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Energy and Purpose

Outline notes for lecture by Walter C Patterson

1. Despite all the recent controversy and concern about 'energy', no one wants 'energy' as' energy. People want comfort, nourishment, mobility, and so on. They accomplish these immediate purposes by a combination of three factors: ambient energy, fuel energy and energy conversion systems. Ambient energy is free but hard to control; fuel energy can he controlled but costs money. An energy conversion system takes ambient energy and fuel energy and combines them to produce the desired temperature level, or mechanical motion, or other physical condition required to achieve the underlying purpose.

2. Before 1973 planners tended to take the energy conversion system infrastructure for granted, and concerned themselves with 'fuel policy': provision of the various types and quantities of fuel energy to run the infrastructure, reliably and at lowest cost. After 1973, although 'fuel policy' was relabelled 'energy policy', it still tended to take the energy conversion systems for granted, and to seek 'alternative sources of energy' to run the same systems, to meet a forecast 'energy demand'. There grew up a jungle of inconsistent and contradictory concepts and terminology - 'millions of tons of coal equivalent of solar energy', and the like - confusing both the policy-makers and the public. Discussions tended to blur the distinction between the three factors mentioned in paragraph 1.

3. The distinction is, however, crucial for policy-making, as can be seen from a comparison of garbage with uranium as fuel, or a comparison of fossil-fuelled, nuclear and solar energy conversion systems as investments.

4. For policy-making the central question is that of priorities: how best to allocate resources, money, skills and time to achieve our social and personal purposes, and how to make the necessary choices and decisions. Arguments which insist on 'keeping all the options open' simply dodge the question of resource allocation and opportunity cost, and are no help to policy-makers.

5. Previous emphasis on 'fuel policy', however labelled, has meant hitherto that we have known very little about the fine structure of the end-use physical conditions we require to achieve our purposes: the temperature level, spatial distribution and time variation, mechanical power flow, portability of fuel and conversion systems and so on. Such data are now being collected and becoming available; and detailed analysis is revealing a range of policy options far larger than hitherto supposed.

6. The key feature of the new options is the possibility of improving the conversion infrastructure, to accomplish the same purpose with less fuel energy. This is the true significance of current thinking about 'energy conservation', although it is of course really fuel conservation. Properly conceived and executed, however, such 'conservation' is in no sense a sacrifice but rather a gain, in overall resource use and in less quantifiable attributes like 'energy security' and 'energy independence'.

7. If such strategic options are available, the question then arises as to how they compare with the 'supply'-oriented strategic options which have largely prevailed to date. Points for comparison include the relative technical and economic status of the various options, and their relative political feasibility. It can indeed be argued that the most pressing topics for energy research in the forthcoming decade are the

institutional problems confronting various energy strategies, and how they can be optimally resolved. The perceived advantages and disadvantages of various strategies are of course matters of considerable controversy. It is anticipated that they will figure prominently in the seminar session to follow this lecture.