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Direct Action on Oil

We have a variety of options, both immediate and long-term, for reducing dependence on OPEC.

Energy policy is once again taking a prominent place on the national agenda, but not because there is much concern about our energy problems. Although low oil and gas prices may be setting the stage for another round of energy shocks, few outside the energy business seem to care. After all, we like paying as little as possible for energy, and it would be surprising for our leaders to suggest we do otherwise.

The rise of energy policy is due rather to energy's role in other issues—climate change, acid rain, and international competitiveness. Because politicians and the public do see a need to deal with these problems, improving energy efficiency, promoting the use of natural gas, developing alternative automotive fuels, demonstrating clean coal technologies, reinvigorating the nuclear option, and funding more research in conservation and renewable energy sources are all getting increased attention. In effect, we get an energy policy, but one that is not a response to energy problems.

There is nothing much wrong with this agenda, and one can confidently expect action in Washington to implement a good part of it. Even so, the situation is unsettling. For we still have an energy problem—an oil problem mainly—and more direct action is needed to manage it properly.

The oil problem lies in the prospect that demand for oil from the Organization of Petroleum Exporting Countries (OPEC) will grow, creating an unacceptable dependence on an unstable part of the world. The standard scenario is based on the observation that OPEC, and especially the Arab Gulf states, controls vast, low-cost oil reserves. In contrast, non-OPEC, noncommunist world reserves are increasingly difficult—and costly—to find and develop. As a result, non-OPEC oil production capacity will slowly decline, absolutely as well as relative to OPEC.

While production is declining, the story goes, noncommunist or Western world oil demand will inexorably rise. Demand growth will be fairly rapid at currently low oil prices, as experience following the 1986 price collapse demonstrates. But projections by the

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***TABLE 1* Years Before OPEC Oil Production Reaches 80 Percent of Capacity**

Non-OPEC oil supply (annual rate of change)	Noncommunist world oil demand (annual rate of change)		
	0.5%	1.0%	1.5%
-0.5%	16	10	7
-1.0%	14	9	6
-1.5%	10	7	6

Source: John F.Mungo, vice president, Citibank. OPEC production capacity is assumed to be 30 million barrels per day.

Department of Energy and others suggest oil demand will still grow at prices up to $30 per barrel or so—twice the price prevailing in late 1988. Of course, an even higher price would finally halt this growth, but such a high price is unlikely until after the world becomes excessively dependent on OPEC.

This combination of demand growth and slowly declining non-OPEC production will sooner or later sop up excess OPEC production capacity. At some point, usually said to arrive when OPEC is producing at about 80 percent of its capacity, trouble begins. At this level OPEC will be able to allocate production quotas among its members in such a way that no member will be likely to break ranks by selling more oil. Disciplined control of supply will enable OPEC to keep prices high and effectively control the market.

The future is unlikely to be as simple or as stark as this standard scenario suggests. Nevertheless, the world is moving in this direction, and the concern is real enough to warrant action. We therefore need to deal with first things first—to develop an energy policy that responds to energy problems before it tackles other issues.

Setting the right goals

After two decades of trying, we have not even gotten straight on the goals of energy policy. For example, reducing U. S. oil imports is not a sufficient goal. Unless other countries also reduce their demand for OPEC oil, the U.S. oil supply will remain at risk in our interdependent world. Likewise, energy policy will never provide an escape from the political turmoil of the Middle East. OPEC will always be a major supplier of world oil and we will always have an interest in the stability of the Middle East. Thus, economic and foreign policies have a major role to play in managing problems that oil dependence creates.

The chief goal of energy policy should be to hold worldwide demand for OPEC oil well below OPEC's production capacity. In the long term, this requires developing and deploying technology that permanently reduces our reliance on oil. Nearer term, the objective is to buy time for technology and other policies to work. The immediate question, then, is whether we can buy enough time.

Relatively small changes in the rate of change of oil supply and demand can have a significant impact on the time we have to act. According to recent studies by the Department of Energy (DOE) and Chevron, average annual demand growth for the period 1986–1995 should fall in the range of 0.8 percent to 1.3 percent, and supply is projected to decline at the rate of 1.5–2.0 percent per year. At these rates, we have between 6 and 10 years from 1985 before OPEC again becomes an effective cartel. It is this line of reasoning that lies behind the commonly heard forecast that the energy problem becomes critical in the early to mid-1990s.

But a look at Table 1 shows that we could do better. In general, if demand growth can be kept under 1.0 percent per year, and if supplies decline at a similar rate, the day of reckoning could be pushed out past the end of the century. Technically, it is entirely possible to achieve this result. For example, the Department of Energy estimates that a price increase to $27 a barrel would reduce annual demand growth to 0.6 percent and slow the decline in supply to 0.2 percent annually. These rates would give us 18 years of relatively manageable oil markets. And a couple of decades should allow us to make some serious permanent adjustments in the energy system.

Buying time

Given this statement of energy policy goals, it is not too difficult to identify the opportunities for buying time.

Reduce the use of oil in transportation, especially in the United States. This is an old but still important objective. The transportation sector accounted for 50 percent of total 1985 oil consumption in the

***TABLE 2* Oil Consumption in OECD Countries by Sector in 1985** (Quadrillion Btu)

	Transportation	Industry	Residential/ commercial	Utilities	Total
United States	19.5	7.7	2.6	1.1	30.9
Western Europe	9.8	7.4	4.7	2.3	24.2
Japan	2.4	3.2	1.3	1.9	8.8
Canada	1.6	0.9	0.4	0.1	3.0
Other OECD	1.3	0.5	0.0	0.3	2.1
Total	34.6	19.7	9.0	5.7	69.0

Source: *Energy Security* (U.S. DOE, 1987).

***TABLE 3* Sources of Energy Conservation in Japanese industry**

	Percentage of total energy saved	
	1973–1979	1979–1983
Industry structure	7	43
Value added	55	12
Technology	8	27
Other	30	18

Source: Institute of Energy Economics, Tokyo, Japan.

countries of the Organization for Economic Cooperation and Development (OECD). Transportation uses of oil in the United States alone accounted for 28 percent of the OECD total (see Table 2). Furthermore, the problem is worsening; OECD use of oil for transportation grew by 16 percent between 1973 and 1985. Significantly, the increase was only 8 percent in the United States, but 28 percent in the rest of the OECD countries, which indicates that as important as the United States is, it cannot solve the problem alone.

Reduce industrial oil use in the OECD countries. The industrial sector consumed 29 percent of total OECD oil in 1985 (almost 60 percent of all uses other than transportation). But doing something about industrial energy use may not be easy. For one thing, this sector has already done quite a bit; half of the net decline in total imported oil use between 1973 and 1985 came from industry. To judge how much more is possible, it is useful to first understand how industry has accomplished what it has already done.

Although the literature on this important subject is surprisingly sparse, it appears that industrial restructuring and new technology played the major roles in reducing oil use by industry. Consider Japan's experience: After the first oil shock in 1973, the major contributor to decreased energy intensity was increasing the value added in industrial production (see Table 3). Japanese companies found that they could produce a high-performance $800 VCR for about the same energy input as a low-end $200 model. They therefore abandoned many of their less expensive product lines and focused their efforts on manufacturing and selling more expensive models, thus enabling Japan to increase the value of its industrial output without using more energy.

After the second shock in 1979, however, more fundamental changes took place, which resulted in saving three times as much energy. Over 40 percent of the savings between 1979 and 1983 came from industrial restructuring, which essentially means shutting down the most energy-intensive sectors of the economy—a phenomenon often called "hollowing." New, energy-efficient production technology also played a major role, accounting for 27 percent of the conservation effect.

If industrial restructuring and new technology were the major factors leading to reduced energy demand, then we must wonder how much more industry can do. How much more restructuring, for example, is possible if the most energy-intensive industries have already been hollowed? And how much new technology will be deployed merely to save energy, particularly at today's low oil prices? In fact, OECD performance in reducing industrial energy intensity could be less impressive than we think. If, for example, Japan now imports the aluminum ingot it once produced, the energy content of its final output of aluminum-containing products may have changed little. All that may have happened is that the energy consumed to produce aluminum is being recorded on

the books of another country—perhaps a developing country with less efficient technology.

Contain the use of oil in developing countries. These countries will play a much larger role in determining worldwide demand than they did between 1973 and 1986. For one thing, the base is larger; in 1973, the non-OECD countries accounted for only 16 percent of total noncommunist world oil use, but in 1987 they accounted for nearly 27 percent. Furthermore, the projected rate of growth of oil demand of these countries remains high, especially in the industrializing countries of Asia.

How well developing nations manage their oil use depends to a large extent on the actions of the developed countries. One critical link is the availability of capital and technology for energy projects. A recent study by the Atlantic Council of the United States, an organization of high-level foreign policy analysts from government and industry, suggests that over the next 10 years some $80 billion per year of investment will be needed in the energy sector of the developing countries, including about $55 billion for electric power generation. For comparison, between 1975 and 1981, U.S. private investment in gas and electric utilities averaged about half this level, and U.S. GNP per capita was over 10 times that of most developing countries. Clearly, supplying capital for the energy sector in developing countries is beyond their internal capacity, and is no small challenge for the industrialized world.

Stabilize non-OPEC oil production. The standard scenario assumes that non-OPEC oil will be harder and more expensive to find and produce, leading to a gradual erosion of non-OPEC oil production. This is a perfectly respectable hypothesis, but not the only feasible one.

The most prominent dissenter is William Fisher of the University of Texas, who argues that U.S. production levels could remain stable for 25 years at prices below $25 per barrel (see *Issues,* Winter 1988). He bases his argument on two observations. First, he notes that recent history shows no evidence of the exponential decline in U.S. oil and gas production thought to be the inevitable consequence of relying on smaller, higher-cost reserves. Second, Fisher argues that the discovery and recovery of oil can be made more efficient with a better understanding of the geosciences of reservoirs and advanced technology for gaining access to them. Fisher estimates that the total resource could more than triple. Of particular interest is the calculation that unswept mobile oil—that is, oil that can be recovered without expensive enhanced oil recovery techniques—grows by almost a factor of 5.

Note that these are resource data, not production data. However, Fisher argues that, on the basis of these much larger resources, production levels could remain constant for many years. He also points out that a similar circumstance exists for natural gas, which is a prime candidate for replacing oil. And while Fisher's analysis is based on U.S. data, there is nothing in it to suggest that its conclusions be limited to this country.

Of course, Fisher could be wrong, but it seems that this hypothesis is solid enough, and certainly important enough, to warrant serious investment in the research needed to verify it. Nor does this argument depend solely on Fisher. Others, including DOE's Energy Research Advisory Board, have independently concluded that a much stronger push in geosciences research holds promise for arresting the decline in U.S. oil production.

From goals to actions

Policies to achieve our energy goals will be most effective if they are founded on two fundamental insights: Energy is a global problem that must be addressed in cooperation with other countries, especially the developing countries; and energy policy serves several masters, including diplomatic, economic, and environmental concerns, and must be integrated with other policies.

The first and perhaps most important step toward a successful energy policy should therefore be to recognize these facts. To do so would require the Department of Energy to take a broader view of the problem than it generally does. It should enlarge the scope of its policy analysis to understand the reciprocal effects between energy and other domestic and foreign policies. Similarly, it should give increased attention to policies for helping developing countries avoid excessive oil dependence. Thus armed, it should become a more forceful advocate for energy policy within the major policy councils of government.

A second step in developing energy policy is to understand that energy is a problem that we must

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manage over the long haul, not a crisis to be solved and forgotten. Accordingly, it is essential to put in place the institutions and incentives that over time encourage the actions more likely to make our management of the energy problem successful. Among the most important such steps are the following:

Establish industry-government partnerships to develop and deploy energy technology. For several good economic reasons, the private sector tends to underinvest in new energy technology, especially on the demand side. At the same time, experience shows that government rarely succeeds in picking winners in the marketplace. The institutions that have succeeded are partnerships, such as the Electric Power Research Institute and the Gas Research Institute. Such hybrids are hard to create and manage, but their importance makes the effort worth attempting. The geosciences research program noted earlier, for example, would benefit from such a partnership, as would DOE's clean coal technology program.

Encourage electric and gas utilities to invest in energy efficiency. Much of the problem in deploying energy-efficient technologies in the residential and commercial sectors is that an initial investment is required to buy future savings. Some utilities have helped by providing capital for the investment and sharing in the resulting savings. But in many states, regulations make it impossible for utilities to profit from energy conservation efforts. For example, many states do not allow utilities to include conservation investments in the rate base, and others require that all operating savings be passed along to the consumer. Reforming regulation to allow utilities to profit from conservation investments would be a step in the right direction.

Consider a gasoline tax. Dealing with the federal budget deficit may mean new taxes, and if so, a gasoline tax is a logical first choice. From an energy standpoint, it is the one action that draws a direct bead on the transportation fuel problem in the near term. More generally, the imposition of a gasoline tax would be a powerful signal that energy still matters. And, since it raises a billion dollars for every penny of tax, a tax of, say, 50 cents per gallon would have a powerful effect on both oil demand and the budget deficit.

Absent gasoline taxes, automotive fuel efficiency standards should remain in effect. The difficulty with these standards, which have helped improve efficiency, is that they punish manufacturers for failing to attain the target average efficiency for all cars sold even though manufacturers cannot completely control sales. If consumers disproportionately favor a company's large cars over its most efficient small cars, the company's average mileage can fall below the standard. If we are to rely on standards, this problem needs solving.

Provide incentives for energy technology exports. Other countries need our energy production and conservation technologies, and we need to cultivate international outlets for them. Developing countries are often the best initial markets for new technologies, such as solar photovoltaic cells. Selling these devices helps our trade balance and builds domestic capability to supply our own future needs for advanced technology. Considering the potential benefits, DOE should be pressing hard for programs aimed at promoting energy technology exports.

Taking the first steps

The actions outlined above would establish an institutional framework for the long-term management of the energy problem. Within this framework are four more specific steps that should be undertaken now. Each is designed to provide options we need to buy even more time with future energy policy.

Fill the Strategic Petroleum Reserve. The SPR is an in-the-ground inventory of oil that can be used in the event of disruption in world oil supply. It is our best insurance against future oil price shocks, and the time to fill it is while prices are low. A reasonable target is 1 billion barrels, about twice the size of the current SPR and a third again larger than the current target.

Increase funding for geosciences research. As noted earlier, the Fisher hypothesis is worth testing. Something like $100 million over several years, spent cooperatively with industry, should be sufficient.

Demonstrate an alternative automotive fuel. We need to have an economical alternative fuel, such as methanol or ethanol, that also satisfies environmental requirements. This means getting the technical, infrastructural, and regulatory underbrush cleared away now. In fact, given that the technical characteristics of ethanol and methanol are fairly well known, most of the problem lies in passing regulatory muster and getting the supply system in place. Although the merits of ethanol versus methanol are still debated, long-run economics seem to favor methanol—it can be made from natural gas or coal, with gas being the cheaper and more environmentally benign option. Since only modest inroads of methanol would cut the growth in gasoline demand enough to make a real difference in the amount of time we can buy, relying on natural gas should not be a problem.

Keep electricity generation options open. This includes clean coal, nuclear, and renewable energy sources. Although they will not displace much oil in the near term, these options have to be available to keep future generation capacity away from oil, especially in developing countries.

None of these steps conflicts with present efforts to use energy policy to resolve nonenergy problems. Indeed, for the most part, they reinforce such efforts. But an energy policy that does not first address the energy problem would only exacerbate all the other problems to which energy contributes. While energy policy deserves a high place on the national agenda, it should be there for the right reasons.

Recommended reading

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