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PRIVATIZING FEDERAL ENERGY RESEARCH

INTRODUCTION

The recent congressional vote to cancel funding for the Clinch River Breeder Reactor is just one of a string of events underscoring that there is something seriously wrong with the federal government's role in energy research. Despite the expenditure of tens of billions of public and private dollars, more and more government inspired projects are being abandoned as unworkable economically.

These costly failures should force Congress to ask some basic questions: Could it be that the problem is not with the specific research projects themselves, but with the whole notion of federal energy research? Is it possible that the real solution lies not in more and more federal money, but in transferring the responsibility to the private sector, where the market--not politics--is the dominant force? Could it be that the answer is to return the full responsibility for energy research to the private sector?

The facts strongly suggest that "privatization"--the systematic transfer of federal activities to the private sector--is indeed the proper direction to take. Not only would privatization bring the practical expertise and market sensitivity of the private sector to bear on energy problems, but it could realize an annual saving to the American taxpayer of at least \$2 billion. More important, it would serve to depoliticize energy research, so that commercial merit, instead of political pressure, would become the criterion for funding.

There are, of course, some problems with a policy of privatization, and these should not be overlooked. A mechanism must be created, for example, to ensure that research data are made available to all. Jointly funded private research also raises

questions of antitrust factors. Many would argue, on the other hand, that the existing antitrust laws discourage private research and need to be reformed. Furthermore, some means must be found to finance industry-wide research in an equitable fashion. And then there is the question of what should be done with federal projects already under way.

These and many other questions must be answered before privatization can take place. Fortunately, however, a model already exists that holds many of the answers: the Electric Power Research Institute (EPRI). This institute provides a prototype, which could be applied throughout the energy industry, enabling Congress to place the responsibility for research where it truly belongs--in the private sector.

BACKGROUND

Federal energy research changed fundamentally in the decade following the 1973 oil embargo. Previously, federal energy research had focused primarily on basic science, but the panic-stricken atmosphere of the post-embargo period gave rise to a new class of programs: the so-called commercial demonstration projects. In its determination to "do something" about the energy crisis, the government created these programs with little regard to the fact that they represented an unprecedented federal intervention in the energy market and the usurpation of a function traditionally reserved for the private sector. Even more disturbing, this abrupt change in policy was accompanied by the rapid growth of federal energy research budgets and the inevitable politicization of the budget process.

During the middle and late 1970s, the word "energy" seemed to cast a spell over congressional budget committees. No price seemed too high, no technology too marginal, to warrant massive federal support. Congress eagerly voted funds for programs ranging from relatively straightforward activities, like the creation of a Strategic Petroleum Reserve, to such outlandish ventures as a program to gasify chicken guano--all in the name of energy independence. The unquestioning, "cost be damned" attitude that prevailed in the halls of Congress at the time was perhaps best illustrated when President Carter's ambitious (albeit ill-fated) \$88 billion program to establish a domestic synthetic fuels industry was enacted by both Houses of Congress and signed into law in just a little over three months.

Fortunately, those days of panic action seem to have subsided, and a new mood of fiscal restraint has taken hold in Washington. Energy is no longer the sacred cow it once was, and for the first time in a decade, legislators are beginning to question the wisdom of spending billions of taxpayer dollars, sight unseen, on energy projects that have at best only a marginal chance of success. In keeping with this growing budgetary skepticism, the entire scope and nature of the federal government's involvement

in energy development has come under close scrutiny, with increasing numbers of legislators asking whether a broad range of programs currently conducted by the federal government might not better be left to the private sector. This transfer of programs to their proper place in the private sector lies at the heart of a thorough reexamination of federal research policy now taking shape in Washington. One thing is already clear. In privatization lies the first real hope of bringing the runaway federal energy research budget under control.

There are a number of conclusions that can be drawn from the country's decade of experience with extensive government involvement in research, and these help to provide a framework for determining the proper federal role. The first is that the federal government should continue to have a limited, but important, presence in energy research, both as a patron of basic science, and as the sponsor of programs involving national security. Nuclear programs in particular need some federal involvement, due to the unique nature and military importance of nuclear materials, and because there is a continuing need for government supervision of their manufacture and use.

A second inescapable conclusion is that commercial demonstration projects will be far less likely to win congressional support in the future than they were in 1970s. Congress has finally become aware of the inherent flaw in the logic underpinning federal encouragement of commercial demonstrations: that is, the notion that the law of supply and demand can somehow be repealed through legislative fiat, in order to force a new technology into the marketplace prematurely. Experience gained at great cost shows that this approach simply does not work. Despite the expenditure of massive amounts of taxpayer dollars, little has been gained through commercial demonstrations. And because private sector funds were also involved in many of these demonstrations, it is possible that they might actually have undermined, rather than enhanced, the nation's energy security, by diverting scarce capital and manpower from more worthy applications.

In recent months, numerous government inspired projects have been abandoned. Exxon, for example, has given up its shale oil project in Colorado, taking a pre-tax loss of nearly a billion dollars. The Great Plains Gasification project--the recipient of a \$2.1 billion government loan guarantee--now says that it cannot survive unless additional federal help is forthcoming. And the Clinch River Breeder Reactor, the most controversial energy project for many years, has just been denied further funding by Congress, after more than a billion dollars of taxpayers' money was spent on the demonstration plant. The conclusion is clear and unpleasant. Billions have been spent on such demonstrations, which have produced little except embarrassment, at a time when risk capital for conventional energy research has been in short supply.

Between the two poles of basic research and commercial demonstration, however, lies a gray area where experience shows that the appropriate federal role is difficult to identify. This area includes activities ranging from bench-scale testing to the construction of small pilot plants. It would also include the development of those technologies intended primarily for military use that might also have civilian applications. Ideally, most of these research programs would be performed by the private sector, but a combination of factors has caused many of them to fall under the federal aegis. A policy of privatization, therefore, must provide a mechanism for transferring research to the private sector, but it must first distinguish the boundaries of legitimate federal activities.

WHAT SHOULD BE PRIVATIZED?

There are two methods that could be used to determine the appropriate roles for the government and private sectors. The first is on the basis of fuel type (fossil, nuclear, etc.), and the second is on the basis of research purpose (such as commercial demonstration, pilot-scale plant, or bench-scale test). Some blend of these approaches is likely to be necessary in each case. If this framework is used, a number of obvious targets for privatization emerge.

Demonstration Projects

All commercial demonstration projects should be conducted by the private sector. Not only have these projects traditionally been undertaken by private organizations, but government commercial demonstration projects--dating from the attempt to create a synthetic rubber industry during the second World War--have been singularly unsuccessful. Among the projects falling within this first category for privatization would be all of those undertaken by the Synthetic Fuels Corporation, together with the Clinch River Breeder Reactor and solar energy demonstration projects.

Commercial demonstrations account for a major portion of the federal energy research budget, and they are by far the most questionable type of energy research for government involvement. Yet nearly \$20 billion has been authorized just for the first round of synthetic fuels demonstration projects, and the Clinch River Breeder Reactor alone will account for \$1.2 billion of the federal nuclear research budget. If these technologies are really commercial, the private sector should be willing to fund them.

It must be remembered that commercial demonstration plants are supposed to be full-scale facilities that will turn a profit. They cannot properly be called "research projects" any more than a prototype production model of an automobile can be called an experimental vehicle, or a new soft drink, agricultural research. Commercialization comes after research is completed. It is not part of genuine research.

Pilot Plants

A second category of projects that should be left to the private sector is the construction of pilot-scale plants--although there may be occasional exceptions to this general rule where nuclear technology is concerned because of security considerations. These exceptions would cover facilities to enrich uranium, reprocess spent fuel, or in some other manner produce fissionable nuclear materials. The rationale for continued federal involvement in these pilot plants is the need for tight government controls over nuclear materials that could be diverted to nonpeaceful uses.

Fossil Fuels

Another activity suitable for privatization is all government sponsored research on fossil fuels. Firms that produce and market these commodities are more than capable of conducting the necessary research. To suggest that the government should supplant well-established commercial-sector research verges on the ludicrous.

Most major firms engaged in the production and marketing of fossil fuels maintain active and well-funded research divisions in order to stay competitive. These divisions are far better suited to determining research needs than are government employees--who are neither engaged in the day-to-day operations of the energy business nor subject to the economic reality of the marketplace. Furthermore, federal efforts to "steer" research in the area of fossil fuels have led to a number of stellar failures, resulting in damaging losses to the private sector. For example, a number of companies invested hundreds of millions of dollars in synthetic fuels projects at the government's urging only to later abandon them and lose their investments. Similarly, many firms were encouraged to invest in tertiary oil recovery programs, only to discover, too late, that their investment would prove unworkable economically.

Not only have these government inspired research efforts squandered taxpayer dollars but they have inflicted serious losses on the private sector as well. Clearly all research into fossil fuels, such as oil, gas, coal, and oil shale, should be left entirely to the private companies, which have more than enough experience, expertise, and resources to do the job.

Commercial Development

A final, catch-all category would include research projects concerned primarily with the commercial aspects of a technology. This would include product testing (other than safety tests), the development of new products (such as the electric vehicle program), and all the other activities left to private concerns in other industries.

ACHIEVING PRIVATIZATION

Having decided which of those research functions currently undertaken by government, should be returned completely to the private sector, it is necessary to consider how best to implement a program of privatization.

A number of problems immediately emerge. There is the question of ensuring continuing and consistent funding for projects with long-range horizons. Energy research is characterized by long periods of time between the launching of a project and the creation of a commercially viable technology. Typically, energy research also requires very heavy expenditures before it is clear that there will be a usable product, and often only the largest firms can undertake this risk and cost. Even the large companies occasionally find their resources severely strained by research and development.

Another problem is the cross-fertilization of information. Science thrives on the free exchange of ideas. Ensuring that this flow takes place must be a key part of any strategy aimed at promoting private research and development.

EPRI-A Possible Model

These problems should not be minimized, but they do not present an insurmountable barrier to privatization. A model exists that can serve as an example of how they can be overcome.

The Electric Power Research Institute (EPRI) was formed by the electric utility industry to meet its need for long-term research and development. The institute has been at the forefront of the search for new methods to generate electricity, and it has made major contributions to pollution control, power plant safety, and energy efficiency. With an annual budget of nearly a quarter of a billion dollars, EPRI brings the best scientific and technical talent to bear on the nation's energy problems in facilities using the most up-to-date equipment. Since its budget is raised through voluntary contributions from roughly 80 percent of the nation's electric utility companies, no single firm has to shoulder an undue financial burden. In fact, the EPRI contribution assessed from each of the member companies amounts to only about 0.3 mill (a mill is one-one thousandth of a dollar) per kilowatt hour of electricity. Considering the typical return on their EPRI research dollars, the contribution is one of the most worthwhile investments the companies make.

EPRI is a particularly attractive model for privatizing other types of energy research because its financing mechanism amounts to a de facto user fee. Since it funds research by a charge on electricity consumption, EPRI ensures that the cost of research is shouldered by each consumer in direct proportion to the benefits the consumer is likely to receive. This approach is simple, efficient, and equitable, and it is readily adaptable to other forms of energy research.

Creating an Energy Research Trust Fund

The concept of an industry assessed user fee would be appropriate in adapting the EPRI model to other areas of research. Energy companies would become members, on a voluntary basis, of an industry-wide energy institute, and pay a fee based on the energy consumption of their customers. It is important to assess the fee at the point of end use in order to avoid double counting. Otherwise a fee could be charged on coal used to fire a utility boiler, say, and yet another fee on the electricity produced by the same coal. In this example, the fee would be assessed on the electricity consumed, not on the coal. Conversely, if the coal were used in a steel smelter, a fee would be levied on the smelting company.

Although the research organization would be a nonprofit corporation, chartered by Congress and provided with an antitrust exemption, its funds would not be subject to congressional review (any more than are those of a university). The fund, which might be called the Energy Research Trust Fund, would be governed by a board of directors representing the various energy industries, large energy consumers, and the scientific and technical community. The board would have sole authority over the projects to be undertaken and their priority. This would ensure that the direction and focus of research would reflect the energy market, rather than the politics of the moment.

After the fund were established, there would be a period during which the projects currently under way at the Department of Energy (DOE) could be assumed by the new research unit. DOE's research would be phased out, except for programs involving basic science or nuclear weapons, and all research data, engineering designs, software, and components previously acquired for DOE projects would be transferred to the Energy Research Trust Fund for a token fee. This would create an incentive for the institute to continue worthwhile government projects. Since very little salvage value could be recovered from most of these projects, the government would be foregoing minimal revenue by charging only a token fee.

The fund could also undertake research for local utilities by providing a centralized facility and scientific staff and lowering overhead costs. This cooperative effort would create considerable economies of scale, thereby realizing great saving for utility customers.

Although membership and contributions to the Energy Research Trust Fund would be voluntary, there would be a great incentive for companies to join. First, all members would share in the research results without additional cost. Second, firms who were members would have an enormous competitive advantage over those who were not. And since the government would no longer be engaged in these research activities, companies could not count on receiving free scientific data, while the taxpayer paid the bill.

Providing the fund with an antitrust exemption would be important, since it would enable firms to pool information and resources, thus creating a mechanism to undertake expensive commercial demonstration projects on a joint venture basis. Without such an exemption, many of these would not be built, because the cost and risk is beyond the resources of any single firm.

ADVANTAGES OF PRIVATIZATION

Depoliticization

The advantages of privatization are many, but one of the most important is that by returning energy research to the private sector it will be depoliticized. Far too many federally supported energy research programs are undertaken because of the political strength of their supporters, instead of their scientific merit. No technology has been immune. All have their partisans.

Even within a particular technology, certain types of research have been subject to political pressures. For example, solar power satellites have been blocked by environmentalists who otherwise support solar energy. Similarly, the high-temperature, gas-cooled nuclear reactor has suffered from underfunding, thanks to the political clout of advocates of more conventional designs. Privatization would eliminate these political pressures.

Businessmen and Bureaucrats

A second advantage of privatization is that, by placing energy research decisions in the hands of people who must deal with the day-to-day realities of the energy market, more appropriate research would be conducted. At present, huge amounts of money are frittered away on energy research, which fits the agenda of Washington bureaucrats, while projects that would benefit consumers and the industry are starved of funds. Although it would be incorrect to assume that all of the research advocated by the private sector would yield beneficial results, hard-nosed businessmen are less likely to miscalculate the energy market than are energy department officials.

Improved Incentives

A third benefit of privatization is that the incentives in the private sector are the opposite of those in the public sector. Private sector researchers must justify their expenditures to managers and stockholders. They must demonstrate progress in order to receive continued funding. Since most private sector firms consider research and development an ongoing function within their companies, there is no "project" mentality. Private industry researchers, in other words, generally do not live with the fear that their departments will be eliminated once the task at hand is completed.

This is not the case with government research. When a government project is complete, funding disappears, and so do the jobs of researchers. Consequently, there is no real incentive to finish anything. The whole process becomes a sophisticated game designed to justify job-retaining delays and cost-overruns.

Stability of Funding

A related advantage of privatization is that it would lead to stable funding for projects with long-range horizons. A paradox of federal research is that while it is not product or profit oriented, the political nature of the process jeopardizes virtually every project that does not come to fruition within a relatively short term. The reason for this is that congressional budget committees must think in terms of the annual budget cycle, and so each project is reexamined every year. As a result, funding is never certain from one year to the next.

A classic example of this problem can be seen in the case of the Clinch River Breeder Reactor. Congressional vacillation helped to produce a staggering increase in the reactor's cost. Regardless of the specific merits of Clinch River, the project's time frame of over twenty years virtually guaranteed that it would encounter difficulties with Congress at some point.

Other long-term projects have suffered from congressional whipsawing. In the end, it is always the taxpayer who suffers. By placing research in the hands of a private sector entity with a stable funding base, this annual budget debate would be ended, and long-term projects could be undertaken with some degree of certainty that funding would continue throughout the life of the project. It would also eliminate the constant empire building of the congressional budget process, where committee and subcommittee chairmen seek to enhance their jurisdiction and prestige by increasing the budgets of the agencies in their domain, whether or not such increases are warranted.

Reducing the Federal Budget

The most important advantage of privatization, however, is that it would be a decisive step toward bringing the runaway federal budget under control, while actually improving a service now undertaken by government. Once the private funding mechanism were established, political considerations would no longer result in huge outlays for energy research of dubious merit. The immediate annual savings in federal outlays could amount to \$2 billion, but future savings could be much greater. Moreover, privatization would mean that the beneficiaries of research would shoulder the burden, instead of the taxpaying public.

CONCLUSION

In the final analysis, privatization makes sense from both a scientific and an economic standpoint. The Electric Power Research Institute model would create a mechanism able to overcome the barriers now posed by the antitrust laws, and provide a mechanism for sharing the information so vital to the growth of scientific investigation. Transferring energy research back to the private sector in this way would serve to depoliticize energy research, stabilize funding, and ensure that research priorities are appropriate to the real needs of the energy market.

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