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MAKING AN ENERGY CONSERVATION EXTENSION SERVICE WORK

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I'm an optimist. I believe we will resolve our energy problems in a fashion and in a time frame consistent with maintaining our high level of living. The evidence I have for this assertion is two fold.

First, a great deal of effort and money is going into basic and applied research in new energy technology. Nuclear, solar, and wind power cycles have tremendous potential. Many of the problems remaining are problems of engineering, not of science. For many of them—the breeder reactor, for example—we know from substantial scientific evidence and laboratory experimentation that solutions exist.

The second piece of evidence that we will solve our energy problems is to me the most convincing. At the same time it contains the core of our energy policy challenge. It is that many of the problems already are solved. The technologies already are available, but unutilized. There is no inventory of technologies, but there could be if we wanted to buy it.

Take solar energy for example. Solar is an "exotic" new source; or is it? There are companies now manufacturing solar collectors, converters, and related items for sale on the commercial market. Right now, you can order all you need for an entirely self-sufficient solar-powered community. Most of the customers are scientific and public institutions.

The demand is not very great. Moreover, the production is so limited that many of the items are backordered already. Perhaps more disturbing, all these systems suffer from little technical failures that require maintenance by specialists. Like color television during my childhood, many people are waiting for solar systems to have the "bugs" bred out of them.

Solar is plagued by other myths as well. For example, solar energy is believed to require large areas, unlike point sources such as coal, petroleum or hydroelectricity. The fact is just the reverse.

If you add up the land required for a power cycle—coal mine plus power plant, and so forth—you discover that commercially

available solar plants use several times less land per unit of installed capacity than other power cycles. Moreover, direct solar applications to space heating and cooling require almost no land—just roofs.

CONSERVATION AS A TECHNOLOGY

Perhaps a better example of an available exotic technology is conservation. Yes, why shouldn't conservation be considered a form of energy just like coal or petroleum or nuclear power? After all, if you are putting in a home heating system, you can install a 100,000 BTU furnace, or better insulation and a 50,000 BTU furnace.

Energy and conservation are interchangeable techniques. It is well known that we could use somewhere in the neighborhood of one half of the energy we now use and still maintain the same level of living. Conservation technology, too, is largely available, but underutilized. There is nothing exotic about it.

We know why these new technologies are underutilized—lack of information, lack of incentive, shortage of supplies, indifferent capital markets, intransigence by the fossil industry and its regulatory establishment, to name a few reasons. These things can be changed. It is in this area that an energy policy education program, and beyond that an energy extension service, has a central role to play.

The social, economic, and political institutions that mine, refine, and deliver our energy heavily favor the conventional fuels. The development and utilization of conventional technology is driven by a system permeated with entrepreneurial talent, from the gas station owner to the directors of Exxon, and buttressed with subsidies and supports from government. What is lacking is a similar set of subsidies and supports for new technology.

These are coming, however. Every session congress considers one or more bills to provide additional help.

THE ENERGY EXTENSION SERVICE

More germane to this group is the new and vigorous interest in congress to provide the nation with an energy extension service (EES) modeled on or at least sparked by, the agricultural extension service model. The new EES would provide the driving force behind the new technologies, just as private business provides the drive for the conventional fuels system. The initial legislation all but passed in the 94th Congress and seems very likely to pass in substantially the same form in the early days of the 95th.

ADMINISTRATION

Congress placed the overall national direction, review, and control of the proposed EES in the Energy Research and Development Administration, signaling its feelings that technology R & D should be mated directly with technology outreach. It authorized the creation of state energy conservation research laboratories, à la agricultural research stations, as additional backup for the service. Thus, at least in the statute, congress decided not to turn to one of our existing extension instrumentalities and add the energy conservation mission to its mandate.

But, congress chose to shape the Energy Conservation Service in the federalistic model of the Agricultural Cooperative Extension Service. It stated that "any federal outreach program should be organized with the states as full participants, and each state should plan and coordinate the outreach activities within the state, optimizing the use of existing outreach capabilities."

The significance of this statement is clear. As has been the case with agricultural extension, each state will develop its own, unique program, probably quite distinct from what the Washington mandarins of energy policy would prefer. Moreover, the role to be played by agricultural extension, the university, and the human services delivery systems is by no means foreclosed.

Thus in many states, especially rural states, the EES will become, and should become, a division of the agricultural extension service on a par with community resource development, 4-H, and the rest. This will only happen, however, if a case is made to the governor during his planning efforts required under legislation.

MISSION

The proposed statute reads in part:

> SEC. 904. (a) The service shall develop and implement a comprehensive program for the identification, development, and practical demonstration of energy conserving opportunities, techniques, materials, and equipment, including opportunities, techniques, or methods responsive to local needs or resources, and alternative energy technologies such as solar heating and cooling, for—
>
> (1) agricultural, commercial, and small business operations, and
>
> (2) new and existing residential, commercial, and agricultural buildings or structures.

> Such program shall provide for technical assistance, instruction, information dissemination, and practical demonstrations in energy conservation opportunities, and shall provide an active interface with end use energy consumers at the local level for the purpose of offering active outreach assistance and affording a communication channel for end user technology requirements. Such outreach assistance shall be provided by means of such appropriate local offices, including metropolitan city offices, county agents, and technical staff assistants, as may be required to provide energy extension services.

The intent of this statement of purpose clearly goes beyond the mere delivery of information on energy conservation to the promotion of conservation. It is in this area of implementation that energy conservation programs have to date been the weakest.

Principal among the differences between an information service and the successful EES would be the fact that the EES would be at the center of an industry—the conservation industry—and it would have to deal with proprietary product issues. This is not unlike agricultural extension where cautious and studied education involving specific proprietary products is commonplace.

THE CONSERVATION INDUSTRY

Although the conservation industry does not exist anywhere in a fully realized form, the institutions that must ultimately be built, to function within and in support of that industry, have their analogs in today's fossil fuel industry. These include exploration and discovery systems, production, equipment supply, financial supply, distribution and marketing, and various ancillary support systems including economic incentives, government regulation, professional education, licensing and recruitment. An EES, if it is to be relevant, must itself take on one or more of these functions.

In existing industries the above-mentioned institutions are permeated with a profit-making incentive. It is the motive force behind the system. In the conservation industry, the role of the profit motive is a critical question. The problem is that conservation must be generated on site. The decision to invest in conservation capital equipment has so far been made largely by conservation consumers.

Consumers in general do not make capital investment decisions on strict economic grounds. While investments in conservation

typically yield a minimum of 15% to 20% annual returns (fully competitive with most business opportunities), consumers seem to be unmoved until investment recovery periods shorten to a year and a half or less, i.e. 50% annual return.

Instead of inducing a demand for conservation investment, the consumer seems to translate the pressure of higher energy prices into demands for higher wages. The consuming mind is characterized by a higher discount rate than the investing mind.

Many have argued that the solution to this dilemma is to shorten the capital recovery period by raising the price of energy relative to conservation. But it is not certain that this can be done effectively for any but the scarcest and least substitutable fuels. Inflationary spirals, substitutions, austerities, black markets, and technological changes might be induced first.

A second proposed solution is to appeal to the non-economic motives of consumers, in addition to the economic. Spiritual motives are of deep interest to many conservation cultists and "Spartan hedonists." Other motives also have their appeal, such as an energy conservation lottery: "free kilowatts for life—if you don't need 'em, sell 'em back to the power company for an income of $1,000 a year for life". So far, neither of these approaches has had much success.

An alternative solution is to move the conservation investment decision at least partially from the consumer to entrepreneurs. To stimulate entrepreneurial activity, institutions must be created to permit the entrepreneur to benefit from conservation investment decisions. Thus a key function of any energy extension service would be to provide for entrepreneurship, in addition to supplying the information and expertise normally associated with technology dissemination programs.

Let me discuss other elements of a conservation industry that might help you as you assist your governor in developing an EES.

HOW DO YOU PROPOSE TO DISCOVER NEW CONSERVATION OPPORTUNITIES?

Conservation, like other energy resources, must be accessible both technologically and economically. Sea water is not accessible as an atomic energy resource because the fusion technology is not yet developed. The energy minerals of the moon are not resources because of the excessive cost of acquiring them. Similarly, conservation resources consist of accessible deposits, and those that are accessible will change as new conservation technology is introduced and the economic environment changes.

Conservation resources must be identified by exploration. Discovering new resources requires people and money. Other energy industries spend billions of dollars and use thousands of well-equipped, highly trained persons in exploration efforts supported by government. If the conservation industry is going to compete, a comparable institution of exploration must emerge.

WHO WILL OWN, MANUFACTURE, WAREHOUSE, AND SELL THE CONSERVATION MATERIALS AND TECHNOLOGY?

Conservation reserves must be exploited. Other energy industries involve complex bureaucratic organizations that convert raw energy reserves into finished consumer fuels. Some energy is delivered by profit-making corporations, while non-profit municipal utilities also have proven to work well. Large vertically-integrated oil companies exist side-by-side with small specialty companies.

The key organizational question is, who should derive the benefits from production, and how? There are a great many possible answers. For example, in a mandatory new building code the potential homeowner makes the investment in conservation technology and reaps the benefits.

One can imagine an institutional setting, however, in which the "right" to install insulation in a given area were franchised out to an individual (or corporation). He would install the material at his own expense under a long term lease with the owner. This idea is being experimented with now.

The question of which part of the production system of organizations should be public and which part should be private also seems a matter of choice. In the example above, one could just as easily imagine a proprietary, revenue generating, state or local public agency as the central actor in the production system.

One variation that has been successfully tried is to place a production program with a public utility. Denver's electric utility will install and finance insulation for its customers. An obvious extension of this program would involve the state requiring that additional light plant expansion be approved only if the service area met certain conservation standards. The utility could then be given limited eminent domain powers to enter upon its customer's property for the purpose of installing insulation, which it would own, à la telephones.

HOW WILL THE NEW TECHNOLOGY BE FINANCED?

Since conservation is produced at the site of use, not at a central plant from which it is distributed, the item requiring distribution is the capital required to produce the product. The capital

is in many cases relatively expensive. Financing might be necessary. Financing requires a willingness to lend and to borrow, a supply of funds, and a means to pay. Capital finance usually assumes the capital item would generate the revenue for debt service. The more certain the investment the more financable it is.

It may be important to take some of the risk and other difficulties out of the financing problem. One can imagine a public "energy conservation finance bank", a public improvement assessment district, or guarantees of the return on a conservation investment.

HOW WILL YOU GIVE THE NEW ENERGY CONSERVATION INDUSTRY ENOUGH SUPPORT TO SURVIVE IN THE MARKETPLACE?

The conservation industry must have at least the same level of tax incentives, subsidies and support as the rest of the energy industry. It must have additional support to promote its development as an infant industry in competition with giants.

In order to develop equivalent subsidies without an act of congress, states and localities could in their conservation plans establish conservation industries as tax-free corporations, and then subsidize them somewhat. Or, these corporations could be operated like some municipal utilities that receive no allocation of tax dollars for their operations.

The agencies might be given quite broad powers in the areas of finance, regulation, and eminent domain, as well as the powers characteristic of a municipal corporation. Additional subsidies could be given either to the agency (for example, for low interest or insured loans) or to its potential clients as an incentive to deal with it.

WHAT KIND OF EDUCATIONAL SUPPORT WILL THE NEW INDUSTRY NEED?

The conservation industry, like other energy industries, needs supporting institutions for education and recruitment. Conservation curricula in the regular educational system will ease the marketing job of the industry. It can also provide protection against charlatanism and fraud. In addition, once the industry is established, its professional employees will benefit from inservice and continuing education.

A vigorous industry professional society could also have a service role, such as developing and updating curricula materials for use in public schools, providing for job mobility of industry employees, and for their initial training and apprenticeship.

FINANCING—A LOGICAL ROLE FOR ESS

An ESS could be designed that would meet the institutional needs not now provided by existing interests. The availability of conservation technology is well developed, but the identification of specific conservation "deposits" is not. An EES could thus develop a capacity for identifying the quality and quantity of conservation opportunities, as for example, in the residential sector of a specific community.

Most importantly, an EES could bring a measure of entrepreneurial spirit to the conservation industry. The key is to create an EES that in some way supports the financing of conservation technology. This might involve the establishment of an energy conservation authority as a public municipal corporation with the power to borrow money. The EES would be an arm of the authority. The authority might undertake several programs. It might employ agents, or deputize existing outreach agents, to visit potential clients, (such as schools, farms, businesses, and individual residences) promote conservation technology, and offer to finance it.

The exact finance sales package would be tailored to the particular market, but could include such items as a guaranteed energy savings level, low interest rates, and no collateral. Sales and installation would remain in the private sector. The authority could guarantee savings easily if clients paid a fixed monthly fee to the authority for both debt service and energy. Any losses on the guarantee could be handled by adjusting the monthly fee to develop a positive cash flow.

Such an authority could be set up by state or local legislation. Much the same effect could be achieved by establishing an EES and contracting for financing with local banks, local housing authorities, or even special public service and assessment districts, provided that the EES would assume some of the loan risk.

Any approach must involve building some implementation capability into the EES, in addition to its advisory capability. To simply dispense information is not enough. An effective EES will have to adopt some necessary function within the conservation industry itself. Since no institution is currently providing adequate financing for conservation, it is a natural function to be picked up by the EES.