241,000	9.4
1979/80	32.0 ^a	685,700	31.9	29.1 ^a	411,800	15.5
1980/81	-1	281,700	17.5	18.0 ^b	303,600	17.1
1981/82 ^p	-1	225,200 ²	*3	28.6 ^b	383,800	25.4
1982/83	-1	?	?	31.4 ⁴	?	?

- ¹ specific allocations to local authorities for energy conservation work was ended.
- ² from the 2nd quarter 1981 specific figures for energy conservation work in Wales no longer collected.
- ³ figures not available until local authority cash outturns are available.
- ⁴ figure includes initial allocation of £27.85M + money allocated to H.I.S. out of March '82 Budget increase of £7.5M.
- p provisional

Table compiled from *Housing and Construction Statistics* (March 1980, part 2 and March 1982, part 2), DOE, HMSO; (a) *Hansard* 23 January 1980, Written Answers, col. 223/4; (b) Government Expenditure on Energy Conservation - a note from the DEN, September 1981, Appendix 25, Select Committee on Energy, 5th Report Session 1981/2, *Energy Conservation in Buildings*, (1982), HMSO.

4.3.1 Public sector scheme

Of the two, the decline in the P.S.P. appears much more dramatic, but this could be understandable. Initially only 2 million dwellings were estimated as being in need of insulation, and over half that total was achieved by the end of 1979/80. Annual reductions must eventually be inevitable. Reductions will also have occurred through the H.I.S. Until November 1979 council tenants were ineligible for a loft insulation grant. The scheme was then modified in order to include them, resulting in 24,200 and 51,800 council dwellings being insulated under the H.I.S. in 1980/81 and 1981/82 respectively (88).

More importantly, the financing of the P.S.P. has also undergone a major alteration. In 1978/79 and 1979/80 each local authority received an allocation within their Housing Investment Programme's (H.I.P.) specifically for energy conservation. If it was not so spent, then it remained unspent. Leftover allocations could not be carried over into the next financial year. The advent of the Block Grant in 1980 changed the allocation system. Money is still allocated for energy conservation when the Rates Support Grant (R.S.G.) and capital allocations are assessed, but then the money is aggregated into a lump sum. Local authorities, as central government has been keen to point out, can then determine their own spending priorities. Theoretically a local authority could spend all its H.I.P. on energy conservation. In practice the evidence suggests that it is less than the allocation, if anything at all. (89)

A quarterly breakdown of dwellings insulated under both the public sector and the H.I.S. is presented in table 4.13. A 4-quarterly time series analysis (to eliminate seasonal variations) was carried out for the public sector programme and plotted against the quarterly figures (figure 4.6). It can be seen that the first quarter of 1980 marked a turning point in the number of dwellings insulated under the P.S.P. Except for the last quarter examined the trend has been steadily downwards. This change coincides with the introduction of Block grants, and the end of the specific energy conservation allocation, from the second quarter of 1980, onwards. Despite this setback local authorities have remained sufficiently concerned with energy conservation to achieve the original annual target. They have shown, however, that they can achieve much more.

Figure 4.6. Dwellings insulated under Public Sector Program (quarterly)

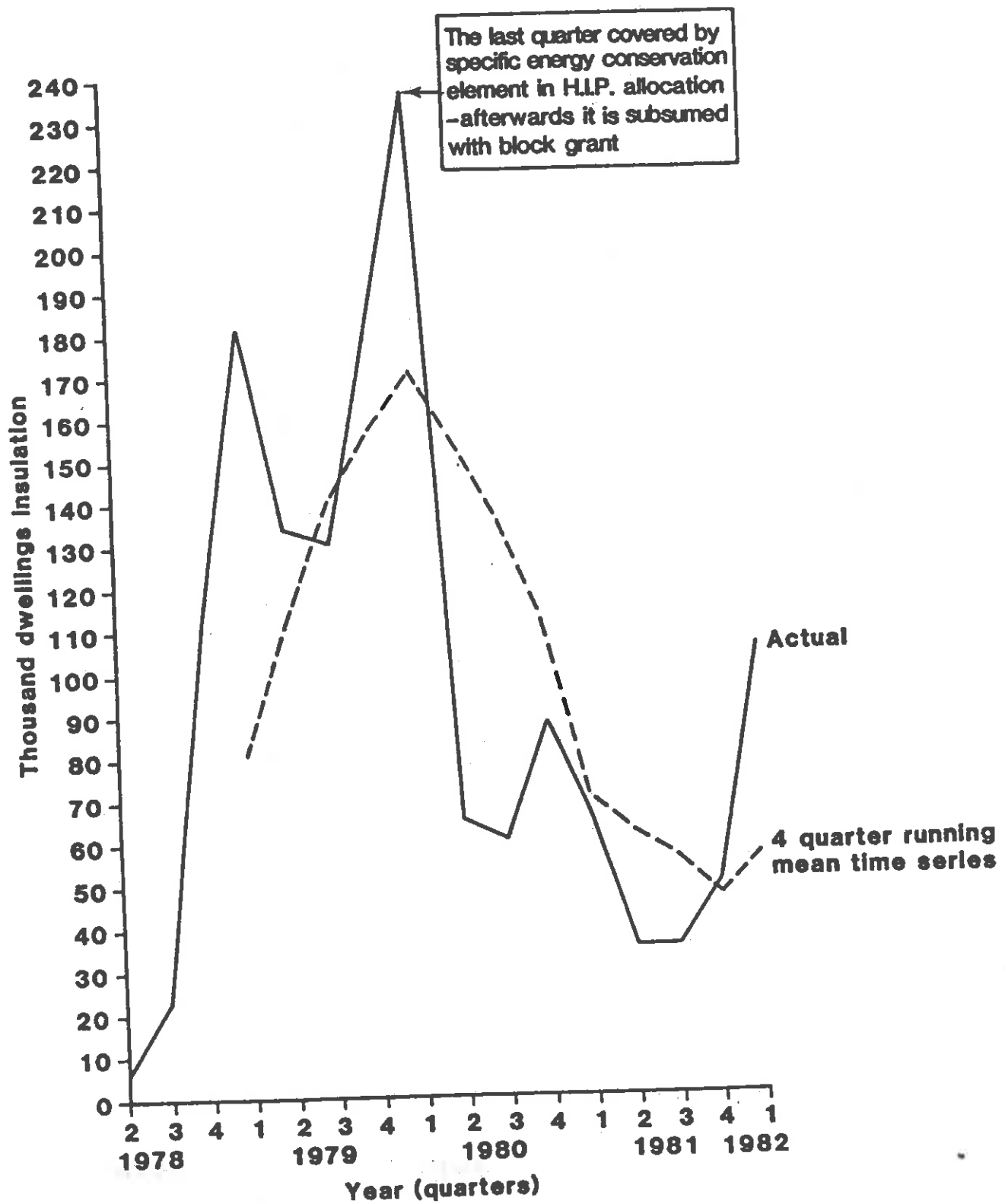


Table 4.13. Dwellings insulated (per quarter) under public sector and home insulation schemes

	Quarter	Public Sector	Home Insulation Scheme
1978	1	-	-
	2	7,000	-
	3	23,000	-
	4	113,000	95,000
1979	1	182,000	146,000
	2	134,000	88,000
	3	131,000	68,000
	4	183,000	126,000
1980	1	237,700	129,800
	2	65,900	68,400
	3	60,700	44,000
	4	88,500	91,800
1981	1	66,600	99,400
	2	34,500	93,900
	3	34,800	79,100
	4	49,600	99,900
1982 ^P	1	106,300	110,900 ^{77%}

^P Provisional

(Table compiled from Housing and Construction Statistics (March 1980, part 2, March 1982, part 2), DOE, HMSO.)

4.3.2 The Home Insulation Scheme

The H.I.S. was introduced because it was believed that market forces would not be sufficient to realise the potential for domestic conservation. Both the Labour and the Tory governments have stated it was never their intention to provide subsidies for activities that would have occurred anyway. The figures would suggest that this subsidisation has happened.

In table 4.14 it can be seen that the largest percentage (43.3%) of uninsulated lofts falls within the lowest social class grouping (DE), with the least (6.3%) amongst the high group (AB). Despite

this large difference, between July 1978 and June 1979, the percentage of the total recipients of grants from each group was almost equal (19% from DE and 16% from AB) (see table 4.15) representing 11% of the AB group eligible, but only 5% of the DE group eligible. The AB groups (not unexpectedly) show the highest ownership of all types of house insulation (table 4.16).

Table 4.14

Uninsulated roofs - by socio-economic class						
(1)	By 000's	Total	AB	C1	C2	DE
	Total	4,789	301	704	1,708	2,076
	Owner Occupier	2,363	243	462	878	780
	Local Authority	1,637	19	125	580	913
	Private Rented	789	39	117	250	382
		4,789	301	704	1,708	2,076
<hr/>						
(2)	By % of total uninsulated stock					
	Total	100	6.3	14.7	35.7	43.3
	Owner Occupier	49.3	5.1	9.7	18.4	16.3
	Local Authority	34.2	0.4	2.6	12.1	19.0
	Private Rented	16.5	0.8	2.4	5.2	8.0
		100	6.3	14.7	35.7	43.3
<hr/>						

(Taken from S.C.O.E. 1981-82 Session, 5th Report "Energy Conservation Buildings", page 208).

Table 4.15. Uptake of insulation grants between July 1978 and June 1979

Social class	% of all those eligible for grant	% of group eligible for grant	between July '78 & June '79	
			% of all those eligible receiving grant	% of all those receiving
AB	14	26	11	16
C1	23	31	12	29
C2	29	27	11	35
DE	34	56	5	19

(Compiled from table 3.3 and 3.4 of National Consumer Council (1980), *Paying for Loft Insulation: a review of the Homes Insulation Scheme 1978*, NCC, London.)

Table 4.16. Ownership of house insulation by social class (1980)

Type	% A B C1 C2 D E					
	A	B	C1	C2	D	E
Hot water tank insulation	95	93	89	85	79	74
Loft insulation	84	82	71	66	55	47
Cavity-wall insulation	16	14	10	8	5	4
Double-glazing	42	35	22	15	8	5

(Taken from ACEC, *Report to The Secretary of State for Energy - 1982*, Energy Paper 49, DEu, HMSO, London.)

During its existence the H.I.S. has been modified

- it has been extended to include council tenants
- the grant was increased to 90% for the elderly
- the grant was increased to a maximum of £65, and then £69, or 66%
- the 90% grant was extended to the severely disabled
- the required thickness of loft insulation eligible was increased to 100 mm.

Except for the last measure all these modifications were introduced to assist with the grant's uptake. Yet, none of these modifications have dealt with the fundamental problem of uptake by the DE social group - namely finding the remaining capital. For social security recipients the DHSS will make one-off payments for lagging the hot-water cylinders, but not for loft insulation.

The H.I.S. only benefits those houses where there is no loft insulation. The presence of any loft insulation whatsoever disqualifies the applicant. This is meant to enable the government to concentrate its limited resources on the most cost-effective measures. The addition of extra layers of insulation is subject to the law of diminishing return. At the same time, however, this regulation is also leaving a vast stock of underinsulated dwellings (see table 4.17).

Table 4.17

(December 1980)

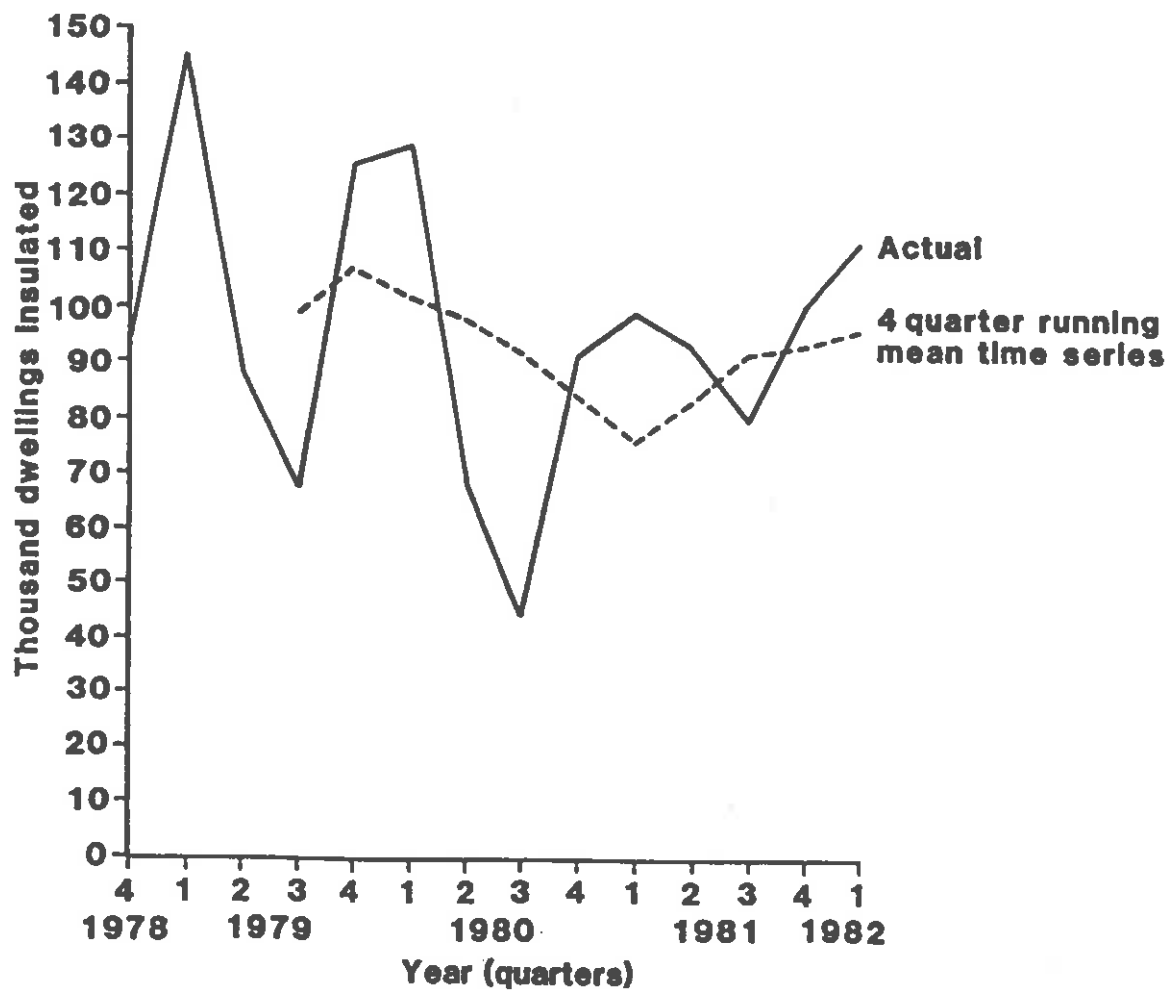
Roof Insulation		000's	
Total stock	20.0 m	20,045	
With no loft (Flats/Flat roofs)	3.2 m	3,189	
Net stock	16.9 m	16,856	100%
100 mm and above insulation	2.1 m	2,090	12%
75 mm and 80 mm insulation	4.2 m	4,208	25%
50 mm and 60 mm insulation	3.5 m	3,503	21%
25 mm insulation	1.2 m	1,186	7%
Uninsulated	4.8 m	4,789	29%
Not accessible	1.1 m	1,080	6%
	16.9 m	16,856	100%

(However, of those insulated, 42% are under-insulated at 50/60 mm thickness level and below. Similarly, taking roofs insulated at 80 mm thickness and below, then 80% of roofs are under-insulated.)

Despite the modifications, the H.I.S. has never achieved its annual target. Neither has it been an unmitigated disaster. A similar time series analysis to the one carried out on the public sector programme presents a different picture (see table 4.13 and figure 4.7). After peaking early on, a decline did set in, but unlike the P.S.P. it was not continuous. A steady increase has been recorded during the last 4 quarters. While this increase will reflect the workings of the price mechanism, the decline set in at a time fuel prices were very much in the news - the first quarter 1980. The decline over the 5 quarters corresponds with the time span covering the government's announced intention to reduce the H.I.S. allocation and the year this cut was in effect. Since the annual increases in the allocation have been restored the dwellings insulated have risen.

Both time-series graphs then, indicate a link between the programmes effectiveness and the government's commitment to them. The government though would appear not to want to recognise such linkages.

Figure 4.7. Dwellings insulated under Home Insulation Scheme (quarterly)



"The higher number insulated in 1979 may be attributed to an exceptional number of lofts insulated by local authorities in that year". Recreating the circumstances that gave rise to the exceptional number has been ruled out - the government has consistently reiterated its position that it would not restore the specific allocation. It is likely that the government would subsume the H.I.S. within the Block Grant if it could. Given the government's philosophy and its position on the public sector allocation, this is the implication of the statement that the H.I.S. only "continues to be a separate provision within the H.I.P. because of the Homes Insulation Act 1978". (90) The reaction of local authorities after the specific energy conservation allocation was subsumed within the H.I.P., if repeated would, be disastrous for the success of the H.I.S.

The insulation programmes have resulted in almost 3 million dwellings receiving loft insulation since 1978. This increase has not necessarily been reflected in reductions in Final energy consumption. Potential domestic savings have proved susceptible to being exchanged for increased thermal comfort, especially amongst lower income groups. This does not mean that the savings have been lost, just that improved standards are reached sooner than they may otherwise have been. Leach et al (91) have collated data to show that the average whole-house temperatures have been rising over the last three decades. Rather than the savings being lost, there is a timelag. Future increases will not be as great as they would otherwise have been.

5. The co-ordination of energy conservation

Energy conservation has been incorporated into official thinking on energy policy. It has also been acquiring an enhanced status within Whitehall since 1974. Initially only a small unit established some months after its parent body, DEN, energy conservation was promoted to the rank of division, with its own under secretary in December 1977. In the era that has followed, marked by reductions in the civil service, the Energy Conservation Division (ECD) staffing has actually increased (see table 5.1).

Table 5.1. Department of Energy

Category	1.5.79	1.9.80	1.6.81	22.7.82
Total department	1267	1231½	1182	1137
Energy conservation	29	29	35 ¹	41
% Energy conservation of Total	2.3%	2.4%	3.0%	3.6%
(Supply)				
Atomic energy	48	40½	43	39
Coal	26½	25½	25	25
Electricity	87½	73½	73½	74½
Gas	144½	136½	137	129
Petroleum ²	162	178½	185	199
Total 'Supply'	468½	454½	463½	466½
% 'Supply' of Total department	37%	36.9%	39.2%	41%

¹Brach transferred in from Energy Technology.

²Petroleum includes Engineering and Production.

(This table does not include members of staff in Establishment, Information, Economics and Statistics, Finance and Nationalised Industries, any Policy, Energy Technology, Offshore Supplies Office, Legal, or Top Level/Parliamentary sections.)

Data for 1.5.79, 1.9.80 and 1.6.81 - Select Committee on Energy (1982), Second Report Session 198/82, Department of Energy's Estimates for 1981-2, HC 231, p. 32, HMSO.

Data for 22.7.82 - Hansard, 22 July 1982, v. 28, Part 1, Col. 239-246.

The balance within DEn however has remained supply orientated. In manpower terms the ECD staffing level is similar to the Atomic Energy Division and is even greater than the Coal Division. Unlike the individual divisions no significant organisation exists outside DEn to provide an extra impetus for conservation. There are numerous small interest groups and assorted trade organisations; the ACEC only exists within the structures of the department and its membership can be manipulated by government; the ETSU has a contract-client relationship with DEn and provides expertise on energy conservation, including monitoring the Energy Conservation Demonstration Project scheme, amongst its activities; but there is nothing to compare with the following:

ATOMIC ENERGY DIVISION	→	U.K.A.E.A. and BNFL
COAL DIVISION	→	NCB, NUM
ELECTRICITY	→	CEGB, ELECTRICITY COUNCIL AND AREA BOARDS
GAS	→	BRITISH GAS, REGIONAL BOARDS
PETROLEUM	→	BNOC, BRITOIL, OIL COMPANIES

Thus, when compared to an aggregated "supply side" staffing the ECD total is very small indeed.

Although DEn is responsible for co-ordinating the government's overall energy policy, and energy conservation policy, it would be misleading to present the E.C.D. as the sum total of Whitehall officials involved with energy conservation civil servants. Responsibilities and activities directly involving an energy conservation component, are spread throughout a large variety of departments. These include:

- DI runs several grant schemes and is involved with the funding of energy conservation projects within industry. It has been involved with providing part of the funding (along with DEn) for the Energy Conservation Demonstration Project Scheme.
- DOE is responsible for running the Home Insulation Scheme, local authority energy conservation, the PSA programme within the government estate and setting the thermal standards of the Building Regulations.
- DES has funded a programme to increase the insulation standards in Local Education Authority buildings.
- DHSS has funded a similar programme for NHS buildings and is very much in the firing line as regards the issue of fuel poverty.

COI has sponsored a number of studies on the "Save-It" campaign. Though this illustrates the departments with the major concern it is not complete. The spread can be further emphasised by the fact that the

42 recommendations of the SCST report were said to have touched upon the activities of all government departments, while an indepartmental paper on energy conservation cited 18 different departments and government bodies as contributing to the study. (92) In a DEn submission to the SCOE (93) energy conservation funding has been spread amongst 12 departments over the last two financial years (see table 5.2). DEn's share represented only 4.1 and 6.3% of the totals, respectively.

This same spread of responsibility and funding has been considered too fragmented, resulting in a lack of co-ordination in government's efforts. (94) The concern centres round

- too many departments involved for a real concerted effort (any report that has to be acceptable to 18 different departments must invariably be heavily diluted).
- for the majority energy conservation is at best only a minor interest or concern.
- the departments have different priorities which can result in contradictory actions (the Health Minister vetoed the appointment of an energy conservation officer in a hospital in the same month that DEn had declared Energy Conservation in Hospitals month; earlier this year the DOE and MOD were seen to have different investment criteria for energy conservation than the DHSS).
- the different departments presenting inconsistent advice (DEn and DOE have disagreed over proposed thicknesses of insulation).

As can be seen from the few examples, the concern is not unfounded.

The resolution of this lack of co-ordination and spread of responsibility has been envisaged at various times in the form of a specially constituted agency (95) or task force (96). These would bring together all aspects of energy conservation under one roof, providing energy conservation with a more visible focus and adding to its substance to counter balance "supply side" bias.

Though such a body has gained increasing attention and support, both Labour and Conservative governments have dismissed the idea. It has generally been regarded as anachronistic. The present government

Table 5.2. Energy conservation expenditure programmes - summary

	£m	
	outturn cash (actual 1980/81)	and estimated 1981/83
Department of Energy	6.636	9.527
Department of the Environment	54.96	49.8
Department of Industry	25.723	21.317
Department of Education and Science	40.1	33.9
Department of Health and Social Security	12.677	9.13
Ministry of Defence	3.37	4.8
Department of Transport	0.584	0.731
Department of Employment	2.5	3.4
Ministry of Agriculture, Fisheries and Food	0.935	1.038
Scottish Office	7.3	7.55
Welsh Office	5.295	4.35
Northern Ireland Office	3.492	3.482
	<u>£163.572</u>	<u>£149.025</u>
TOTAL		

Note: 80/81 and 81/82 figures are not strictly comparable because for certain items of local authority expenditure specific allocations for energy conservation are not being made in 81/82 although expenditure will continue, eg. DoE where £13 million was spent on local authority domestic buildings in 80/81 but no figure for 81/82 can be given until outturn available.

(Taken from SCOE (1982) 5th Report on Energy Conservation in Buildings, Session 1981-82, HC 401-ii appendix 25.)

would be particularly loathe to create something that may be viewed as a quango, or further contribute to bureaucracy. The question that remains to be answered would be whether such a body would be more efficacious in its pursuit of energy conservation than the existing institutions?

Such a body would probably overcome the problem of co-ordination, externally at least. Disagreements over proposed thicknesses of insulation or investment criteria would probably remain internal. It would have no competing priorities as the pursuit of energy conservation would be its sole task. The real problem revolves around financing. If it has to rely on other departments to receive finance it will have to spend an inordinate amount of its time on fund-raising. Departmental co-operation would also be necessary for the implementation of proposed measures. With the responsibility for energy conservation removed, the departments would have an excuse to rank energy conservation lower priority than at present. Without its own financing the establishment of such a body would be a pointless exercise.

There is no reason to suppose that with financing such a body would not receive co-operation from the various departments. The basis of financing could be the present allocation for energy conservation spread throughout government. The departments would probably appreciate additional expenditure within their sphere of interest.

There are three parallels to support this stance. The first concerns local authorities and their specific allocation for energy conservation. As discussed above, when the money was available only for energy conservation they quite willingly spent it on such. As a competing priority, before 1978 (with the JCP), and since 1980, the local authority effort was reduced.

Secondly, prior to the Health and Safety at Work Act 1974 responsibility for the different inspectorates was spread throughout a number of departments. The general opinion was that it was more effective that way. The 1974 act brought them together under one

body, the Health and Safety Executive. The Labour Party, where the responsibility for the legislation lies, has described it as one of the success stories of its last term in office (97).

The third parallel lies with the government's own energy conservation programme. The PSA though responsible for almost all buildings in the government estate (some MOD buildings being the exception) is under the sole responsibility of the DOE. Its budget is provided solely from the DOE allocation. Despite this, it has managed to implement its programme, affecting all departments, with much success. To date it has met all of its fuel saving targets, usually ahead of schedule.

These parallels do not prove that an Energy Conservation Agency would be more effective than the existing spread of responsibility and allocation, but only further support its credence. Such a step however cannot be taken by DE or the ECD. The political will must come from the government. To date, it has not accepted the validity of such a body.

6. Conclusion

Energy conservation has been pursued as a government policy seriously since 1977. Prior to that its concern was only that of tinkering with the system. While the different philosophies of the two governments have been manifested in different approaches to energy conservation there have also been marked similarities. Their approaches have resulted in a reduction of the nation's energy consumption despite the difficulty, through changing factors, of determining the exact magnitude. Whatever the actual impact, it could be greater, given an increased government commitment.

This lack of commitment is not unintelligible

- if fuel savings are difficult to determine then such programmes, especially in a period of strict control on public expenditure, are difficult to justify.
- energy conservation is not necessarily cheap. To carry out loft insulation, cavity wall insulation, double glazing and draught-stripping on all dwellings in need of treatment would cost an estimated £18 billion.

- it is not considered a politically emotive or inspiring subject. There are few votes in it.

Nor has it gone unnoticed by the government. The Prime Minister's specially appointed adviser, Sir Derek Rayner, has been given the task of assessing the effectiveness of the government's energy conservation arrangements.

It is an easy thing to proclaim that energy conservation is one of the three central planks to the country's energy policy, but much more difficult to achieve. One item clearly seen in this paper is that with an increased government commitment, if only to its own policies, a greater part of the potential for energy conservation would be achieved.

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Appendix 1. A chronology of "official" energy conservation measures and selected events in the U.K. since 1973

1973

- PSA commence programme to save 30% of 1972/73 consumption by 1978
- Oct. Middle East war
- " Arab oil embargo and OPEC quadrupling of prices
- Nov. NUM overtime ban
- " State of emergency declared
- " Fuel and Electricity Control Act (1973) passed by parliament
- Dec. Statutory orders introduced under Fuel and Electricity Control Act : speed limits reduced
- : external lighting limits introduced
- " Rationing scheme for petrol prepared
- " Three-day working week imposed
- " Mandatory temperature limit set for non-domestic buildings at 68°F (20°C)
- " "Switch Off - Save Energy" campaign

1974

- Jan. DEu established - SS for Energy, Lord Carrington
- Feb. General Election - Labour government elected, SS for Energy, Eric Varley
- " State of emergency lifted
- Oct. ACEC set up
- ETSU set up
- July CPRS report - "Energy Conservation - a study" published
- Motorway speed limits restored
- Nov. Fuel and Electricity Control Act renewed by order in parliament
- Dec. Interim energy conservation programme announced in parliament including launch of Energy Saving Loan Scheme for industry
- " NEDO report - "Energy Conservation in the U.K." published
- " Speed limits relaxed
- Health and Safety at Work Act (1974) passed including Section 3 which allowed building regulations to be passed for energy conservation purposes for the first time

1975

- Jan. "Save It" campaign launched
- Finance Act (1975) - 100% tax allowances for industrial energy conservation measures
- Mar. "Save It" campaign funded for a further year
- May DHSS issue advice to NHS on energy conservation

- BRE report "Energy Conservation : a study of energy consumption in buildings and possible means of saving energy in housing" published
- June New SS for Energy appointed, Tony Benn
SCST "First Report on Energy Conservation" published
Increase in Building Regulations Part F, effectively doubling thermal standards (U-value for lofts $0.6\text{wm}^{-2}\text{C}^{-1}$, walls $1.\text{wm}^{-2}\text{C}^{-1}$) (under Public Health Act (1961))
Home Insulation Scheme set up by Durham (FOE)
- Oct. Job Creation Programme established, making labour available, for local authorities to insulate lofts of their council properties of elderly and disabled
- Dec. DEn issue Energy Conservation Circular to local authorities in England and Wales
Industrial Energy Thrift Scheme initiated under DI
Energy Audit Series commenced by ETSU under the DI
- Nov. Fuel and Electricity Control Act renewed again
RECO's appointed within DI regional offices, though responsible to DEn (a part-time duty)
- 1976
- Jan. DEn issue Energy Conservation Circular to local authorities in Scotland
- " Plowden Committee Report "The Structure of the Electricity Supply Industry in England and Wales" (Cmnd. 6388)
Better Insulated Home Programme initiated by DOE
Minister appointed with special responsibilities for energy conservation
Ministerial Committee for Energy Conservation (MEC) set up
- July Government reply to SCST report on energy conservation - Cmnd. 6575
"Save It" campaign funded for further year
PSA - 30% target met : revised to 35% saving on '72/73 consumption but without time limit
Energy Act (1976) passed by parliament - superceded Fuel and Electricity Control Act (1973) and met obligations under European and International commitments
Voluntary codes of practice for external lighting come into effect as mandatory controls are lifted
First Energy Manager group is initiated in Somerset and Avon
- Dec. Energy Survey Scheme initiated by DEn
Scottish building regulations are increased to levels in England

1977

- "Save It" campaign funded for a further year
- Joint Working Party on Heating and Energy Conservation in Public Sector Housing set up
- Durham FOE submit plan to government for a National Insulation Campaign
- Energy Saving Loan Scheme wound up because of lack of success
- Sept. "Energy Management" - DEen bulletin of energy conservation information first published
- First "National Energy Managers Conference" held
- Mar. Job Creation Programme expanded to allow local authorities to insulate lofts of all its council dwellings
- ACEC working on priorities for a new government programme
- May London Summit Meeting - the need for increased energy conservation activities was one of the seven points of the Summit Declaration
- June Energy Commission set up
- All speed limit restrictions lifted
- Dec 10-year, 12 point government programme announced, including the establishment of an Energy Conservation Division within DEen, public sector insulation programme, and the initiating of ECDPS to be controlled by ETSU and jointly funded by DEen and DI

1978

- Feb. Green Paper "Energy Policy" published (Cmnd. 7101)
- " " "Save It" campaign receives a three year commitment for financing
- Mar. Commission on Energy and the Environment set up
- Apr. STEP and YOP (to replace Job Creation Programme) announced
- " Compulsory fuel consumption tests on new cars comes into effect
- May Homes Insulation Bill introduced in parliament
- June Energy Conservation Scheme for Industry to be run for two years
- RIBA receive grant from government to train architects in energy conservation principles
- July Homes Insulation Act (1978) passed by parliament
- Sept. First Homes Insulation Scheme introduced - £55 or 66% grant for loft insulation and hot water cylinders
- Dec. Job Creation Programme wound up
- Inner Urban Areas Act (1978) passed by parliament, establishing Partnership authorities, and Urban programme aid

1979

- Jan. Review of domestic insulation standards of building regulations started
- May General Election - Conservative government elected. SS for Energy - David Howell

- June Increased thermal insulation standards for non-domestic buildings (Part FF of the Building regulations) come into effect
- " STEP restricted to Special Development Areas, Development Areas, and Inner Urban Areas (effectively all but the south of the country)
- PSA - 34% reduction on 1972/73 achieved - new target of 12% saving on 1978/79 fuel consumption by 1981/82
- OPEC doubles oil prices
- Oct. Rayner study initiated on energy conservation in the government estate
- Nov. Select Committee on Energy set up
- " Homes Insulation Scheme extended to cover council tenants
- First National Schools Energy Competition run by DEN
- Dec. Non-domestic heating limits reduced from 68°F to 66°F
- RECO's appointed as full-time position in 11 regions
- July Energy Commission disbanded
- 1980
- Jan. ACEC reduced in size
- Mar. Homes Insulation Scheme modified - £90 or 90% grant for elderly
- Apr. Financial allocation for Home Insulation Scheme reduced by almost half
- " Specific allocation for energy conservation in local authority capital allocations subsumed within Block Grant
- June Energy Conservation Scheme for Industry closed
- " DOE consultation letter on new domestic insulation standards issued
- July Rayner report on energy conservation in the government estate finished
- Oct. Heating limit in non-domestic buildings set at 19°C
- Nov. Energy Conservation Bill introduced in parliament
- Transport Act (1980) removed unnecessary restrictions on car-sharing and new forms of public transport
- SCOE First Report on Government's Nuclear Power Programme
- Aug. Grant for Home Insulation increased to a maximum of £65
- 1981
- Apr. STEP replaced by Community Enterprise Programme (CEP) to operate on nationwide basis
- " Parker Morris standards - minimum heating standards phased out
- " Housing Cost Yardstick replaced by Housing Project Control
- " Energy Conservation Act (1981) passed by parliament
- May Housing Development Directorate of the DOE to be wound up

- June DEn announces availability of "Seedcorn Grants" for local groups
- " Neighbourhood Energy Action receive funding
- DHSS announce availability of one-off grants for social security claimants for lagging hot water cylinders
- Commission for Energy and the Environment dissolved
- DHSS announce the building of two "low-energy" hospitals as prototypes
- Sept. New SS for Energy appointed - Nigel Lawson
- Dec. Homes Insulation Scheme modified - 90% grant extended to severely disabled
- " ACEC mandate extended, with new membership
- National Energy Managers Advisory Council (NEMAC) set up
- Government reply to SCOE First Report on Government's Nuclear Power Programme (Cmnd. 831)
- 1982
- Apr. Energy Quick Advice Service withdrawn
- " Homes Insulation Scheme modified - thickness of loft insulation eligible for grant increased to 100 mm.
- " Increased allocations to local authorities for Homes Insulation Scheme
- " Increased eligibility for boiler conversion scheme grant
- June Increased building regulations for domestic buildings (Part F) come into effect
- July SCOE Fifth Report on "Energy Conservation in Buildings"
- " Increased allocations announced for local insulation projects
- Homes Insulation Grant generally increased to £69 maximum

Appendix 2. CalculationsCalculations for Table 4.2

$$\text{system efficiency} = \frac{\text{total delivered energy consumption}}{\text{total primary energy consumption}} \times 100\%$$

$$\text{derived primary energy consumption} = \frac{\text{column 2 (table 4.1)}}{\text{system efficiency of base year}}$$

$$\begin{aligned} \text{derived delivered energy consumption} &= \text{derived primary energy consumption} \\ &\times \text{system efficiency of actual year} \end{aligned}$$

Calculations for Table 3.4 and Table 4.4

$$\frac{\text{year total} - \text{base year total}}{\text{base year total}} \times 100\% = \% \text{ change}$$

Calculations for Table 4.8

$$\begin{aligned} \text{derived industry consumption} &= \text{actual final energy consumption} \\ &\times \frac{\text{Actual Industry Consumption of Base Year}}{\text{Actual Final Energy Consumption of Base Year}} \end{aligned}$$

$$\text{Derived Final Energy Consumption} = (\text{Derived Industry Consumption} - \text{Actual Industry Consumption}) + \text{Actual Final Energy Consumption}$$

Calculations for Table 4.9 and Table 4.10

$$\begin{aligned} \text{Corrected Industry Consumption} &= \text{Corrected Final Consumption} \\ &\times \frac{\text{Actual Industry Consumption of Base Year}}{\text{Actual Final Energy Consumption of Base Year}} \end{aligned}$$

$$\text{Adjusted Final Consumption} = (\text{Corrected Industry Consumption} - \text{Actual Industry Consumption}) + \text{Corrected Final Consumption.}$$

Appendix 3. Acronyms

ACEC	- Advisory Council on Energy Conservation
AGR	- Advanced Gas-Cooled Reactor
BIH	- Better Insulated House Programme
BNFL	- British Nuclear Fuels Ltd
BNOC	- British National Oil Company
BRE	- Building Research Establishment
CEB	- Central Electricity Board
CEE	- Commission on Energy and the Environment
CEGB	- Central Electricity Generating Board
COI	- Central Office of Information
CPRS	- Central Policy Review Staff
DEn	- Department of Energy
DES	- Department of Education and Science
DHSS	- Department of Health and Social Security
DI	- Department of Industry
DoE	- Department of the Environment
DUKES	- Digest of UK Energy Statistics
EAS	- Energy Advice Service
ECD	- Energy Conservation Division
ECU	- Energy Conservation Unit
EEC	- European Economic Community
ESI	- Electricity Supply Industry
ESS	- Energy Survey Scheme
ETSU	- Energy Technology Support Unit
HDD	- Housing Development Directorate
HIP	- Housing Investment Programmes
HIS	- Homes Insulation Scheme
IEA	- International Energy Agency
IETS	- Industrial Energy Thrift Scheme
IMF	- International Monetary Fund
JCP	- Job Creation Programme
MEC	- Ministerial Committee on Energy Conservation
MSC	- Manpower Service Commission
NCB	- National Coal Board
NEA	- Neighbourhood Energy Action
NEDC	- National Economic Development Council
NEDO	- National Economic Development Office
NEMAC	- National Energy Managers Advisory Council
NHS	- National Health Service

NSHEB	- North of Scotland and Highlands Electricity Board
NUM	- National Union of Miners
OECD	- Organisation of Economic Cooperation and Development
OPEC	- Organisation of Petroleum Exporting Countries
PSA	- Property Services Agency
PSP	- Public Sector Energy Conservation Programme
RECO	- Regional Energy Conservation Officers
RSG	- Rate Support Grant
SCOE	- Select Committee on Energy
SCST	- Select Committee on Science and Technology
SGHWR	- Steam Generating Heavy Water Reactor
SSEB	- South of Scotland Electricity Board
UK	- United Kingdom
UKAEA	- United Kingdom Atomic Energy Authority

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