

ENERGY CONSERVATION

Who can take the initiative?

By

M.J. PLATTS

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In 1974-5 he co-ordinated a study on the national economic situation for the Religious Society of Friends which resulted in a book 'Public Resources and Private Lives'.

FOREWORD

There is much talk about energy conservation — the need for it, and the benefits that will accrue to consumers and to the nation — but less action. High policy is all very well, but needs to be translated into practice. In this paper Mr. Platts examines the case for energy conservation, and points up the moral for economic policy makers. It is not enough to lay down policies; thought must be given to how and by whom policies are given effect.

The domestic sector accounted for 27 per cent of energy consumption by final consumers in the U.K. in 1979. Over 60 per cent of this domestic consumption went into space heating. This means that about one fifth of U.K. energy consumption was for space heating in the domestic sector.

Mr. Platts claims that a substantial proportion of this energy could be saved by conservation measures. These measures are not being adopted because people do not know what can be achieved or how to go about it. The Government, it is true, make information available and could be said to be encouraging energy conservation by a policy of high energy prices. Even so, energy is being wasted on an enormous scale. Some new initiative is needed. Refreshingly, Mr. Platts does not stop there, but goes on to suggest how and by whom this initiative should be taken. Nor is his case confined to space heating in the domestic sector alone.

There can be little doubt as to who *should* take the initiative. Consumers are under no obligation to help fuel suppliers to a larger share of their incomes than necessary. But who *can* take the initiative? As Mr. Platts points out, it is not only that many consumers lack knowledge and expertise; as individuals they have different propensities to invest and different spending priorities — and, rightly or wrongly, may judge that they cannot afford energy conservation. Furthermore, prices charged by the conservation industry doing jobs piecemeal are inevitably higher than they need be if the whole job were carried out on national or regional programmes.

Mr. Platts lets the Government off lightly. The Ministry of Fuel and Power Act 1945 places on the Secretary of State for Energy a clear duty to promote efficient use of fuel and power. Mr. Platts does, however, suggest that the energy supply utilities are well placed to take the initiative. They have the knowledge and the means, and appear to lack only the motivation. May one hope that if the nationalised energy supply industries do not seize upon this suggestion of their own accord the Secretary of State may, in pursuit of his statutory duty, lean on them heavily?

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Economic Research Council
February 1981.

SUMMARY

Recent energy policy has centred on macro-analysis of fuel supply requirements. A micro-analysis of end use of energy suggests that a different type of policy should be considered. Space heating dominates the nation's energy consumption pattern, and significant national energy savings can be made by the adoption of appropriate conservation measures. However, no serious study has been made of policy options in this field. A common failing of policy makers and analysts concerned with energy conservation in buildings has been to focus attention firstly on economic incentives, and secondly on legislative enforcement to promote change, without asking questions about the individual's ability to respond. There are no studies examining the factors which prevent the conservation market from working effectively.

The average householder or small business man is not familiar with conservation technology, and is not able to choose wisely in this market. He or she associates conservation measures with outwardly visible and tangible products – double glazing, solar panels – which rarely pay for themselves. The most cost effective conservation measures usually involve more subtle items – better developed heating controls, well adjusted boilers, appropriate wall insulation – which are only apparent to a trained technical mind.

The industrial response to this dilemma has been to isolate conservation as a skilled task, and to give professional energy managers authority to acquire the relevant detailed knowledge and take the initiative on conservation matters, and the incentive to do so. Significant progress cannot be made in the home and small business sector until the same question of initiative is similarly addressed, with technically competent individuals being appointed, charged with taking the initiative and bringing conservation opportunities to householders' attention in a creative and responsible way.

The public utilities could fulfil this role, but they would need to operate truly as public utility companies, (i.e. concerned with the sale of usefulness) rather than simply as public fuel supply companies. It would be in their interest to do so, as investment in reasonable conservation measures yields a better return than investment in new energy supply equipment. In America privately owned utility companies are responding to this opportunity. To do this the utility companies need to train staff to assess and advise on the efficiency of customer's energy use (i.e. create a "utility" sales and technical support staff). Secondly, the conservation industry needs to gear itself to be able to negotiate with the utility companies on an area by area basis.

Public debate on this subject, scrutinizing the operation of the conservation market, is an important ingredient currently lacking in energy policy discussions.

MICRO-ANALYSIS AND MARKET POLICIES

Despite the statement that conservation is now one of the three main components – the others being coal and nuclear power – of the government's long term energy policy (1), it receives little political attention. Only a small proportion of the 1978 Green Paper(2) on energy policy is devoted to a discussion of conservation possibilities. The document is dominated by discussions relating to the different fuel industries. In the 1980 Department of Energy statistics(3) conservation is not mentioned at all. The statistics are the conventional statistics of fuel supply. Figure 1 shows the breakdown of fuel supply to different sectors of the economy, as summarised in these statistics.

In recent years there has been criticism of this approach because it says nothing about the actual use to which the energy is put, and therefore cannot say anything about the efficiency with which the energy is used. The only indicator offered in the 1980 statistics is the so-called energy co-efficient, which relates the rate of increase in the total UK energy consumption to the rate of increase of GDP. Instead of a concern with the bulk figures of energy supplied, critics have presented detailed analyses of the UK's energy needs(4, 5), and by aggregating they have been able to make clear statements not only about the UK's total energy supply needs, but also about the appropriateness and efficiency of use of fuels for particular needs, and about the possible contribution that could be made by the widespread adoption of different conservation measures(4). The difference in approach is akin to the differences in the economic field between macro-economic and micro-economic analysts.

Figure 2 shows a typical summary breakdown given by the newer, micro-analytical approach, centering on energy use. Two features are outstanding. One is the small requirement for essential electricity (electricity is a very inefficient means of supplying energy), considerably less than is already supplied (8% as opposed to 13%) and the other is the dominant nature of the simple need for heat. About 60% of all fuels in the UK are consumed to provide heat, of which well over half is for space and water heating at final temperatures under – and usually well under – 80°C. Ignoring the special cases of transport and the use of fuels for non-energy purposes such as feed stocks, the proportions are very much higher; over 50% of energy used is then for low-grade heat. Typifying this, the breakdown for the domestic sector is given in Figure 3. Quite rightly critics argue that detailed attention to insulation, draught-proofing and other measures at the point of use could dramatically reduce the nation's need for this sort of energy supply.

The inadequacy in the official figures in failing to direct attention to matters of efficiency is paralleled by conservation policies which are simplistic in their formation. It is relatively easy to control fuel supply by macro-economic levers. However, because improvements in the efficiency of energy utilisation necessarily have to be made by detailed adjustments at

each point of use, a policy of energy conservation cannot be so easily dictated from the centre. The only direct tools available to the government are exhortation and the distribution of information, financial incentives (grants and tax relief), mild pressure in the form of fuel pricing policies, and more extreme pressure in the form of conservation legislation.

Different western governments have each sought to use different combinations of carrot and stick. Recently, West German proposals for increased government powers to enforce energy conservation were described as introducing "a totalitarian conservation state"(6). In the UK, Department of Energy documents discussing energy policy have shown equal concern that state enforcement might be necessary if the fledgling conservation market cannot respond adequately, with the present minimal level of government educational and economic assistance. The summary from Energy Paper 33(1) is reproduced as Appendix A.* No proper attempt has yet been made to analyse the conservation market as a market, to see what might be hindering its growth, and what might assist and speed its operation.

In reality there is no need for a stark choice between polarised alternatives which leave the responsibility totally with the individual or vest the responsibility totally with the state. Various existing industries could take the initiative, and make energy conservation "their business". If instead of thinking of direct management of the energy economy government concerned itself with an analysis of the energy market, these possibilities would emerge, and government policy would then centre on establishing conditions in which this market could flourish.

Some market economists might suggest that the government's best policy would be total non-involvement. However, the energy market is so dominated by the nationalised fuel supply industries, which have such an unequal access to expertise and capital, that a true market can hardly be said to exist, and government action is required to open up the options. It is not so much that the fuel supply industries prevent others from building a conservation industry, but that they themselves are in the best position to take such an initiative, and therefore stifle progress by their inaction. Taken together they have a total penetration of the energy market — they do business with every energy consumer — and they invest heavily on their customer's behalf in energy related equipment. This could be extended to include conservation equipment installed on the consumer's premises and 'sold' to him.

The British Gas Corporation is in a particularly interesting position, because it dominates the home heating market, because it currently has capital to spare, yet at the same time cannot satisfy its customers' demand for gas, and because it has had experience of introducing new equipment to consumers before. In the early 1970's every gas appliance in the UK was converted for operation with natural gas. The whole exercise was planned and executed by the Gas Boards, and financed in a manner which was

painless and invisible to the customer.

In this exercise everybody gained by the application of new and superior technology, yet few individuals would have thought of doing it themselves, and even fewer would have been able to make judgments about the technical issues involved. Most markets have their technical aspects. We do not expect the whole population to be experts in all subjects, and we employ experts specifically to advise us and take initiatives such as this on our behalf. It is therefore curious that we persistently expect the general population to become so concerned and aware of energy conservation that each individual will not only seek to apply conservation technology, but will be able to make competent technical judgments on conservation matters. No combination of carrot and stick can conceivably make a lame donkey walk. In such circumstances the only viable policy is to send for the vet.

TECHNICAL EXPERTISE AND FINANCE

This question of expertise has long been recognised in industry. Apart from a few energy intensive industries, energy costs are generally a low percentage of a company's expenditure (5%) and thus have an inevitably low priority in boardroom discussions. New equipment will always be a more important investment consideration, efficient management will always be more important in the running economics of the factory. It has therefore been the policy of large companies to appoint an energy manager with the specific brief to become an expert, and to argue the case and formulate the plans in detail for energy conservation measures to which the Board can then respond. The Board itself would not take the initiative in such matters, but it will respond positively to follow a well reasoned initiative offered from elsewhere. It is government policy to support this industrial attitude. There is government sponsored support for the professionalisation of energy management (conferences, seminars, lectures). Magazines have sprung up to serve this new professional market.

It seems to go unrecognised that energy costs have a similarly low priority in home economics. Figures 4 and 5 reproduce the breakdown of household expenditure given in Social Trends 1980(7). The average figure for fuel and light is 4.8% of the household budget. Even for low income pensioners this rises to only 13%. Even given significant increases in energy specific costs, this is not a major household expense. Many other economies would be considered before the home owner deliberately sets money aside and seeks out information on cost-effective ways of investing money in conservation. Even when the initial effort is made, lack of a detailed awareness of technical possibilities means that capital is likely to be invested in the most readily visible physical equipment — typically double-glazing — which is unlikely to be cost effective.

Recently published figures for the UK show that out of £200 million invested privately in home insulation of one sort or another in 1979, £150

million went on double glazing, £30 million on loft insulation, £15 million on cavity wall insulation and £5 million on hot water tank jackets(8). The cost effectiveness of these measures is not quite in the reverse order, but is almost so. Similar experiences in Germany — of the major investment being in double glazing — have prompted a re-think of policy over grants for conservation measures(9). Just as a company would not invest shareholders' money in uneconomic projects supervised by unskilled personnel, the government cannot be proud of citizens' money being spent in this way.

Neglecting the £150 million wasted on double glazing, a £50 million useful investment represents just over 1% of the nation's domestic energy bill, and will reduce that bill by perhaps 0.2%. The government's budget for conservation advertising of £3¼ million for 1980 (in real terms less than half the 1974 "save it" budget) is less than the separate advertising budgets for leading brands of chocolate. The effect of insulation grants is clearly minimal. Britain has long experience of home improvement grants, where the citizen is offered a financial incentive but is left to take the initiative and make the technical decisions in exactly the same way as is proposed for energy conservation. There has been a consistently low uptake in home improvement grants for more than a decade, despite widespread publicity. There is no reason to suppose that conservation grants will fare any better. If this is the best the public and government can achieve, what can the experts offer?

Studies abound which show that subtle changes are the most cost effective measures in conservation. The PSA reduced energy consumption in government buildings by 30% between 1972 and 1977(1) by changes which all paid for themselves within a year — mostly detailed attention to the timing and thermostat settings of heating systems, and the efficiency of the boilers. The Watt Committee(10) has costed conservation methods for an average dwelling and shows a hierarchy of things to be done, as have others(4, 9, 11). There is general agreement that a 50% reduction in energy consumption can be achieved easily in most buildings, with measures that will have paid for themselves typically in 5 years. Significantly greater reductions are possible with more care, and nearly 90% reduction in energy use is possible(9, 10).

But how many laymen would be able to assess the appropriate hierarchy of cost effective conservation measures for the particular construction pattern of his property, with his particular pattern of use? How many laymen would know, for instance, that there are several different types of insulation for filling the cavities in brick walls, with widely differing costs, but that some of them are not suitable for some types of wall construction? The individual home owner is like the company director. He is unlikely to make a competent response himself to the problems, but he would probably react with interest to a sound personal explanation of the possibilities open to him, and would also probably accept the offer of an understandable conservation package, from a reputable source, which was organised for him

and fitted at minimum inconvenience, and which was self-financing and required no capital commitment or extra outpayment from him. It is possible to conceive of such a scheme — indeed it is easy. The remainder of this paper is devoted to exploring this.

The general public's lack of access to expertise on energy matters is paralleled by its lack of long term perspective on investment. Beijdorff(11) has pointed out that investment in a wide range of conservation technologies has a pay back time of about 5 years, whereas the general public desire is for a shorter, more visible pay back period of 3 years. However, as Beijdorff has pointed out, and as the Energy Technology Support Unit, Harwell has confirmed(12) the pay back on this investment is much shorter than is achievable with investments in new energy production equipment, where 10 to 15 years is commonly accepted. These gaps, in expertise and in attitude to finance, provide the opportunity for the creation of a conservation business.

Various existing groups have been attracted by this vacuum. The building profession has not been slow to offer its services, neither have building societies and banks been slow to offer finance. Combined packages of expertise backed by attractive financial terms represent a market which could perhaps be explored further. However, neither of these existing groups has an automatic interest in energy use, nor do they have intimate knowledge of the energy supply market.

TAKING THE INITIATIVE ON UTILITY

Energy supply utilities can be identified as fulfilling these requirements. They invest shareholders' money in energy producing plant and sell the resulting energy to their customers. Thus it is in their interest to invest their shareholders' money in conservation technology. The energy supply utilities employ people skilled in assessing energy producing plant etc. To sell conservation they would need to employ a new group of people with the appropriate skills, and they would need to liaise more closely than in the past with their customers, but it should not be a difficult step for them to shift emphasis, and sell their customers more of a total energy service, helping the user tailor his equipment (in the widest sense) to meet his energy needs as efficiently as possible.

The fuel supply company's knowledge of their customers' fuel bills has triggered a Canadian suggestion(13) for an advisory service, in which the fuel supply companies would be required to provide each customer with a "homeowner's annual fuel report". This would involve energy companies providing each customer at the end of the heating season with a summary of fuel use. This summary should include the total expenditure on fuel for the last year, the quantity of fuel consumed and its b.t.u. content. In addition, it should include the severity of the weather measured in degree days, and finally the weather adjusted fuel consumption; the quotient of fuel consumption divided by degree days. The last number is one that

would be relatively stable from year to year, despite weather differences. It should only change when there is a change in living habits or in the performance of the heating or insulation or other aspects of the home energy system.

The provision of this homeowner's annual fuel report, which should cover the present year and the last 4 years, would allow consumers to determine whether a modification made in a given year had significantly improved their fuel consumption. It would provide those who offered equipment servicing an opportunity to guarantee the performance of their work based upon the weather-adjusted fuel consumption. The inexpensive provision of this information would have a tremendous value for home owners concerned about their heating costs. However, the suggestion still leaves action to the initiative of each homeowner.

In America, utilities are experimenting with the problems of making the full switch to selling conservation. There, energy supply utilities are public companies responsive to shareholder attitudes, and most utilities are small and in competition, and thus much more anxious to meet their customers' real needs as efficiently as possible. There is also a willingness to move into new business and an acceptance that inefficient practices should rightly be left behind. There is no assumption of an unending right to simply sell fuel to a public uneducated in efficiency matters.

In the UK the so-called public utility companies in fact operate simply as fuel supply companies, though they will give advice on energy use. Several moves have been made recently to break their monopoly. One challenge has come from the Chemical Industries Association wishing to be free to buy and distribute gas in competition with the British Gas Corporation (14). In the electricity market, a significant change has been to allow large companies with their own generating plant to sell their electricity(15). This opens the way to combined heat and power schemes generally. A more extensive recommendation of the Marshall Committee(16) is for the establishment of "heat boards" to distribute heat in appropriate areas. However, all these are examples of partial competition. Even the idea of heat boards is narrow, since not all end uses of energy are heat.

If the energy market is taken as a whole, there should be proper competition for investment funds, between different fuels and different fuel suppliers, and between them and all the suppliers of more energy efficient equipment of all kinds. The activities of public utility companies properly operating as utility companies, i.e. selling "usefulness", would create this balance, buying in bulk for their customers, either new energy supplies or new conservation measures, not only including domestic insulation, but covering such items as the replacement of inefficiently sized electric motors in industrial equipment.

The financing of such a scheme is easy to work out. Assume a central heating customer usually pays £A per annum for gas. After a technical assessment, the utility proposes a package of insulation measures and other

steps — perhaps a more efficient boiler and thermostats — which they calculate will pay for themselves in, say, 5 years, saving gas and reducing the user's gas bill by £B per annum to £(A-B).

If the customer agrees, the utility then organises the work and finances it. For 5 years (on this example) the customer continues to pay £A per annum and receives the same comfort and performance standards as before (i.e. he perceives no change). After 5 years the loan is repaid and the customer's bill drops to £(A-B) per annum. If the customer sells his house in the interim he has lost no capital. The new owner takes over the insulation paid for by the utility, and continues to pay £B per annum for the remainder of the five years, added to the cost of a different quantity of gas which matches his own particular requirements. Throughout, the customer has had to acquire no technical expertise, and has had to make no capital outlay or special payment. The initiative has come from a utility company seeking an investment opportunity.

Obviously any such scheme would have detailed ramifications which would make it more complex than the simple picture outlined above but the basic pattern is crystal clear. Similar examples of the way a market can develop can be found in any classical economic textbook. Conservation technology which pays for itself can eventually come into use purely on its technical and economic merits, if those in a position to seize the initiative do so.

ENSURING COMPETITION

In an open economy, different utility companies competing in the quality and cost of the service they offer would ensure a well developed industry. The limit to the rate of introduction of such a scheme is first the rate at which sound technological understanding can be developed, but subsequently the rate at which that knowledge can be spread to the large number of technicians who would liaise with the customers, make all the individual assessments of people's homes or factories, specify the appropriate measures and supervise the installation. The success of the venture would ultimately rest upon the quality of that workforce, and the quality of the tools (computer programs or whatever) they would have to work with.

The picture is a little more complex in the UK because there are no competing utilities ready to take this initiative purely for the classical market reason of a move into a good business. Two steps can be taken to ensure healthy competition. Firstly there is no need for the utilities to be on a national scale. The present regional distribution boards (which are the ones known to the customers anyway) could have autonomous powers to act in their areas, and have their performance judged against other areas. Secondly, the utility company which arranges the investments on behalf of its customers is at liberty to buy both expertise and technology in an open market.

Although the Gas Board might co-ordinate a scheme in a particular area,

few of the conservation measures applied to any house or industrial building would involve gas technology. Most changes would concern the fabric of the building. It would be possible for the Gas Board to split up its supply areas into districts and ask for bids from teams of architects and engineers to take the responsibility for different districts. This would ensure competition in the technical quality and cost-effectiveness of the services offered. It would also enable a great diversity of schemes to develop. In some districts there would be the appropriate concentrated industrial and housing loads to make a combined heat and power scheme cost-effective. In some places individual house by house study would give the best yield. In other places it would be appropriate to discuss with the occupants standard treatment to blocks of similar houses. Whatever the variation in technical solution the technical groups would in their turn seek bids from contractors to carry out the work, ensuring further competition of quality of service and cost.

In considering the cost and time involved in applying conservation, enough attention is not given to the repetitive nature of the task. A small industry operating on houses at random obviously has a difficult task. The task is very different to an architect faced with an estate of 150 houses, but all built to one of three basic designs. He does a detailed calculation three times, and simply adjusts for individual variations thereafter. Similarly the contractors supplying and installing insulation and equipment can benefit from bulk ordering and delivery, and repetitive installation.

It is perfectly possible to organise a national programme of work in such a manner that a diverse, healthy, technically and economically efficient conservation industry emerges to carry it out. From an initial investment — which is soon repaid — the whole scheme is self-financing. What is lacking is the will to seize the initiative.

A MATTER OF POLICY

Internationally, report after report suggests that enormous improvements in the effectiveness of energy use are technically possible and economically viable. In commercial terms it is an easy market possibility to analyse. The technical development programme and management structure needed to open up the market are equally easy to picture. If this matter concerned a company policy, the next step would be a decision whether the company was interested in opening up that market, and whether corporate determination was to be applied to make the exercise a success. In a company such a decision is a matter for the Board.

For a country, decisions concerning initiatives and responsibilities are the ingredients of national policy. Without such decisions nothing else can happen. To fail to make even a proper assessment of the problem (of who can credibly take an initiative in energy conservation matters) is to fail on the very first rung of the policy-making ladder.

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Figure 1

Energy Consumption of Final Users in 1979 (Heat Supplied Basis) Percentage Share by Sector and Form of Energy

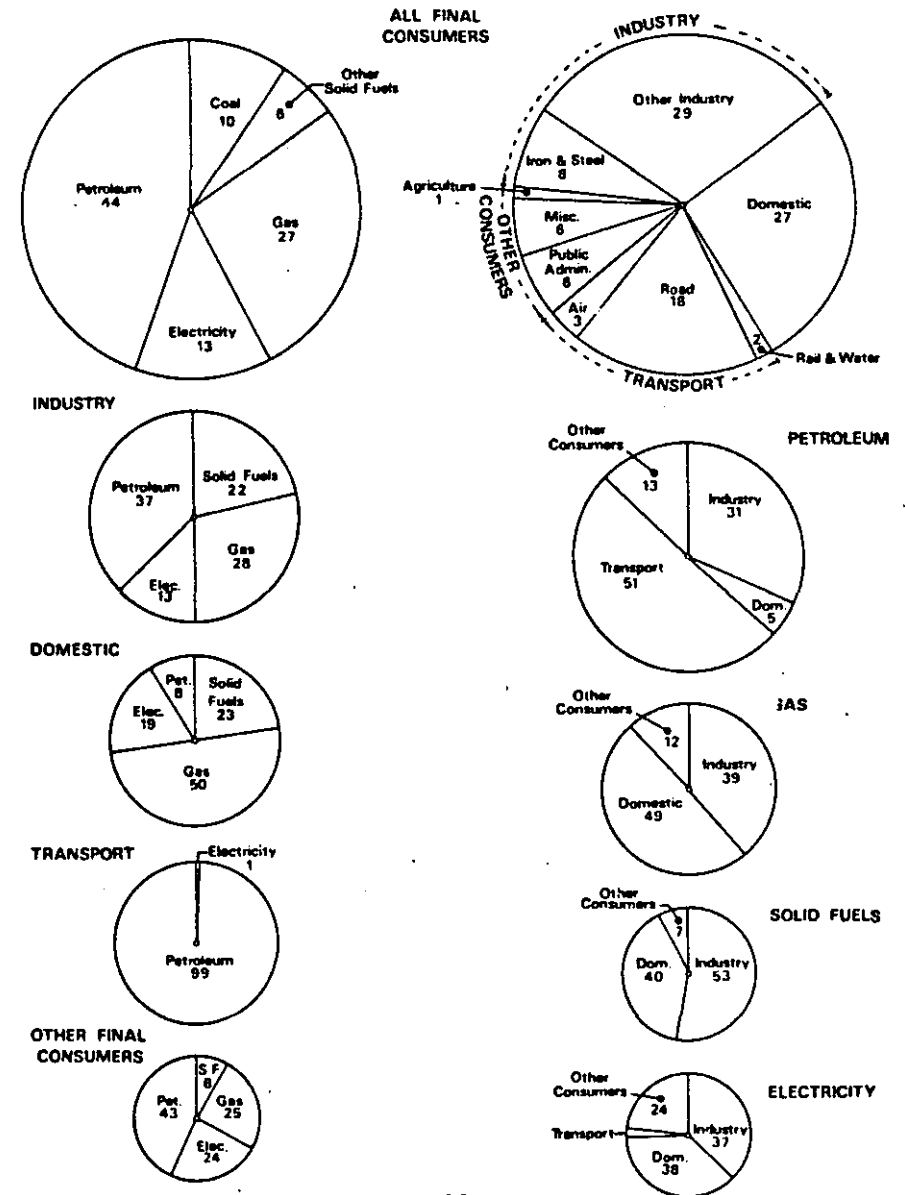


Figure 2

Energy Breakdown by fuels and end-uses, UK 1976

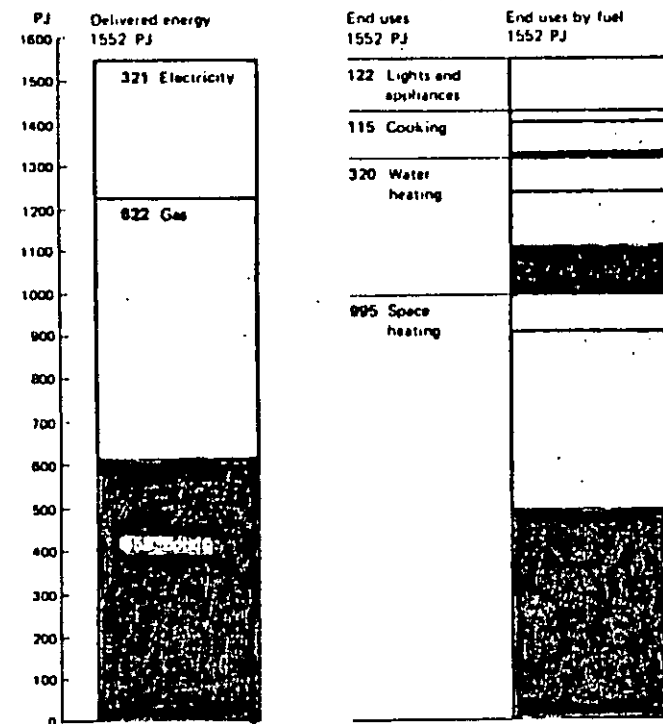
	Solids	Liquids	Gas	Elec.	Heat*	Percent Total
Low temperature heat (under 80C)	8.2	10.5	12.0	3.1	1.0	34.8
High temperature heat (over 80C)	7.4	7.5	6.5	1.1	2.5	25.0
Essential electricity**				8.1		8.1
Transport	0.1	20.8		0.2		21.2
Non-energy uses***		9.5	1.5			11.0
TOTAL	15.7	48.3	20.0	12.5	3.5	100.00

* Co-generation of heat and electricity in industry.

** Lighting, machinery, electrochemical processes, etc.

*** Chemical feedstocks, international shipping (bunkers), bitumen, lubricating oils, industrial spirits, etc.

Figure 3



Domestic sector delivered energy by end-use and type of fuel, 1975

Summary

1 This report reviews the scope for further energy conservation measures, other than through price mechanisms, to see whether additional specific proposals could be prepared for Ministerial consideration.

2 It does not cover combined heat and power or fuel consumption targets for new cars since these are being examined by other groups. Nor does it consider such wider questions as renewable sources of energy or depletion policy which are pursued elsewhere in the overall context of energy policy.

Need and scope

3 Over the last 12 months the Government has introduced a comprehensive 10-year programme costing £450 m over the first four years. These measures have won the United Kingdom a good reputation abroad.

4 The need to conserve energy has been stressed at successive Summit meetings. Conservation is now one of the three main components—the others being coal and nuclear power—of the Government's longer term energy policy. The Green Paper on Energy Policy (Cmd 7101) allows for a reduction in demand in the year 2000 of 60 million tonnes of oil equivalent (mtoe) through the effects of energy conservation.

5 A combination of higher prices and the 'Save It' campaign is thought to be saving up to 6 per cent a year, or 12.5 mtoe, and the programme is expected to produce additional savings of 11 mtoe a year after 10 years. As allowed for in the Green Paper, there is,

however, scope for considerable further savings. Some of these will be achieved by the response of consumers to rising prices which are expected to increase substantially (at least doubling in the case of oil) by the end of the century. In addition, consumer patterns of behaviour are likely to be influenced by the growing realisation that energy will be scarcer and dearer. In the period up to the year 2000 progressive improvements in Building Regulations and standards of appliance efficiency can also be expected. Nevertheless, if the full potential of energy conservation is to be obtained, continuing and sustained action by the Government will be required.

Recommended strategy

6 We recommend that this continuing Government action should be developed against a clear overall strategy made up of eight main elements:

(i) *economic energy pricing*: The level of energy prices should reinforce conservation measures and not work against them;

(ii) *information and motivation*: We are satisfied there will be a continuing need for a forceful information and motivation campaign if we are to achieve the necessary widespread change in attitudes;

(iii) *a good example from Government*: The Government is already giving a strong lead to the private sector but we recommend that more should be done to encourage energy conservation investment by the nationalised industries and through the National Enterprise Board

and the Scottish and Welsh Development Agencies;

(iv) *specialised advice and training*: The main need at present is to maintain existing or establish proposed schemes and, in the light of experience, to extend or supplement them;

(v) *energy efficiency standards*: We recommend the development and extension of British Standards and codes of practice and an urgent examination of a scheme for labelling appliances with their energy consumption;

(vi) *research, development and demonstration*: We consider these to be adequately funded at present but suggest a special study of the best means of stimulating microprocessor developments in the energy conservation field;

(vii) *mandatory measures*: and

(viii) *financial incentives*: both of which we deal with below.

Mandatory measures

7 We have examined the scope for mandatory measures in the light of the largely voluntary nature of the UK's approach so far to energy conservation. Regulations are unsatisfactory if they cannot be enforced and they are unlikely to be publicly acceptable in this area unless the danger of energy scarcity is widely recognised as being imminent or certain. That is not the position in the UK at present. Building Regulations present few difficulties of principle and we wish to see them progressively extended and improved, subject to the need to ensure that the standards proposed do not have undesirable side effects. But some other measures might be considered a serious infringement of the liberty of the individual. Mandatory measures would increase the burdens on industry and could in the short term operate against the immediate need to increase industrial efficiency and competitiveness.

8 We conclude that further mandatory measures, apart from extensions to Building Regulations, would not at present be appropriate in:

—*the domestic sector*.

—*road transport* where we believe progress in the immediate future can best be made by a combination of price and tax measures, voluntary fuel consumption targets for new cars and a vigorous campaign to influence driver behaviour. This progress will be assisted by the Government's recent decision to phase out Vehicle Excise Duty on petrol driven vehicles and recoup the lost revenue by increased petrol taxation.

—*industry and commerce*: A number of mandatory measures could be devised but we believe that the weight of the argument is against them at this stage. The position should be kept under review.

Financial incentives

9 Financial incentives increase the burden on the Exchequer and limit the availability of funds for other deserving causes. They can also subsidise investments which would have taken place in any case. On the other hand, there is evidence that both companies and private householders are unlikely to take full advantage of cost-effective investment opportunities unless they are given some inducement to do so. As a result worthwhile investment both to the company or individual and the country may not take place as early as it might, with the danger that the task of adjustment will be left too late.

10 The first scheme under the Homes Insulation Act 1978 came into force only on 18 September 1978. Without experience of its effect we consider it would be premature to take any fresh initiatives under the Act at this stage. The Energy Conservation Scheme, providing selective financial incentives for energy conservation investment in industry, commerce and agriculture, has attracted great interest in many sectors and promises to be a success. Both schemes are being monitored and should be kept under review.

Further measures

11 We have reviewed in detail the potential for further measures in the

main sectors of the economy and our suggestions are set out in the form of a check-list at Annex A. These are mainly minor measures to strengthen or develop existing policies or measures which do not require legislation.

Conclusions

12 We reach five broad conclusions:

- (i) the level of energy prices should reinforce conservation measures and not work against them;
- (ii) the main priority at this stage is to implement effectively the substantial programme of measures announced over the last 12 months;
- (iii) there are no serious gaps in the programme or major new initiatives which are required at this stage;
- (iv) the introduction of a significant element of compulsion, beyond a progressive extension of the Building Regulations, would not be appropriate at this stage, but the balance between financial incentives and mandatory measures should be kept under review; and
- (v) energy conservation is not a once and for all activity and cannot be achieved overnight. Policy and measures will need to be developed in the light of changing circumstances. Progress should be reviewed regularly and reported to Ministers.