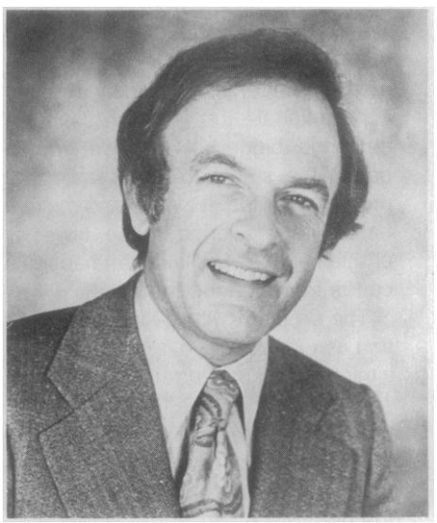
Energy Conservation: The Debate Begins

Critics charge that the Reagan Administration's free-market policies do not go far enough

The Reagan Administration's approach to energy conservation is simple and straightforward. Decontrol of oil and gas prices—one of the Administration's first moves—should spur investments in conservation and renewable energy resources, and the federal government should step aside and allow market forces to do their work. In keeping with this free-market philosophy, budgets have been slashed for conservation and solar energy programs and a slew of regulations have been targeted for elimination.



Conservation's champion

Representative Richard Ottinger

To many critics, however, the Administration's policy is not just simple, it is simple-minded. In a blistering attack on the proposals, for example, Thomas Stelson, head of conservation and solar energy programs in the Carter Administration, told a congressional subcommittee recently that the Reagan plans are "based upon ignorance with respect to both the free enterprise system and the energy conditions of the United States." Richard Ottinger (D–N.Y.), a congressional champion of conservation and solar energy, calls the new policy "misguided." The Administration's expectations, he says, "are not corroborated by any studies."

A major battle is shaping up as the energy budget and regulatory proposals wend their way through Congress. At the heart of the impending debate are very different views of the government's role in encouraging conservation and the use of renewable resources, and different perceptions of how much can be expected from a laissez-faire approach to energy policy.

A new twist to the debate is that the conservation proponents have adopted the Reagan Administration's free-market arguments and are trying to throw them back in its teeth. Generally, the conservationists agree with the lifting of price controls but say that the Administration has not gone far enough: it should also abolish all subsidies for conventional sources and nuclear power. In addition, they argue that direct government action is required to make the market work properly and to protect the poor from rising energy costs. These themes have been highlighted in several recent studies that point to a high payoff from investments in conservation.

These studies indicate that the United States could curb its appetite for energy while enjoying a healthy rate of economic growth. Indeed, the studies suggest that a vigorous conservation program will be essential for economic growth. As Roger Sant, who has been directing a major study for the Mellon Institute, quipped at a recent meeting in Washington, "the environmentalists have run into a paradox: their conservation strategy produces economic growth, and that is not what they had in mind."

The most ambitious—and most controversial—of these studies originated, ironically, within the federal government itself. A 1000-page document prepared by the Solar Energy Research Institute (SERI), it concludes that by the year 2000 the United States could cut its energy consumption by 25 percent, virtually eliminate oil imports, drastically slow down the construction of power plants, and derive some 20 to 30 percent of its energy needs from renewable resources. All this with an economic growth rate of around 3 percent a year.

SERI's message has not been greeted with unbridled enthusiasm in the Department of Energy (DOE), however. The study, which was commissioned in mid-1979 by former DOE Under Secretary John Sawhill at Ottinger's request, has yet to be published although it was completed several weeks ago. Last year, DOE officials tried to shut off funding for the study. They were reluctant, according to several sources, to have the study published before the election and there is now some unease with the prospect of DOE putting out a study that is so much at odds with Administration policy.

In an interview with *Science*, Ottinger called the delay in publishing the report "outrageous." Arguing that SERI's analysis should be folded into the congressional debate over the energy budget, Ottinger said that the energy subcommittee he chairs will print the document in mid-April and circulate it around Capitol Hill.

A few years ago, SERI's conclusions would have been dismissed as fantasy, but several other studies are now saying similar things. SERI suggests that, given policies that place investments in conservation and renewable energy resources on an equal footing with investments in conventional energy supply, the United States could require only about 62 to 66 Q (quadrillion British thermal units) of energy a year by the end of the century. Current consumption is about 80 Q a year. A few weeks ago, Marc Ross of the University of Michigan and Robert Williams of Princeton University published a study suggesting that demand could be cut to 64 Q by 2010. The National Audubon Society last week published its own analysis suggesting that 80 Q by the turn of the century is a reasonable goal. And, in the next few weeks, the Mellon Institute study directed by Sant will suggest a target of 88 Q by that date.*

All these figures fall well below the conventional wisdom about energy demand. DOE last week projected that U.S. energy demand would reach 102 Q by 2000, and the Edison Electric Institute (EEI) puts the midpoint of its projections at 117 Q by the turn of the century. It should be noted, however, that the conventional wisdom has changed significantly over the past few years (*Science*, 20 June 1980, p. 1353). Just 2 years ago, DOE was forecasting that the United States would need 122 Q in 2000.†

*Marc H. Ross and Robert H. Williams, *Our Energy: Regaining Control* (McGraw-Hill, New York, 1981); National Audubon Society, *Audubon Energy Plan* (New York, 1981). The Mellon Institute study will be published in late May, a preliminary version, *The Least-Cost Energy Strategy*, was published last year.

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The general level of agreement between the low energy growth studies may not be too surprising, since there is some overlap among the people working on them—a fact that has given rise to the term "conservation mafia." Although the methods of analysis differ from study to study, they are united on three general points. First, that decontrol of oil and gas prices is an essential first step in encouraging more efficient use of energy. Second, that a program designed to curb energy use will consume far less capital than one designed to boost supplies to meet rapidly rising demand. And third, that by using energy more efficiently, a healthy rate of economic growth can be maintained while holding down consumption. Most of the studies conclude, however, that simply boosting energy prices will not be enough: more direct government support is also needed. "The proposed budget cuts, based on the mistaken notion that all the government must do in a market oriented policy is decontrol oil and gas prices, would leave the nation's conservation program in a shambles," asserts Robert Williams.

The SERI study, which was put together with the assistance of scores of consultants, starts from the assumption that investments in energy efficiency and renewable energy resources should be treated in the same manner as investments in conventional energy supply. "We looked at policies from scratch," says Henry Kelly, who directed the study, "to see what would happen if investments are allowed to flow in the direction that produces the greatest rate of economic return." The result, if market forces were able to operate effectively, is that investments in efficiency would generally produce a higher rate of return than investments in energy supply, the study concludes.

The Mellon Institute study attempted to do the same thing. "We were a little more free market in our approach than SERI," says Steven Carhart, a leading investigator on the study, "but our results are in general agreement with theirs." According to Carhart, "there has been a lot of talk about what a free-market approach to energy would produce. Our numbers say that if you do have a free market in energy what you will see is a massive investment in energy productivity. The Reagan people seem to be saying that what you will see is a massive investment in supply."

†Energy Information Administration, *1980 Annual Report to Congress*; the Edison Electric Institute study will be published later this year, an executive summary, *Economic Growth in the Future-II*, is available from EEI.

The problem, however, is that the energy market is shot through with imperfections that impede the flow of capital into what may be the most economic areas. Most of the studies of low energy futures thus call for government involvement in the market to enhance its operations. And that, of course, is out of tune with the prevailing philosophy in Washington. What is needed, these studies maintain, are policies at federal, state, and local levels to ensure that market forces work to shift investments in the most effective direction.

In general, this means ensuring that energy prices reflect the real cost of energy supplies, that those making the investments have the information needed to make a wise decision, and that regulation be used sparingly to overcome gross deficiencies in the marketplace. In addition, say SERI and others, the federal government has responsibility for supporting research and development that industry is unwilling to fund and for mitigating the impact of rising energy prices on those who can least afford to pay them.

In the buildings sector, for example, both the SERI study and the Audubon Society report call for measures such as energy-efficiency labeling of buildings and appliances, the provision of low-interest loans or grants to weatherize houses for low-income families, and support for programs to train technicians in techniques for retrofitting houses. In some cases, regulations may be necessary. Because more than half the appliances used in the United States are bought by contractors or landlords rather than by their users, for example, market forces are greatly diluted and minimum performance standards may have to be imposed, the studies suggest. Many of these programs were started by the Carter Administration, but most have been eliminated or severely reduced in the Reagan budget proposals.

"For the Reagan Administration to say that market forces will take care of things is unrealistic," says Arthur Ro-

SERI's Low Energy Future

The SERI study, a copy of which has been made available to *Science*, breaks the U.S. economy into four sectors—buildings, industry, transportation, and utilities—and examines energy supply and demand in each of them separately.

The buildings sector offers perhaps the largest single area of savings, says SERI. Almost one-third of all the energy consumed in the United States is used to heat, cool, and illuminate buildings and to run appliances such as refrigerators and cooking stoves. This requires 13 Q of oil and gas directly and another 13 Q of primary energy converted to electricity. By 2000, SERI argues, investments in energy efficiency could reduce this demand by 8 Q and economic investments in solar technologies could cut the total by another 4 to 5 Q.

As for industry, higher energy prices are already leading to more efficient use of energy, and market forces can be expected to accelerate this process. But while most studies anticipate that industrial energy use will still rise significantly, along with industrial output, the SERI study argues that, with a mixture of tax changes and investment subsidies, energy demand in industry can be held roughly constant. The value of industrial output could grow by about 50 percent over the next two decades with little increase in energy consumption, SERI concludes, and industry could derive between 13 and 25 percent of its needs from renewable resources, chiefly biomass.

In the transportation sector, consumption of gasoline peaked in 1978 and most analysts believe that it has entered a long-term decline. The SERI study suggests that this decline can be accelerated in a cost-effective manner so that the energy required for transportation could be cut from the current level of 19.5 Q to between 12.6 to 16.5 Q by the end of the century. Moreover, it should be possible to meet 25 to 45 percent of those demands with alcohol, principally methanol derived from coal or biomass.

Like the other low energy growth studies, the SERI report argues that savings of these magnitudes will be cost-effective because, up to a certain point, investments in energy efficiency will save more energy than would be produced by an equivalent investment in energy supply.—C.N.

DOE/Jack Schneider

Maryland solar house

Better insulation and use of solar energy could slash energy use in buildings.

senfeld, director of the Energy-Efficient Buildings Program at Lawrence Berkeley Laboratory, who headed the buildings study for SERI. The market is highly imperfect, he says, and unlike the automobile industry, "there are no Japanese competitors."

In transportation it is a similar story. Market forces can be expected to push automobile fuel efficiency at a fairly rapid rate, but the free market may need to be augmented if the cost-effective level is to be achieved. The SERI study favors a "gas-guzzler" tax on inefficient automobiles when the fuel economy standards expire in 1985, and it argues for railroad deregulation coupled with higher road taxes for trucks to encourage use of trains for freight. The Audubon plan suggests that Congress require automakers to build new cars with an average fuel economy of 37 miles per gallon by 1990. The Reagan Administration argues that market forces will be sufficient.

As for industry, SERI has some novel suggestions for enhancing market forces. First, the correct price signals should be sent by removing all subsidies for conventional energy supplies. Beyond that, the federal government should consider imposing a tax on industrial energy use, says SERI. One problem with this approach is that it may bankrupt weak companies in energy-intensive industries. SERI therefore suggests that the energy taxes should be offset by a reduction in corporate income taxes and by a novel "scrap-and-build" program of direct subsidies to encourage energy-intensive industries to replace obsolete, inefficient plants. This program, suggests SERI, could be run by the Synthetic Fuels Corporation. Investments in more efficient plants would save more energy than they would produce if channeled into synthetic fuels facilities, the study argues.

The low energy growth studies are sure to encounter considerable opposition as the energy debate heats up in Congress during the next few weeks. The central objection to their findings is likely to come in two areas: their assumptions about the links between energy growth and economic growth and their expectations for limited growth in electricity consumption.

Throughout most of the postwar period, economic growth and energy growth went hand in hand, but during the 1970's that tight linkage was broken. In 1980, 11 percent less energy was used to produce a dollar of gross national product (GNP) than in 1973. Most experts expect this trend to continue, but there is much disagreement about how fast it will occur. The Audubon study, for example, projects a 50 to 80 percent increase in the ratio of GNP to energy consumption over the next two decades, while the EEI is expecting a more modest 22 percent improvement. SERI's figures, which are even higher, are based partly on the expectation that the energy intensity of the U.S. economy will shrink as the nation moves away from heavy industries toward more knowledge-intensive activities.

As for electricity growth, the EEI is again at the top end, suggesting that demand for electricity will probably grow at around 4 percent a year in the 1980's and 1990's. SERI argues, however, that with vigorous conservation and use of renewable resources, electricity demand is likely to stay flat or even decline over the next two decades. EEI's projection is based on the belief that consumers will continue to switch to electricity because of its convenience and cleanliness at the point of use.

The difference between these projections cannot be overestimated. EEI's growth estimate would require a major power plant building program. SERI's scenario would enable growth in electricity demand to be met and permit utilities to move away from oil and gas plants with virtually no new construction beyond that which is already under way. The Audubon plan, meanwhile, anticipates a 30 percent rise in demand for electricity, but it believes that most of it can be met through cogeneration of steam and electric power by industry.

The low energy growth scenarios see this slowdown in electricity demand as essential to maintain economic growth. Pointing out that fully 40 percent of investment in the United States now goes to energy production, the SERI study argues that this is diverting capital from more productive uses and is incompatible with healthy economic growth. SERI acknowledges, however, that the wide divergence in estimates for energy demand over the next few years places the utility industry in a precarious position. Already suffering from overcapacity in many regions and facing difficult problems in raising capital, utilities will pay dearly if they miscalculate the growth in electricity demand.

The critical battles over conservation policy are likely to be fought over other areas of the energy budget. Most observers accept the fact that government spending on energy programs will be cut this year, and thus supporters of conservation and solar programs will be looking for cuts elsewhere in the Administration's budget to shift more money into their favored programs. The chief target is likely to be nuclear power.

While proposing cuts of about two-thirds in spending on conservation and renewable resources, the Administration has proposed a 30 percent boost in support for nuclear power, chiefly the breeder reactor program. Champions of solar and conservation are employing the Administration's own free-market arguments to oppose this spending pattern. "I can't see why the federal government should be involved in synfuels or why the nuclear budget needs to be increased," says Steven Carhart of the Mellon Institute. "These things," he argues, "should stand or fall as business investments."

Pointing out that conventional energy supplies, including nuclear power, already enjoy subsidies amounting to more than $6 billion a year, while the tax incentives for conservation and solar power add up to less than $1 billion, Robert Williams argues that it is clear that "the fate of nuclear power is not being left to the invisible hand of the market."

Ottinger agrees. "I don't think it is realistically possible to increase the budget for energy," he says, "so I am hoping to restore some balance to it." Along with House energy committee chairman John Dingell (D–Mich.) and Philip Sharp (D–Ind.), Ottinger has proposed a bill that would slash the Carter Administration's energy budget by 40 percent—about the level recommended by Reagan—but apportion the cuts equally among DOE programs. Saying he is "realistic, not optimistic," Ottinger predicts that the final budget will come close to his proposals for conservation and solar energy.—COLIN NORMAN